Interdisciplinary teamwork and technological innovations:
A winning approach to pressure ulcer management

Organised by the European Pressure Ulcer Advisory Panel (EPUAP) Local Organising Committee with support from Bambino Gesù Children’s Hospital, Research Institute, Unit of Plastic and Maxillofacial Surgery, International Society for Pediatric Wound Care (ISPwW), Italian Association for Pressure Ulcers (AIUC), Italian Nursing Society for Wound Care (AISLeC) and World Union of Wound Healing Societies (WUWHS).
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Dear Colleagues,

It is our immense pleasure to welcome you to the 20th Annual Meeting of the European Pressure Ulcer Advisory Panel (EPUAP) in Rome!

We are delighted that for the next 3 days the Eternal City will become a meeting point for over 600 researchers, clinicians, health professionals and industry representatives from all around the world brought together to discuss the latest developments and innovations in the field of pressure ulcer prevention, treatment and care.

The EPUAP 2018 annual meeting is organised in partnership with: the Bambino Gesù Children’s Hospital, the largest paediatric hospital and research centre in Europe; the International Society of Paediatric Wound Care (ISPeW); the Italian Association for Skin Ulcers (AIUC); the Italian Nurse Association for the Study of Cutaneous Wounds (AISLeC) and the World Union of Wound Healing Societies (WUWHS).

The theme of this year’s conference is “Interdisciplinary teamwork and technological innovations: A winning approach to pressure ulcer management” and the key topics include, among many others, the following: innovations in pressure ulcer prevention, neonatal and paediatric pressure ulcer management, negative pressure wound therapy, incontinence-associated dermatitis and biomechanics and aetiology. The EPUAP 2018 scientific programme has been accredited by the European Accreditation Council for Continuing Medical Education and assigned 14 European CME credits.

In line with the 2018 conference themes, EPUAP and Bambino Gesù Children’s Hospital will jointly present the new EPUAP and Bambino Gesù Children’s Hospital Paediatric Award in order to recognise significant research/clinical work done in the field of pressure ulcer prevention and treatment for neonatal and paediatric patients.

In addition to the rich scientific programme, the exceptional historical venue of the Angelicum – Pontifical University of Saint Thomas Aquinas, located in the heart of Rome, is the setting for the conference. Its Orangery garden and the Hall of the Columns will host a number of interactive sessions, workshops and lunch with experts. Last but not least, the EPUAP & Bambino Gesù Roma Walk will take place around the Colosseum in order to raise awareness of the pressure ulcer problem and highlight the impact upon patient quality of life.

In the unique location, you will experience the spirit of the Italian capital: the impressive mixture of the omnipresent masterpieces of art history and the vibrant present.

Welcome to Rome!

On behalf of the European Pressure Ulcer Advisory Panel and the EPUAP 2018 Local Organising Committee

Prof. Jane Nixon, EPUAP President
Prof. Guido Ciprandi, Chair of EPUAP 2018
The “European Pressure Ulcer Advisory Panel” was created in London in December 1996 to lead and support all European countries in the efforts to prevent and treat pressure ulcers. At its inaugural meeting in London in December 1996, which included experts from many European countries, the group of over twenty agreed their mission statement and the initial Executive Board and Trustees.

The mission

“To provide the relief of persons suffering from or at risk of pressure ulcers, in particular through research and education of the public and by influencing pressure ulcer policy in all European countries towards an adequate patient centred and cost effective pressure ulcer care.”

A very important activity for the EPUAP is our annual conference. These meetings are aimed at bringing together clinical care practitioners, researchers and people from industry, to discuss the current status of the problem in Europe and the world and to discuss new developments in pressure ulcer prevention, treatment and care.

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Marco Romanelli, WUWHS President
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Valentina Vanzi, Skin Care Team, Gesu’ Children’s Hospital
Mario Zama, Head Plastic Surgery Unit, Bambino Gesu’ Children’s Hospital
Rosa Rita Zortea, AISLeC President

EPUAP membership
The EPUAP involves people working in the field as doctors, nurses and other health professionals, but also members working in research and education or in industry. We all have a single goal, and that is to find out what is the best way to prevent and treat pressure ulcers.

WHY BECOME AN EPUAP MEMBER?
• Receive regular information related to pressure ulcer prevention and management
• Benefit of a special EPUAP member registration fee at the annual meeting
• Get advice on issues related to the prevention and treatment of pressure ulcers
• Get advice in your daily practice upon the implementation of the guidelines.
• Receive important publications from our corporate sponsors
• Networking opportunities with other professionals from the same or related fields
• Share your projects and information about pressure ulcers with other members
• The opportunity to join regional or local projects and get support from the EPUAP

EPUAP Business Office
Vodičkova 12/5
120 00 Prague 2, Czech Republic
Tel: +420 251 019 379, office@epuap.org
www.epuap.org

Follow EPUAP on LinkedIn, Twitter, Facebook
Bambino Gesù

The Bambino Gesù Children’s Hospital is the largest paediatric hospital and research center in Europe, with connections to leading international centers in the sector. The hospital has a staff of almost 2,600 including physicians, researchers, nurses, clinical technicians and office staff.

In 1985, the Bambino Gesù received recognition as an Istituto di Ricovero e Cura a Carattere Scientifico (IRCCS – Institute for Research, Hospitalization and Health Care) and it ranks with other hospitals at an international level, sustaining research and clinical trials for innovative treatments alongside healthcare services.

Children are the Focus
The Bambino Gesù Children’s Hospital is known as the hospital for children and the hospital of the Pope.

Mission
Our hospital was established in 1869 through an act of love by a family that was aware of the needs of less fortunate children - the Salvati family. The project, which started as a room with four beds, has, over the years and thanks to the efforts of thousands of staff members, reached the point where today our hospital which is owned by the Holy See, is a work dear to the heart of the Holy Father.

A child’s life should not only be about their illness
Our focus on every detail is designed to be "child-centered", for children who find themselves, not by choice, living a part of their lives in a hospital ward. This is why the Bambino Gesù offers a true “Welcome Treatment” that includes a variety of services: hospitality homes, hotel accommodations, game rooms, relax areas for mothers, "guardian angels", a donor milk bank, cultural-linguistic mediators, and social workers.

To read more about BAMBINO GESÙ CHILDREN’S HOSPITAL, please visit the OBG website www.ospedalebambinogesu.it.

ISPeW

The goals of the International Society of Pediatric Wound Care (ISPeW) are to:
• set global standards for the assessment and treatment of pediatric wounds of varying etiologies;
• provide a forum for international, interprofessional collaboration among healthcare professionals, researchers, educators and industry leaders dedicated to the care of pediatric wounds;
• promote and support clinical research focused on the prevention, assessment and treatment of pediatric wounds;
• collaborate with wound care organizations worldwide on pediatric wound care issues and
• provide evidence based pediatric wound care education to healthcare professionals, parents and lay caregivers.

For more information please visit: www.ispew.org
AIUC

Over the last years “skin ulcers” - also known as “chronic wounds” - (whether venous, arterial, diabetic or hypertensive) have become more and more important also due to the growing elderly population and their chronic and disabling diseases. Chronic wounds represent an increasingly crucial clinical care problem, which is often disabling and difficult to approach.

Thanks to the work of renowned experts in the field, the Italian Association for Skin Ulcers is committed to acting as a meeting forum as well as a national point of reference for all those who have to tackle skin ulcers on a daily basis.

The Association aims at sharing state-of-the-art knowledge in terms of research, physiopathology, diagnostics and treatment of chronic wounds. A clinical-diagnostic interdisciplinary approach combined with competence, humbleness and enthusiasm is key to addressing this problem. Continuous studying and researching is a vital condition which underpins the notion that in order to be informative, you have to be able to act with competence and eagerness to learn. Always.

For more information please visit: www.aiuc.it

About AISLeC

The goals of the Italian Nurse Association for the Study of Cutaneous Wounds (AISLeC) are to:
• improve the quality of care to individuals with cutaneous wounds
• develop scientific and systematic research on wound care
• foster wound care Best Practice dissemination within Healthcare Institutions
• promote educational meetings and technical advice for Wound Care Corporations

For more information please visit: www.aislec.it

About WUWHS

WUWHS is the premier wound care professional association and presents more than 90% of all practicing wound care specialist in the world. The Association’s top priority is to raise and maintain the standard of the medical practice of wound care and improve its practice.

For more information please visit: www.wuwhs.com
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<tr>
<th>Time</th>
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<tr>
<td>08:00</td>
<td>Registration area ➤ Registration, badge and bag collection</td>
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<tr>
<td>08:00–09:00</td>
<td>Exhibition area ➤ Morning coffee &amp; tea</td>
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<td>09:00–10:00</td>
<td>Plenary session</td>
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<tr>
<td>10:00–11:30</td>
<td>Key session 1: Interdisciplinary, interprofessional teamwork, combined with technological innovations: A winning approach to pressure ulcer prevention and management for all age groups</td>
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<td>11:30–13:00</td>
<td>Lunch break, exhibition viewing ➤ Lunch with experts 1: The role of biomechanics in pressure ulcer prevention and treatment</td>
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<tr>
<td>12:00–14:00</td>
<td>Key session 2: Multidisciplinary pressure ulcer prevention and treatment for our most fragile patients: From premature to elderly patients ➤ Key session 3: IAD: The GLOBIAD experience and the team concept ➤ Free paper session 1: Teamwork and pressure ulcer prevention and management in specific patient groups: Spinal cord, intensive care, operating room, elderly, palliative and disabilities (1) ➤ Industry workshop 1 ➤ Specialist session 1: Pressure ulcer and malnutrition: A health problem for hospital inpatients: Supporting pressure ulcer care</td>
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<td>14:30–15:30</td>
<td>Poster area ➤ Poster presentations A</td>
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<td>15:30–16:30</td>
<td>Exhibition area ➤ Coffee break, exhibition viewing</td>
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<tr>
<td>16:30–18:00</td>
<td>Key session 6: Biophysical agents in pressure ulcer treatment: Novel therapies ➤ Key session 7: Medical device related pressure ulcers: Aetiology, research and clinical practice to enhance prevention among persons of different ages and in different settings ➤ Free paper session 2: Basic science: Biomechanics and aetiology &amp; Biophysical agents in pressure ulcer treatment: Novel therapies ➤ Free paper session 3: Teamwork and pressure ulcer prevention and management in specific patient groups: Spinal cord, intensive care, operating room, elderly, palliative and disabilities (2) ➤ Industry workshop 2 (16:30 - 17:30)</td>
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<td>18:30–20:30</td>
<td>Exhibition area ➤ Welcome reception</td>
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<td>07:00–08:00</td>
<td>City of Rome &gt; EPUAP Roma Walk</td>
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<td><strong>Key session 8: Negative pressure wound therapy in paediatric and adult patients</strong></td>
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<td>10:00–11:00</td>
<td><strong>Key session 9: Allied health professionals’ perspectives of pressure ulcer prevention</strong></td>
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<td>Exhibition area &gt; Coffee break, exhibition viewing</td>
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<td>11:45–12:45</td>
<td><strong>Key session 11: EPUAP Quality Improvement Projects Awards</strong></td>
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<td>12:45–13:15</td>
<td>Exhibition area &gt; Lunch break, exhibition viewing</td>
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<td>13:45–14:15</td>
<td>Annual General Assembly of the EPUAP</td>
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<td>14:15–15:15</td>
<td><strong>Key session 13: EPUAP-EWMA joint patient safety session</strong></td>
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<td>15:15–16:15</td>
<td><strong>Key session 14: EPUAP Experienced and Novice Investigator Awards 2018</strong></td>
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<td>Exhibition area &gt; Coffee break, exhibition viewing</td>
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<td>17:00–18:00</td>
<td><strong>Key session 15: Innovations in pressure ulcer prevention bundle: Patient safety, quality of care, evidence based practice and policy</strong></td>
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<td>20:00</td>
<td>Villa Aurelia &gt; Conference Dinner</td>
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<td>10:00–10:45</td>
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<td>10:45–12:15</td>
<td>Expert teamwork: A</td>
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<td>12:15–12:45</td>
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**Friday | 14 September 2018**

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**STOP PRESSURE ULCERS**

15th November 2018

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**How can you get involved?**

- Host educational activities on prevention and treatment of pressure ulcers
- Organise awareness raising events to share information about pressure ulcers
- Reach out to your local community to inform them about pressure ulcers
- Make policy makers aware about pressure ulcers
- Join Stop Pressure Ulcers community on Social media

Download support material for free at: [www.epuap.org](http://www.epuap.org)

EPUAP Business Office: office@epuap.org, +420 251 019 379.
For more information follow EPUAP on [LinkedIn](https://www.linkedin.com), [Twitter](https://twitter.com), [Facebook](https://www.facebook.com)
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<td><em>Chairs: Jane Nixon, Guido Ciprandi</em></td>
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<td></td>
<td>- Opening ceremony - Opera of Rome Theater Orchestra, Italian Music of Ennio Morricone</td>
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<td>- Welcome by the EPUAP President</td>
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<td>- Welcome by the EPUAP 2018 Chair</td>
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<td>- Welcome by the President of Bambino Gesù Children’s Hospital</td>
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<td>- Overview of the Scientific Programme by the Chair of EPUAP Scientific Committee</td>
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<td>10:00–11:30</td>
<td>Key session 1: Interdisciplinary, interprofessional teamwork, combined with technological innovations: A winning approach to pressure ulcer prevention and management for all age groups</td>
<td>Aula Major (Plenary Hall)</td>
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<td><em>Chairs: Lisette Schoonhoven, Marco Ramanelli</em></td>
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<td></td>
<td>- Interdisciplinary interprofessional teamwork skills and passion: How to influence performances and outcomes; Guido Ciprandi, Italy</td>
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<td>- A team picture story: A documented homage to the invisible; Christina Lindholm, Sweden</td>
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<td>- Technological innovations and biomechanics: Development and optimisation in pressure ulcer prevention; Yohan Payan, France</td>
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<td>11:30–13:00</td>
<td>Lunch break, exhibition viewing</td>
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<td><em>Lunch with experts 1: The role of biomechanics in pressure ulcer prevention and treatment:</em> Cees W. J. Oomens, The Netherlands; Amit Gefen, Israel</td>
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<td><em>Lunch with experts 2: How to enhance the integration of evidence and guidelines into practice:</em> Jane Nixon, United Kingdom; Zena Moore, Ireland</td>
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<td>13:00–14:30</td>
<td>Key session 2: Multidisciplinary pressure ulcer prevention and treatment for our most fragile patients: From premature to elderly patients</td>
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<td><em>Chairs: Marco Cavallini, Nils Lehmann</em></td>
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<td>- Patient-centred care: A call to action for wound management; Ellie Lindsay, United Kingdom</td>
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<td>- Pressure ulcer prevention and treatment in fragile patients: A clinical perspective for a paediatric population; Anna Barbara Schüer, Switzerland</td>
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<td>- Wound care teams for preventing and treating pressure ulcers; Zena Moore, Ireland</td>
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<td>- Myths and reality in the prevention and treatment of pressure ulcers in very old patients: A multidisciplinary approach; Sylvie Meaume, France</td>
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<td><em>Key session 3: IAD: The GLOBIAD experience and the team concept</em></td>
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<td><em>Chairs: Alison Porter-Armstrong, Charlie Beetham</em></td>
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<td></td>
<td>- Ghent Global IAD Categorisation Tool (GLOBIAD): From the beginning to the team-assisted scientific paper; Karen Van Den Bussche, Belgium</td>
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<td>- Introduction of a new Minimum Data Set (MDS) for incontinence-associated dermatitis (IAD); Dimitri Breckman, Belgium</td>
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<td>- The Ghent Global IAD Categorisation Tool: Next steps; Jan Kottner, Germany</td>
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<td><em>Free paper session 1: Teamwork and pressure ulcer prevention and management in specific patient groups: Spinal cord, intensive care, operating room, elderly, palliative and disabilities (1)</em></td>
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<td><em>Chairs: Valentina Dini, Marie-Line Gaultier-Dahan</em></td>
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<td>- Limitations of prophylactic film dressing for intraoperatively acquired pressure ulcers in spinal surgery patients. Investigation before the BOSS trial term; Narihiko Ohara, Japan;</td>
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<td>- Effect of cushions for usual/sports wheelchair on elite Japanese male wheelchair basketball athletes; Nao Tamai, Japan</td>
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<td>- Epibole causing delayed wound healing in trochanteric pressure ulcers in spinal cord injury patients; Srirnivasa Budthi, United Kingdom</td>
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<td>- Intersdisciplinary teamwork in prevention and management of pressure ulcer for people with spinal cord injury; Gunnbjørg Aune, Norway</td>
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<td>- Paediatric wound care in PICU: A 4 years survey; Giancarlo Antonielli, Italy</td>
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<td>- Reduction of pressure ulcer incidence in medical-surgical adult intensive care unit: Implementing the guideline recommendations; Maarit Ahtiala, Finland</td>
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<td><em>Industry satellite symposium 1</em></td>
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<td>14:30–15:30</td>
<td>Coffee break, exhibition viewing</td>
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<td>15:30–16:30</td>
<td>Key session 4: Journal of Tissue Viability &amp; Clinical Biomechanics Award</td>
<td>Aula Major (Plenary Hall)</td>
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<td><em>Chairs: Dan Bader, Yohan Payan</em></td>
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<td>- Evaluation of the impact of a therapeutic educational program concerning the prevention of risk of pressure ulcers for persons with a spinal cord lesion; Sandrine Robinneau, France</td>
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<td>- A novel high-throughput device for cell deformation reveals differences in cell membrane permeability between myotubes and myoblasts in vitro; Lisa Tucker-Kellogg, Singapore</td>
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<td>- CI-NPWT: An essential tool for pocket complications involving cardiac implantable electronic devices in children; Guido Ciprandi, Italy</td>
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<td>- Development and evaluation of simplified Finite Element model for pressure ulcer prevention in sitting posture; Pierre-Yves Rohan, France</td>
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<td><em>Key session 5: Basic science: Biomechanics and aetiology</em></td>
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<td><em>Chairs: Corrado M Durante, Peter Worsley</em></td>
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<td></td>
<td>- Current understanding of the aetiology of pressure ulcers; Cees W. J. Oomens, The Netherlands</td>
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<td>- The development of a pressure ulcer conceptual framework; Jane Nixon, United Kingdom</td>
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<td>- Preventing pressure ulcers by manipulating cell dynamics: Mechanobiology-inspired innovation in pressure ulcer prevention; Amit Gefen, Israel</td>
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<td><em>Industry workshop 1</em></td>
<td>Colonne Hall</td>
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Thursday | 13 September 2018

**07:00–08:00**
EPUAP Roma Walk  
City of Rome

**08:00**
Registration, badge and bag collection  
Registration area

**09:00–10:00**
Key session 8: Negative pressure wound therapy in paediatric and adult patients  
*Chairs: Paolo Persichetti, Luigino Santecchia*

- Simplified, portable, canisterless NPWT-systems: A leading technology with psychological optimal benefits; Valentina Dini, Italy
- Use of negative pressure wound therapy to prevent surgical site infection (SSI); Steven Jeffery, United Kingdom
- Healing effects on neonatal and paediatric wounds treated with a negative pressure wound therapy: No more into the black list for small patients; Guido Ciprandi, Italy
- Healing with NPWT: The state of the art in 2018; Luc Teot, France

**16:30–18:00**
**Key session 6: Biophysical agents in pressure ulcer treatment: Novel therapies**
*Chairs: Charlie Beetham, Corrado M Durante*

- Technology update on electrical stimulation and wound healing; Michael Clark, United Kingdom
- Photobiomodulation (PBM) in tissue repair and wound healing; Marco Ramanelli, Italy
- Efficacy of laser therapy at different wavelengths on pressure ulcers and its effect on serum levels of IL-6, TNF-a and IL-2; Jakub Tanadaj, Poland
- Indications for exogenous energies: Topical oxygen and hyperbaric oxygen; Pasquale Longobardi, Italy

**Key session 7: Medical device related pressure ulcers: Aetiology, research and clinical practice to enhance prevention among persons of different ages and in different settings**
*Chairs: Maarit Ahtiala, Peter Worsley*

- Medical device-related pressure ulcers: Aetiology and research in adult, paediatric and neonatal settings; Amit Gefen, Israel
- Clinical observations and prevention in young populations: How to organize a nursing team fighting against medical device-related pressure ulcers in babies; Anna Schneider, Switzerland
- Undue pressures, materials and positions: Exploring the complex world of medical device-related pressure ulcers in adult patients. Is there a place for “Smart materials”?; Dan Bader, United Kingdom
- Are medical devices in a steady state of evolution? The more sophisticated the device, the wider the spectrum of associated pressure injuries. We need to change the culture to enhance the prevention of medical device related injuries among complex patients; Serena Crucianelli, Italy

**Free paper session 2: Basic science: Biomechanics and aetiology & Biophysical agents in pressure ulcer treatment: Novel therapies**
*Chairs: Yohan Payan, Cees W . J. Oomens*

- Dry skin in home care and pressure ulcer risk: A multi-center prevalence study; Andrea Lichterfeld-Kottner, Germany
- CGRP contribution in adaptive adjustments of skin blood flow to pressures: A protection against pressure ulcers; Bérengère Fromy, France
- Corynebacterium striatum as an emerging multi-drug resistant, nosocomial opportunistic pathogen associated with chronic skin wound infection; Edoardo Virgilio, Italy
- Comparing the effects of 3 different pressure ulcer prevention support surfaces on the structure and function of heel and sacral skin: An exploratory cross-over trial; Andrea Lichterfeld-Kottner, Germany; Tsenka Tomova-Samitcheva, Germany
- Innovative pressure ulcer prevention: Cell dynamics agents for mechanobiological protection; Daphne Welhs, Israel
- Mini-invasive drainage to treat pressure ulcer deep recesses; Marco Cavallini, Italy

**Free paper session 3: Teamwork and pressure ulcer prevention and management in specific patient groups: Spinal cord, intensive care, operating room, elderly, palliative and disabilities**
*Chairs: Carina Aabth, Ulrika Källman*

- Migration of retained dressing materials causing non healing pressure ulcers in spinal cord injury patients: A case report; Srinivasa Budithi, United Kingdom
- Pressure ulcer prevention and intervention for patients undergoing lumbar spinal fusion surgery; Birgitte Shawgaard, Denmark; Merete Lebeck Holm, Denmark
- Telemedicine between a rehabilitation center and nursing homes or home: Results after 650 teleconsultations for patients with heavy disabilities suffering from chronic wounds; Sandrine Robineau, Sweden
- A nationwide point prevalence of pressure ulcers in critically ill patients. The national French PRESSURE study: PREvalence of preSSure Ulcers in intensive care units; Brigitte Barrois, France
- Real-time feedback of pressure points during surgery: A pilot study; Eva Sving, Sweden
- Developing a decision making tool for nurses to improve end of life skin care for advanced cancer patients: A qualitative exploratory study; Mary Litchford, United States of America

**Industry workshop 2** (16:30 - 17:30)

**Welcome reception**
### Industry satellite symposium 2

**Specialist session 2: When updating guidelines for clinical practice, the paediatric population should not be forgotten**

*Chairs: Lisette Schoonhoven, Jan Kottner*

- The NPUAP, EPUAP, PPPIA pressure ulcer guidelines; Jan Kottner, Germany
- Updating the EPUAP, PPPIA, NPUAP guidelines 2019; Katrin Balzer, Germany
- Paediatric guidelines development in Costa Rica; Gemina Carvajal, Costa Rica

**Student free paper session 1**

*Chairs: Katrin Balzer, Valentina Vanzi*

- Soft tissue deformations under the weight-bearing sacrum while using a prophylactic dress in combination with support surfaces; MRI studies; Lea Cohen, Israel
- Durability of prophylactic dressings subjected to moisture is critical for effective pressure ulcer prevention; Dafna Schwartz, Israel
- Investigating the effects of simulated prosthetic loading on lymphatic activity of healthy lower limb tissues; Jennifer Bramley, United Kingdom
- Dressings cut to shape alleviate facial tissue loads while using ventilation masks; Lea Cohen, Israel

### Key session 9: Allied health professionals’ perspectives of pressure ulcer prevention

*Chairs: Zena Moore, Amit Gefen*

- Focus on persons with spinal cord injury: How to assist them in posture and mobility; Anthony Gels, France
- An occupational therapy perspective of the use of technology to monitor weight shifts and repositioning behaviours in sitting; Alison Porter-Armstrong, United Kingdom
- Footnotes: What do podiatrists bring to pressure ulcer prevention?; Pauline Wilson, Ireland
- The role of the physiotherapist in pressure ulcer prevention: Supporting the patient through the lifetime risk of pressure ulceration; Menno van Etten, Norway

### Key session 10: AIUC – AISLeC joint session: Two main Italian wound care societies cooperating against pressure ulcers: Confederation as a team

*Chairs: Rosa Rita Zortea, Francesco Petrella*

- A wound care team for pressure ulcer prevention and treatment in 18 hospitals in northern Italy; Roberto Brambilla, Italy
- Criteria for “quality” definition of the so-called advanced dressings and new technologies; Alessandro Greco, Italy
- Heel pressure injuries: Need for a consensus conference; Massimo Rivala, Italy
- Achieving evidence-based practice: Calcaneal ulcers’ management in infants and children; Valentina Vanzi, Italy

### Industry workshop 3

*Chairs: Nils Lahmann, Luigino Santecchia*

- Can the efficacy of pressure relieving strategies be assessed through the magnitude of movements performed?; Silvia Caggiari, United Kingdom
- Innovative biofilm detection system for realizing biofilm-based wound management; Gojiro Nakagami, Japan
- Robotic mattress for pressure redistribution and patient comfort; Aya Kitamura, Japan
- Embedded sensing and actuating systems for pressure mapping and monitoring to prevent pressure ulcers; Ricardo Simoes, Portugal

### Poster presentations B

**Coffee break, exhibition viewing**

### Key session 11: EPUAP Quality Improvement Projects Awards

*Chairs: Zena Moore, Lisette Schoonhoven*

- Protecting the skin our patients live in: Implementing strategies to prevent pressure ulcers; Helen Strapp, Ireland
- Audit of incontinence-associated dermatitis prevalence and skin barrier product usage in nursing and residential homes in a Welsh health board; Sarah Bradbury, United Kingdom
- Student nurse preparation for pressure injury prevention practice: A quality improvement project using social media and teaching rounds; Julie Santy-Tomlinson, United Kingdom
- Mind the gap: Reducing gaps in pressure ulcer documentation through small tests of change; Janie Donnelly, United Kingdom

### Key session 12: Innovations in plastic and reconstructive surgery for pressure ulcers and other challenging wounds

*Chairs: Guido Ciprandi, Mario Zama*

- Spare muscles surgical technics in 4 degree pressure ulcers treatment; Franco Bassetta, Italy
- Primary report of efficiency of fat grafting in prevention of ischial tuberosity pressure ulcer; Christian Herlin, France
- Skin-sparing debridement for necrotizing fasciitis in children; Giorgio La Scala; Switzerland
- Propeller flaps with reduced rotational angles: Clinical experience in various anatomical sites; Paolo Persichetti, Italy

### Workshop 1: Challenges in pressure ulcers prevention and management in critically ill patients

*Chairs: Ida Marie Bredeosen, Ulrika Källman*

- Aminoacidic spray gel vs silver spray powder: A prevention comparative randomized trial; Roberto Cassina, Italy
- Skin blottling analysis of Interleukin 6 on the buttock of wheelchair basketball players; Takeo Minematsu, Japan
- Monitoring pressure ulcers as adverse events: National use of the Global Trigger Tool; Lena Gunningberg, Sweden
- Reducing hospital acquired pressure injuries by implementing WOC nurse-led daily prevention rounds; Chungmei Shih, United States

### Free paper session 5: Innovations in pressure ulcers prevention bundle: Patient safety, quality of care, evidence based practice and policy

*Chairs: Zena Moore, Amit Gefen*

- Mind the gap: Reducing gaps in pressure ulcer documentation through small tests of change; Jeannie Donnelly, United Kingdom
- A wound care team for pressure ulcer prevention and treatment in 18 hospitals in northern Italy; Roberto Brambilla, Italy
- Achieving evidence-based practice: Calcaneal ulcers’ management in infants and children; Valentina Vanzi, Italy
- Embedded sensing and actuating systems for pressure mapping and monitoring to prevent pressure ulcers; Ricardo Simoes, Portugal
### Free paper session 6: Negative pressure wound therapy: From premature to elderly patients (11:45 - 12:30)
**Chairs:** Paolo Persichetti, Jakub Taradaj
- Preliminary experience with the use of NPWT over exposed vessels: Do we have to revise NPWT contraindications?; Guido Paolini, Italy
- Extravasation ulcer in newborn: When the immediate skin full-thickness loss may render a limb virtually useless. Needs for a prompt team-common action; Serena Crucianelli, Italy
- The use of negative pressure wound therapy portable system in pressure lesion management; Simone Toccanci, Italy

### Lunch break, exhibition viewing (12:45 - 13:45)
**Exhibition area**

### Key session 13: EPUAP-EWMA joint patient safety session (13:45 - 14:15)
**Chairs:** Serena Crucianelli, Italy; Guido Ciprandi, Italy, Renato Colognato, Italy

### Industry lunch symposium (14:15 - 15:15)
**Colonne Hall**

### Key session 15: Innovations in pressure ulcer prevention bundle: Patient safety, quality of care, evidence based practice and policy (15:15 - 16:15)
**Chairs:** Jane Nixon, Yohan Payan
- How are we currently collecting the data – prevalence versus incidence; Lisette Schoonhoven, The Netherlands
- OECD action on international measurement of pressure ulcer prevalence; Ian Brownwood, France
- Lobbying at the EU level for greater investment/awareness of pressure ulcers as a public health issue/concern; Lucia Medori, Belgium

### Industry workshop 4 (15:15 - 16:15)
**Colonne Hall**

### Free paper session 7: Medical device related pressure ulcers: Aetiology and research to enhance prevention at different ages and in different settings (16:15 - 17:00)
**Chairs:** Amit Gelen, Jakub Taradaj
- Pressure ulcers in hospitalized neonates. Rates and risk factors; Serena Crucianelli, Italy
- Reducing intensive care medical device-related pressure injuries caused by nasogastric and endotracheal tubes: A pilot study; Fiona Coyer, Australia
- Australian perspective in advancing clinical care to reduce neonatal skin injuries; Margaret Broom, Australia
- Medical device related pressure injuries in the neonate: A multidisciplinary device specific approach to prevention and healing; Deanna Johnson, United States

### Workshop 2: Using simulation to enhance knowledge and skills in NPWT (17:00 - 18:00)
**Colonne Hall**

### Key session 14: EPUAP Experienced and Novice Investigator Awards 2018 (18:00 - 18:30)
**Chairs:** Alison Porter-Armstrong, Guido Ciprandi
- Alternating pressure mattresses versus high specification foam: Results of the PRESSURE 2 randomised controlled trial; Jane Nixon, United Kingdom
- Continuous mobility tracking and activity monitoring using smart sensor technology for efficient and effective prevention of pressure ulcers; Nils Lehmann, Germany
- Embedding of a new risk assessment protocol in the hospital environment; Steven Smet, Belgium
- National policy for PU prevention and monitoring on national level; Andrea Poikarinen, Czech Republic

### Industry satellite symposium 4 (17:00 - 18:30)
**Aula Minor**
### Workshop 3: Repositioning for pressure ulcer prevention
*Chairs: Menno van Etten, Norway*

### Workshop 4: Collaborating with patients to improve research and practice
*Chairs: Delia Muir, United Kingdom; Emer Shanley, Ireland*

### Free paper session 8: Multidisciplinary pressure ulcer prevention and treatment in our most fragile patients: From the premature to the aged population & Basic science: Biomechanics and aetiology (17:00-18:30)
*Chairs: Serena Crucianelli, Ulrika Källman*
- Neonatal skin: How structural difference impact the diagnosis and healing of pressure injuries; Deanna Johnson, United States
- Pressure injury prevalence: A new look at an old process; Ann Marie Nie, United States
- The effects of two different pressure relieving support surfaces on the blood circulation deep in the tissues: A positron emission tomography (PET) study; Esa Soppi, Finland
- The history of a multidisciplinary approach to pressure ulcer prevention in a general hospital; Dirk Milliou, Belgium
- Hyperkeratosis and delayed wound healing in pressure ulcers: A case series; Thuya Win, United Kingdom
- Biomechanics of heel pressure ulcers and the effect of Haglund’s deformity; Bethany Keenan, United Kingdom

### 08:00 Registration, badge and bag collection

### 09:00–10:00 Key session 16: Overcoming communication difficulties: Telemedicine for remote pressure ulcer management consultations
*Chairs: Nils Lahmann, Steven Smet*
- Telemedicine or just better wound care? Take home message; Sergio Pillon, Italy
- Challenges implementing telemedicine: Lessons learned; Rolf Jelnes, Denmark
- Interactive telemedicine in nursing homes for chronic wounds care; Nathalie Salles, France
- Use of tele-wounds in a regional context experience; Francesco Giacinto, Italy

### 10:00–10:45 Coffee break, exhibition viewing

### 10:45–12:15 Expert teamwork: A winning approach for wounded patients: Complex cases
*Chairs: Rolf Jelnes, Guido Ciprandi*

### 12:15–12:45 EPUAP 2019, Lyon, France
Closing of the conference
*Chairs: Jane Nixon, Guido Ciprandi*
Key session 1: Interdisciplinary, interprofessional teamwork, combined with technological innovations: A winning approach to pressure ulcer prevention and management for all age groups
Chairs: Lisette Schoonhoven, Marco Romanelli
KS 1.1 Interdisciplinary interprofessional teamwork skills and passion: How to influence performances and outcomes; Guido Ciprandi
KS 1.2 A team picture story: A documented homage to the invisible; Christina Lindholm
KS 1.3 Technological innovations and biomechanics: Development and optimisation in pressure ulcer prevention; Yohan Payan

Key session 2: Multidisciplinary pressure ulcer prevention and treatment for our most fragile patients: From premature to elderly patients
Chairs: Nils Lehmann, Marco Cavallini
KS 2.1 Patient-centred care: A call to action for wound management; Ellie Lindsay
KS 2.2 Pressure ulcer prevention and treatment in fragile patients: A clinical perspective for a paediatric population; Anna Barbara Schlüer
KS 2.3 Wound care teams for preventing and treating pressure ulcers; Zena Moore
KS 2.4 Myths and reality in the prevention and treatment of pressure ulcers in very old patients: A multidisciplinary approach; Sylvie Mecaume

Key session 3: IAD: The GLOBIAD experience and the team concept
Chairs: Alison Porter-Armstrong, Charlie Beetham
KS 3.1 Ghent Global IAD Categorisation Tool (GLOBIAD): From the beginning to the team-assisted scientific paper; Karen Van Den Bussche
KS 3.2 Introduction of a new Minimum Data Set (MDS) for incontinence-associated dermatitis (IAD): Dimitri Beeckman
KS 3.3 The Ghent Global IAD Categorisation Tool: Next steps; Jan Kottner

Key session 4: Journal of Tissue Viability & Clinical Biomechanics Award
Chairs: Dan Bader, Yohan Payan
KS 4.1 Evaluation of the impact of a therapeutic educational program concerning the prevention of risk of pressure ulcers for persons with a spinal cord lesion; Sandrine Robineau
KS 4.2 A novel high-throughput device for cell deformation reveals differences in cell membrane permeability between myotubes and myoblasts in vitro; Lisa Tucker-Kellogg
KS 4.3 CI-NPWT: An essential tool for pocket complications involving cardiac implantable electronic devices in children; Guido Ciprandi
KS 4.4 Development and evaluation of simplified Finite Element model for pressure ulcer prevention in sitting posture; Pierre-Yves Rohan

Key session 5: Basic science: Biomechanics and aetiology
Chairs: Peter Worsley, Corrado M Durante
KS 5.1 Current understanding of the aetiology of pressure ulcers; Cees W.J. Oomens
KS 5.2 The development of a pressure ulcer conceptual framework; Jane Nixon
KS 5.3 Preventing pressure ulcers by manipulating cell dynamics: Mechanobiology-inspired innovation in pressure ulcer prevention; Amit Gefen

Key session 6: Biophysical agents in pressure ulcer treatment: Novel therapies
Chairs: Charlie Beetham, Corrado M Durante
KS 6.1 Technology update on electrical stimulation and wound healing; Michael Clark
KS 6.2 Photobiomodulation (PBM) in tissue repair and wound healing; Marco Romanelli
KS 6.3 Efficacy of laser therapy at different wavelengths on pressure ulcers and its effect on serum levels of IL-6, TNF- and IL-2; Jakub Tarada
KS 6.4 Indications for exogenous energies: Topical oxygen and hyperbaric oxygen; Pasquale Longobardi
Key session 7: Medical device related pressure ulcers: Aetiology, research and clinical practice to enhance prevention among persons of different ages and in different settings
Chairs: Maart Athola, Peter Worsley
KS 7.1 Medical device-related pressure ulcers: Aetiology and research in adult, paediatric and neonatal settings; Amit Gefen
KS 7.2 Clinical observations and prevention in young populations: How to organize a nursing team fighting against medical device-related pressure ulcers in babies; Anna Barbara Schüer
KS 7.3 Undue pressures, materials and positions: Exploring the complex world of medical device-related pressure ulcers in adult patients. Is there a place for “Smart materials”?; Dan Bader
KS 7.4 Are medical devices in a steady state of evolution? The more sophisticated the device, the wider the spectrum of associated pressure injuries. We need to change the culture to enhance the prevention of medical device related injuries among complex patients; Serena Crucianelli

Key session 8: Negative pressure wound therapy in paediatric and adult patients
Chairs: Paolo Persichetti, Luigi Santeccia
KS 8.1 Simplified, portable, canisterless NPWT-systems: A leading technology with psychological optimal benefits; Valentina Dini
KS 8.2 Use of negative pressure wound therapy to prevent surgical site infection (SSI); Steven Jeffery
KS 8.3 Healing effects on neonatal and paediatric wounds treated with a negative pressure wound therapy: No more into the black list for small patients; Guido Ciprandi
KS 8.4 Healing with NPWT: The state of the art in 2018; Luc Teot

Key session 9: Allied health professionals’ perspectives of pressure ulcer prevention
Chairs: Amit Gefen, Zena Moore
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KS 9.2 An occupational therapy perspective of the use of technology to monitor weight shifts and repositioning behaviours in sitting; Alison Porter Armstrong
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Chairs: Rosa Rita Zorzi, Francesco Petrella
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KS 10.4 Achieving evidence-based practice: Calcaneal ulcers’ management in infants and children; Valentina Vanzi

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Chairs: Zena Moore, Lisette Schoonhoven
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KS 12.3 Skin-sparing debridement for necrotizing fasciitis in children; Giorgio La Scala
KS 12.4 Propeller flaps with reduced rotational angles: Clinical experience in various anatomical sites; Paolo Persichetti

Key session 13: EPUAP-EWMA joint patient safety session
Chairs: Zena Moore, Andrea Pokorná

KS 13.1 How are we currently collecting the data – prevalence versus incidence; Lisette Schoonhoven
KS 13.2 OECD action on international measurement of pressure ulcer prevalence; Ian Brownwood
KS 13.3 Lobbying at the EU level for greater investment/awareness of pressure ulcers as a public health issue/concern; Lucia Medori

Key session 14: EPUAP Experienced and Novice Investigator Awards 2018
Chairs: Jane Nixon, Yohan Payan

KS 14.1 Experienced Investigator Award: The Holy Grail of pressure ulcer prevention; Lisette Schoonhoven, The Netherlands
KS 14.2 Novice Investigator Award: Technologies to alert clinicians of individual risk of pressure ulcer development; Peter Worsley, United Kingdom

Key session 15: Innovations in pressure ulcer prevention bundle: Patient safety, quality of care, evidence based practice and policy
Chairs: Guido Ciprandi, Alison Porter-Armstrong

KS 15.1 Alternating pressure mattresses versus high specification foam: Results of the PRESSURE 2 randomised controlled trial; Jane Nixon
KS 15.2 Continuous mobility tracking and activity monitoring using smart sensor technology for efficient and effective prevention of pressure ulcers; Nils Lahmann
KS 15.3 Embedding of a new risk assessment protocol in the hospital environment; Steven Smet
KS 15.4 National policy for PU prevention and monitoring on national level; Andrea Pokorná

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Chairs: Nils Lahmann, Steven Smet

KS 16.1 Telemedicine or just better wound care? Take home message; Sergio Pillon
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KS 16.3 Interactive telemedicine in nursing homes for chronic wounds care; Nathalie Salles
KS 16.4 Use of tele-wounds in an Italian regional context experience; Francesco Giacinto
[KS 1.1] INTERDISCIPLINARY INTERPROFESSIONAL TEAMWORK SKILLS AND PASSION: HOW TO INFLUENCE PERFORMANCES AND OUTCOMES

Guido Ciprandi
Bambino Gesù Children’s Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy

Background: Effective interprofessional teamwork is an essential component for the delivery of high-quality patient care in an increasingly complex medical environment. The relationship between teamwork and performance outcomes has been documented extensively. Innovation in wound healing requires the impact of team-based interprofessional comprehensive assessments on the prevention, diagnosis, and management of Pressure Ulcers. The two most important questions are “How many wounds did you manage” and “How many professional Figures know and are allied?” A common language has been advocated because the complexity of the Team in Wound Care has greatly increased over the past 50 years, including all Allied Health Professional Figures who share a Team identity and work closely together in an integrated and interdependent manner.

Methods: Over the past ten years, considering the high incidence of Pressure Ulcers (PLUs) in pediatric patients admitted to our Hospital - 18.2% - a severe prevention program of Education/Culture, research of Facilities, development of precise partnerships and focusing on different type of wounds, ages, settings (critical and subcritical areas) has been instituted. Nursing of Caregivers is considered mandatory, investigating not only natural roles but also extended-family members. The effects of an Interprofessional Care Team are investigated. The last point has been to define translational science in children, considering the definition of taking research from lab to bedside.

Results: The efficacy of a well-coordinated and shared action and the impact of a complex team devoted to Wound Care Sciences drastically reduced from 18.2% to 4.1% the number of PLUs diagnosed in different care settings. At the same time the number of involved professional Figures increased from 4 to 21. Tab.1, and the two most important points obtained were improved diagnostic assessment and wound healing outcomes tested by: anamnestic screening, sharing of major surgical procedures and timing; common repeated “head to toe” examinations, PU reclassification, dressing change frequency, turning and positioning activities and offloading.

Conclusion: Interprofessional Wound Care Team is multi-faceted, up-streaming and evidence based approach. This provides best pressure injury assessment, better management knowledge and increased pressure injury education. Considering the Team as a Biocomplex is essential for a natural comprehension of the Interprofessional mechanisms: both include Communities, Dynamism, Changing, Evolution, Sharing skills and abilities. However, lowering burnout, implementing common activities and responsibilities, adopting new innovations such as strategies and organisations makes the difference in one word: Empathy is the glue. The empathic approach requires humility so we can seek to abandon our preconceived ideas and biases. It requires that we have a heightened awareness of other peoples’ needs, wants, motivations and goals. Let’s go through the traits an empathic observer should possess—and some methods you can use to gain a deep understanding of the entire Wound Process. An Emotionally Intelligent Team is the final solution in order to progress and evolve in a perpetual way.

References:

The Complex Interprofessional Wound Care Team at work: Biomechanics expert; Biomechanics expert; Cultural mediator, Dermatologist, Dietician, Family medicine, Immunologist, Industry supporter, Microbiologist, Neurorehabilitator (RFT, CPTA), Nurse Practitioner (CWS, WOCN); Nutritional Pathologist, Pharmacist, Physiotherapist, Podiatrist, Psychologist, Plastic Surgeon, Seating Specialist, Telewounder, Vascular and Lymphatic leader;

[KS 1.2] A TEAM PICTURE STORY: A DOCUMENTED HOMAGE TO THE INVISIBLE

Christina Lindholm
Sophiahemmt University, Institution för Hälsovetenskap, Stockholm, Sweden

Spinal cord injured persons are commonly youngsters or mid-life persons. An accident has turned life upside down in a second. Adaptation to a new life with paralysys of the lower part of the body dominates the immediate experience. Prevention of pressure ulcers is often regarded as secondary to overcoming numerous personal, social and psychological as well as and practical problems. There are substantial needs for an optimal cross-professional teamwork by health care professionals to regain a “normal” life.

It is reported that spinal cord injured persons have a 100% risk of developing pressure ulcers. At Rehab Station Stockholm a successful model of rehabilitation including prevention and treatment of pressure ulcers has been implemented. Professionals providing medical, surgical, nursing, psychological and technical support work in a close cooperation within the team. The care-link also includes an online to the Department of Plastic and Reconstructive surgery at the Karolinska University hospital, and patients in need of graft surgery follow a special care-program.

Continuity throughout the care-chain is a key issue, and specific educational programs have been set up to follow the patient into home-care.

Patients have access to advanced medical technology, as well as excellent nursing care.
**[KS 1.3] TECHNOLOGICAL INNOVATIONS AND BIOMECHANICS: DEVELOPMENT AND OPTIMIZATION IN PRESSURE ULCER PREVENTION**

*Yohan Payan*

Univ. Grenoble Alpes - CNRS UMR 5525, Tmci-Imag Laboratory, La Tronche Cedex, France

**Introduction:** While in interactions with external supports such as shoes, seats or mattresses, human soft tissue can be submitted to large stresses and strains that may affect tissue integrity, especially for people suffering from sensory loss and/or peripheral vascular disease. Basic science has recently made substantial progress as concerns the aetiology of deep tissue injuries (DTI). Mechanical compression, ischemia, lymphatic blockage and reperfusion are indeed potential factors triggering DTI (Oomens 2015). Among these factors, the most dangerous one is probably direct mechanical compression that results in high deformations of the subcutaneous tissue layers and that can damage soft tissue in a very short period of time (some minutes).

**Methods:** We are today fairly confident in the fact that an efficient pressure ulcer prevention medical device should include, at least, four components:
1. a compliant support (shoe, seat, mattress) that optimizes the way pressure forces apply onto skin surface and that limits any stress concentration;
2. an on-line embedded quantitative measurement of the pressure at the support/skin interface;
3. an on-line estimation of the internal soft tissue deformations;
4. the estimation of the risk for DTI and if necessary, an alarm sent to the person.

**Results:** This invited talk will focus on the solutions and bottlenecks towards an on-line estimation of the risks for DTI. If some new technologies and products can now propose embedded pressure mat to measure the pressure at the support/skin interface, a relevant biomarker for estimating tissue internal strain is unfortunately still lacking. The solution is the design of a subject-specific biomechanical model of the bony prominence / soft tissue / support interactions computing in real time tissue internal strains. The associated reminding bottlenecks will be discussed: How to generate, in a clinical routine, a subject-specific biomechanical model taking into account the specific anatomy of the subject, in terms of tissue layers (skin, fat, muscles) or shapes of the bony surfaces? How to get such anatomical information without the use of a complex and costly MRI or CT exam? How to run in real time the non-linear biomechanical Finite Element models required computing internal strains? How to define a subject-specific threshold in terms of maximal strains values?

**Conclusion:** This talk will illustrate the bottleneck questions raised above with some results obtained by our group using biomechanical models of the foot and buttock soft tissues.


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**[KS 2.1] PATIENT CENTRED CARE: A CALL TO ACTION FOR WOUND MANAGEMENT**

*Ellie Lindsay OBE FQNI*

The Lindsay Leg Club Foundation, United Kingdom

**Introduction:** Patient-centred care is referred to frequently in medicine but its comprehensive application to wound management is both complex and overdue. Patient-centred care means caring for individuals and their families in ways that are meaningful and valuable, yet in wound management we frequently continue to fail our patients, even when we know that they are our first priority. Sometimes even clinicians come face to face with the limitations of patient centred wound care and the author’s own recent experience in relation to a grade 2 pressure ulcer received by her husband during hospital treatment for a serious health condition will be discussed.

**Aim:** A major challenge lies in creating meaningful pathways for persons when experiencing wound care in spite of both the multidisciplinary and multifactorial aspects of wound management. Treatment needs to be individualised and involve a two-way relationship between patients and professionals where patients are encouraged to be equal partners. As professionals, we should allow patients and their families to have sufficient information to enable them to play an active part in their treatment, providing transparency in information-sharing facilitating patient input.

**Methods:** Action is therefore needed—not just to assess the current concept and status of patient advocacy in wound management, but to develop and promote an international consensus on a patient-centred approach for wound management and beyond. During the presentation I will allude to the work of the World Union of Wound Healing Societies’ Patient Advocacy Panel and its three priority areas, namely (i) a list of recommendations for improvement in the practice of wound management, with reference to improved patient engagement and outcomes, (ii) further development of the Wound Care Bill of Rights, as created by the AAWC (the American Association of Wound Care) and (iii) a clear algorithm for clinicians explaining where and how patients should be engaged in the wound management treatment pathway.

**Conclusion:** We need to develop guidance and procedures that make the concept of patient centred wound care a functional aspect of a clinician’s everyday practice, so that patients receive the support and advocacy that they need. Moving forward, we need to challenge ourselves as practitioners—to think beyond the term ‘patient’, to stop viewing individuals in our care as passive recipients of our advice, but to view them as people who have an important voice in their own care pathway.
**[KS 2.2] PRESSURE ULCER PREVENTION AND TREATMENT IN FRAGILE PATIENTS: A CLINICAL PERSPECTIVE FOR A PAEDIATRIC POPULATION**

Anna-Barbara Schlüer
University Hospital Zurich, Clinical Nursing Science, Zurich, Switzerland

**Learning objectives of the presentation:** Children’s skin undergoes several changes throughout the first 18 years of life. The skin of children is morphologically and functionally different from adult skin. Within the first days of life neonates undergo various adaptation processes needed to accommodate the transition from the wet intrauterine environment to the dry outside environment. During the first months and years the skin continues to develop and evolve its structure and functions. Effective prevention for PU should always be driven by an individual risk assessment for the paediatric specific risk for each patient and should be performed standardized and regularly. Total skin assessment, repositioning and skin care are important preventive measures. With regard to different skin conditions in different age groups, like the immature skin of neonates (especially preterm neonates), regular head to toe skin assessments and appropriate skin care seem important as preventive measures to decrease Pressure Ulcer risk in paediatric patients.

**Overview of the key messages:**
Category one pressure ulcers are a major nursing care issue in neonates and infants. Ventilation support devices increase the risk of pressure ulcers in infants. Medical devices not adapt to paediatric body shape changes in PICU dependent patients.

Effective pressure ulcer prevention includes device related under-padding.

**Conclusion:** Effective Pressure Ulcer prevention includes device related under-padding and careful positioning and fixation of such devices. At least daily head-to-toe skin assessment of neonates and infants at risk of Pressure Ulcers should be performed. Monitoring and regular repositioning of any monitoring sensors and cables should be conducted as well. Special attention should be paid to the fact that repositioning of the paediatric patient must be weighed against the stress that such an intervention can cause, especially in low- and very low-term neonates and critically ill infants.

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**[KS 2.3] WOUND CARE TEAMS FOR PREVENTING AND MANAGING PRESSURE ULCERS**

Zena Moore
Royal College of Surgeons in Ireland, School of Nursing and Midwifery, Dublin, Ireland

**Learning objectives of the presentation:** At the end of this session the participants will be able to discuss the role of the wound care teams in the prevention and management of pressure ulcers.

**Overview of the key messages:** Pressure ulcers, which are localised injury to the skin or underlying tissue, or both, occur when people are unable to reposition themselves to relieve pressure on bony prominences. Pressure ulcers are often difficult to heal, painful and impact negatively on the individual’s quality of life. The cost implications of pressure ulcer treatment are considerable, compounding the challenges in providing cost effective, efficient health service delivery. International guidelines suggest that to prevent and manage pressure ulcers successfully a team approach is required. Therefore, this paper will clarify the role of wound-care teams in the prevention and management of pressure ulcers.

**Conclusion:** The multidisciplinary wound-care team is expected to deliver better outcomes compared to the alternative, where a person’s pressure ulcer prevention and management-related care is delivered by one group of healthcare professionals (e.g. just nurses alone), without the insight, expertise and active participation of fellow healthcare professionals (e.g. physiotherapists, occupational therapists, pharmacists and doctors). There are a number of factors that can contribute to the formation of pressure ulcers, or can affect the healing of pressure ulcers, which are perhaps best addressed by pooling the expertise of different healthcare professionals in order to enhance the prevention and management-related outcomes of people with or at risk of pressure ulcers. Thus, the multidisciplinary wound-care team may have a positive impact on these outcomes because it brings together a range of healthcare professionals with different expertise in order to plan and deliver care to prevent and manage pressure ulcers in a holistic way that is designed to suit the person’s individual needs. However, there is a lack of evidence concerning whether wound-care teams make a difference to the incidence or healing of pressure ulcers. Well-designed trials addressing important clinical, quality of life and economic outcomes are justified, based on the incidence of the problem and the high costs associated with pressure ulcer management.
**[KS 2.4] MYTHS AND REALITY IN THE PREVENTION AND TREATMENT OF PRESSURE ULCERS IN VERY OLD PATIENTS: A MULTIDISCIPLINARY APPROACH**

**Sylvie Meaume**
Hospital Rothschild, Paris, France

**Introduction:** Pressure ulcers (PU) are common in geriatrics and not always preventable at the end of life. There are pressure ulcers exposing prostheses (hip, knee) of terrible prognosis. PU in elderly people are mostly localized to the sacrum or heel and present some characteristics that no one should ignore. Sacral and Heel PU may not be the same disease. Sacral PU have long been confused, at an early stage with incontinence-associated dermatitis that requires different treatment. At an advanced stage, shear forces can slow down its evolution and require treatment with negative pressure wound therapy but usually have poor prognosis. Heel PU are frequently associated with peripheral arterial disease and favoured by pressure and low blood flow. ABPI is always required and revascularization is the main treatment, if possible. Osteitis is a frequent complication of complex treatment at this age. Undernutrition is very prevalent in the sick elderly population and must be appropriately managed. Ethical considerations are particularly important to consider in the elderly and palliative care has some specificities. The PU management is multi-professional and the geriatrician is a specialist that plays an important role in the evaluation of comorbidity and their treatment. The socio-economic impact of PU is also to be considered in this population.

**Learning objectives of the presentation**
- to know the main locations of pressure sores in geriatrics and their signification,
- to know the role of geriatrician,
- to know how to manage elderly patients with pressure ulcers.

**Overview of the key messages:** The sacral PU is different from the IAD; the heel PU is associated with the chronic arteriopathy of the lower limbs, for the local and general treatment a multiprofessional and ethical approach is always required.

**Conclusion:** The elderly patient who develops pressure ulcers often presents with many co-morbidities and the geriatrician plays a key role in multidisciplinary care.

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**[KS 3.1] GHENT GLOBAL IAD CATEGORISATION TOOL (GLOBIAD): FROM THE BEGINNING TO THE TEAM-ASSISTED SCIENTIFIC PAPER**

**Karen Van den Bussche1, Jan Kötter2, Dimitri Beeckman3**
1 Ghent University, Ghent, Belgium
2 Charité-Universitätsmedizin Berlin, Department of Dermatology, Venerology, and Allergology, Berlin, Germany
3 University Centre for Nursing and Midwifery, Ghent University, Ghent, Belgium

**Learning objectives of the presentation:** At the end of the presentation, the attendants will be able to describe and use the Ghent Global IAD Categorisation Tool (GLOBIAD), and to describe the process of the design and psychometric evaluation of the GLOBIAD.

**Overview of the key messages:**
- Incontinence-associated dermatitis (IAD) is a specific type of irritant contact dermatitis incontinent adults with an estimated prevalence between 4.3% and 53.6% in different care settings.
- A universal IAD classification system was needed to guide practice, inform educational platforms, and support research as existing IAD severity categorization instruments were found to be time-consuming and (linguistically) complex for use in clinical practice.
- The instrument design and content validation was based on expert consultation using a three-round Delphi procedure with 34 experts from 13 countries.
- The GLOBIAD consists of two categories according to the presence of persistent redness (Cat. I) and skin loss (Cat. II), both subdivided based on the absence (Cat. A) or presence (Cat. B) of clinical signs of infection.
- The psychometric properties of the instrument were evaluated using IAD photographs reflecting different severity levels in a sample of 823 health professionals in 30 countries.
- The accuracy of the diagnosis erythema versus skin loss was high when IAD is classified based on images, but identifying clinical signs of infection was prone to error.

**Conclusion:** The development of the GLOBIAD is a major step forward towards a better systematic assessment of IAD in clinical practice and research worldwide. We would expect differentiation between infected and not infected improved with education. Future research will need to show that the use of a valid and reliable IAD categorization tool will improve clinical decision making and research in IAD care. The main strength of the study was the sound content and face validation by a large group of international stakeholders which will facilitate and contribute to the global dissemination of the tool.
INTRODUCTION OF A NEW MINIMUM DATA SET (MDS) FOR INCONTINENCE-ASSOCIATED DERMATITIS (IAD)

Dimitri Beeckman1, Karen Van den Bussche2

1 University Centre for Nursing and Midwifery, Ghent University, Ghent, Belgium
2 Ghent University, Ghent, Belgium

Learning objectives of the presentation: The main learning objective is to get insight into the development and psychometric testing of a Minimum Data Set for Incontinence-Associated Dermatitis (MDS-IAD).

Overview of the key messages: IAD is a specific type of irritant contact dermatitis characterised by erythema and oedema of the peri-anal and/or genital skin. To gain insight into the size of the problem, prevalence and incidence are the most common measures. To date, epidemiological data for IAD that are internationally comparable are missing. In line with the European Pressure Ulcer Advisory Panel (EPUAP) pressure ulcer methodology for the collection of pressure ulcer prevalence data, the systematic assessment of IAD prevalence data using a valid and reliable minimum data set (MDS) is needed. The aim of this study was to develop a minimum data set for IAD (MDS-IAD) in adults and to psychometrically evaluate and pilot test the instrument in nursing home population.

Conclusion: The minimum data set for IAD (MDS-IAD) provides valuable insights in IAD prevalence at organisational level, will allow benchmarking between organisations, and will support policy makers. Future testing in other healthcare settings is recommended.

THE GHENT GLOBAL IAD CATEGORISATION TOOL: NEXT STEPS

Jan Kottner
Charité-Universitätsmedizin Berlin, Department of Dermatology, Venereology and Allergology, Berlin, Germany

Introduction: The Ghent Global IAD Categorisation Tool (GLOBIAD) classifies IAD into two main categories: 1 erythema and 2 skin loss. Subcategories include clinical signs of infection. Content validity, diagnostic accuracy and reliability have been investigated based on standardized photographs. During the development process, GLOBIAD has been translated into 14 languages.

Methods: This presentation gives a summary about the current status and possible future developments of the GLOBIAD.

Results: Based on photographs the empirical evidence supports the diagnostic accuracy and reliability of the two-category classification. The diagnosis of clinical signs of infection contains large measurement errors. The performance of the GLOBIAD in clinical practice is unknown. Practitioners expressed the need to use a similar tool in the paediatric population. However, this population is heterogeneous and there are differences between infants with diaper dermatitis and children and adolescents. Similar to the discussion in adults, the concept of ‘diaper dermatitis’ is not suitable for children and adolescents. The GLOBIAD does not replace existing instruments but because of its simplicity, more complex IAD classifications can be mapped on the GLOBIAD.

Conclusion: The GLOBIAD helps to diagnose and to classify IAD and to enhance international communication. It should not be used to classify clinical signs of infections. Real world testing of the GLOBIAD is needed and the adaption to the paediatric setting planned.

References:
**[KS 4.1] EVALUATION OF THE IMPACT OF A THERAPEUTIC EDUCATIONAL PROGRAM CONCERNING THE PREVENTION OF RISK OF PRESSURE ULCERS FOR PERSONS WITH A SPINAL CORD LESION**

Aurélie Durufle1, Sandrine Robineau1, Anthony Géls2, Lorraine Mathieu1, Emilie Leblong1, Bastien Fraudet1, Philippe Gallien1, Benoît Nicolas3

1 Pôle Saint-Hélier, Rennes, France
2 Société Française de l’Escarre, Centre Multiservice Neurologique Popon, Montpellier, France

**Introduction:** We conducted a study measuring the impact of a program of therapeutic education concerning the prevention of risk of pressure ulcers for persons with a spinal cord lesion, during the chronic phase.

**Methods:** This study concerns each person older than 18 with a medullary lesion, no matter the cause, having had pressure ulcer or not. The participants benefited from 2 collective workshops with a educational objective concerning the prevention of the risk of pressure ulcer.

Data are collected during an initial individual interview and after 3.6 and 12 months. They are demographical and clinical and the results of different scales among which the Skin Management needs assessment checklist revised (revised SMmac). The main evaluation criterion is the score of the revised SMmac.

**Results:** The results concern 20 middle-aged people 52 years. 19 have a traumatic spinal cord injury with median aged of lesion at 234 months (14-884). The last one has a congenital myelomeningocele. The results demonstrate a benefit shown by the very significant increase of the global score on SMmac revised after 3 months with stability at 6 and 12 months. Furthermore, the annual rate incidence of pressure ulcer went from 75 % the year before the study to 55 % during the study.

**Conclusion:** In literature, there is no evidence about the place of the therapeutic education in the management of the risk of pressure ulcer for the persons with medullary lesion and numerous questions remain unsettled including the timing moment to realize these educational programs, evaluation tools, type and duration of intervention. This study enables us to bring some answers on the impact of the therapeutic education during the chronic phase for persons with a medullary lesion on their knowledge and their practices in terms of prevention of the risk of pressure ulcer.

**References:**


**[KS 4.2] A NOVEL HIGH-THROUGHPUT DEVICE FOR CELL DEFORMATION REVEALS DIFFERENCES IN CELL MEMBRANE PERMEABILITY BETWEEN MYOTUBES AND MYOBLASTS IN VITRO**

Julia Jenkins1, Binh P. Nguyen1, Lisa Tucker-Kellogg1

1 Duke-NUS Medical School, Singapore, Singapore

**Introduction:** Pressure ulcers arise from biochemical and mechanical mechanisms. Mechanical damage can disrupt the integrity of cell membranes and cause cell death. When mature muscle fibers (myotubes) lose cell membrane integrity, the resulting release of intracellular contents can cause a toxic wound environment via myoglobin and oxidative stress [1]. To study mechanical disruption of myotube membranes requires devices for in vitro cell deformation. The most common method uses indentation of 6-well plates with a deformable base [2,3], but these devices are limited to 17% strain, which may be insufficient to disrupt myotubes. Another approach uses indentation to create large deformations in 3D gels, but this method is low-throughput. We seek a high-throughput method that provides sufficient strain to damage myotubes.

**Methods:** We fabricated a 24-peg indentation device, which accommodates a 24-well plate with a flexible base. Immature myoblasts (muscle progenitor cells) or differentiated myotubes were subjected to mechanical strain (49% or 82% equibiaxial stretch), and damage was measured using multiple assays of cell membrane permeability.

**Results:** Exposure to 17% strain for 3 hr in a 6-well device caused significant cell permeability and cell loss (P<0.0035) in immature myoblasts but no increase in permeability for myotubes, as measured [4], even when strained for 15 hr. In our 24-well device, myoblasts and myotubes subjected to 49% and 82% strain for 3 hr showed significant deformation. Compared to maximum permeability (i.e., complete lysis of the sample), applying 49% strain caused 25% of maximum signal for myotubes, and 67% of maximum signal for myoblasts. Extreme deformation with 82% strain caused greater measures of permeability, but also caused some patches of complete cell loss.

**Conclusion:** We conclude that differentiated myotubes are less vulnerable than immature myoblasts (muscle progenitor cells) to damage and permeabilisation from mechanical deformation, and we conclude that our novel 24-well device is capable of creating high strain, sufficient to damage to cell membrane integrity in both myotubes and myoblasts. These studies introduce a new device for studying cellular response to mechanical deformation, and shed light on cell membrane integrity for understanding the vulnerability of pre-existing muscle tissue compared with regenerating muscle tissue during mechanical deformation.

**References:**


Development and Evaluation of Simplified Finite Element Model for Pressure Ulcer Prevention in Sitting Posture

Aurélien Macron1, Hélène Pilet2, Alexandre Verney3, Pierre-Yves Rohan3

1 Institut de Biomécanique Humaine Georges Charpak, Arts et Métiers Paristech, Paris, Univ Grenoble Alpes, CEA, Leti, Grenoble, France
2 Institut de Biomécanique Humaine Georges Charpak, Arts et Métiers Paristech, Paris, France
3 CEA, List, Interactive Robotics Laboratory, Gi-Sur-Yvette, France

Introduction: The occurrence and management of Pressure Ulcers (PU) remain a major issue for vulnerable populations despite significant improvement in prevention methods based on external pressure. High strain in soft tissues that overly bony prominences are considered a risk factor and have been computed using the Finite Element (FE) method. Yet, reported studies were based on MRI or CT-Scan data. Owing to the long segmentation time associated with the creation of 3D subject specific FE models, most of these therefore included the data of only one individual. Yet the inter-individual variability can’t be overlooked. To bridge the gap, we recently developed a new methodology for the fast generation of 3D FE model of the buttock for PU prevention and validated the predicted contact pressure with external pressure measurement in six healthy subjects (Macron et al., submitted). Building upon this, we propose in this study to develop and to evaluate a simplified FE model for estimating subdermal tissue strain from a limited number of parameters available in clinical routine.

Methods: Based upon the data previously acquired on six healthy subjects (i) ischial radius of curvatures were extracted from pelvis 3D reconstructions performed from EOS radiographs (ii) muscle and fat thicknesses were measured on Ultrasound images and (iii) external pressure measurement were extracted. A simplified FE model of the subdermal soft tissue was built (figure 1(b)). The Ischial Tuberosity was fixed and the soft tissue response to the external pressure was simulated and compared to that obtained with the reference model (figure 1(a)).

Results: The maximum shear strain in the muscle layer, generally associated with “risk prediction of PU”, is depicted in figure 2 below. A good agreement between the reference model and the simplified model was obtained and, except for Subject 6, both models classified the subjects in the same order of “risk”.

Conclusion: In this preliminary study, based on 9 geometric parameters (all accessible with ultrasound), the simplified model predicted a response consistent with the reference model. To confirm these results, future work will include performing the experiment on a larger set of subjects and extracting these parameters from ultrasound images. This constitutes a first step towards pressure ulcer prevention in a clinical routine set-up.

References:

[KS 4.3] CI-NPWT: An Essential Tool for Pocket Complications Involving Cardiac Implantable Electronic Devices in Children

Guido Ciprandi1, Sergio Filippelli2, Serena Crucianelli1, Mario Zama1, Antonio Amadeo2
1 Bambino Gesù Children’s Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy
2 Bambino Gesù Children’s Hospital, Division of Cardiothoracic Surgery, Rome, Italy

Introduction: Use of incisional Negative Pressure Wound Therapy (CI-NPWT) has been shown to actively manage clean closed surgical incisions. The use of CI-NPWT has been reported in a variety of at risk conditions. Cardiac pockets could symbolize the essence of a high risk wound, often complicated by a surgical dehiscence or infection. The aim of this study is to prove the effectiveness of the CI-NPWT in a series of 18 consecutive children affected by a complicated pocket allocating a cardiac implantable electronic device.

Methods: This is a monocentric retrospective observational study. The full charts of 18 patients (average age 11.7yrs) were reviewed. All children showed a dehiscence and infected pocket at various degrees treated with a conservative closed approach using the same CI-NPWT.

Results: All but 2 children recovered from their local infection. 13 showed a pocket’s rescue. In 3 children we used rotational flaps and a subsequent immediate application of the CI-NPWT on the closed incisional suture. In two cases this technique was used as a bridge for sterilizing the deep Surgical Site Infection (SSIs) with a following removal of the device but on a sterile bed, showing hypergranulating tissues.

Conclusion: The management of deep SSIs has been challenging over the years, particularly in children affected by congenital or acquired impaired immunity. Randomized, controlled studies of NPWT for closed incisions in orthopaedic settings have shown the global impact on reducing wound infection and dehiscence. In our experience the application of CI-NPWT was useful in treating residual seromas and with the aim of consolidating the abdominal wall layers. Its major role was played in preventing, controlling and caring local infection sometimes responsible for the loss of devices. CI-NPWT improves wound outcomes after cardiothoracic surgery in paediatric patients and should be routinely considered as a daily cost saving practice.

References:
[1] Aency-PREVENATM IMS
Learning objectives of the presentation: This presentation will demonstrate the use of a robust process in translating epidemiological and bioengineering research evidence into a format of direct relevance to risk assessment practice.

You will have an increased understanding of the role of risk factors in pressure ulcer development and their relationship through an illustrated new conceptual framework and theoretical causal pathway [1].

Overview of the key messages:


2. The new conceptual framework developed by the National Institute for Health Research (NIHR) under its Programme Grant for Applied Research Programme (RP-PG-0407-10056) is described in the consensus process (Figure 1).

We developed a new pressure ulcer conceptual framework highlighting key clinical and mechanical properties of the tissue geometry of the tissue and property of the skin and other potential causal factors for pressure ulcer development. This can facilitate improved definition of risk assessment in clinical practice, as well as guiding future research and development of new medical devices. The views expressed in this presentation are those of the author(s) and not necessarily those of the National Institute for Health Research (NIHR) Department of Health and Social Care.

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References:
[KS 5.3] PREVENTING PRESSURE ULCERS BY MANIPULATING CELL DYNAMICS: MECHANOBIOLOGY-INSPIRED INNOVATION IN PRESSURE ULCER PREVENTION

Amit Gefen
Tel Aviv University, Ramat Aviv, Israel

Introduction: Tissue damage is always the outcome if cell death rates exceed regeneration and repair (if existing), all of which can potentially be affected by sustained mechanical stimuli (e.g., force application, microenvironment stiffness changes). This talk reviews key mechanobiological factors that can potentially affect cell and tissue tolerance to sustained mechanical loads and tissue repair capacities, towards developing the next generation of pressure ulcer prevention (PUP) approaches and technologies. Mechanobiology, the study of interactions between mechanical stimuli and biological responses of cells, remains poorly addressed in the context of PUP. Cell damage initiates with loss of plasma membrane (PM) integrity, leading to loss of cell homeostasis; the PM is supported by the dynamic cell cytoskeleton (CSK).

Methods: We determined experimentally the damage to the plasma membrane of cells as a result of sustained deformations (e.g., such as at weight-bearing static postures) by evaluating the increase in uptake of a low molecular weight, fluorescent dextran into the deformed cells using fluorescence-activated cell sorting. The effects of two possible mechanobiological approaches for cell-scale PUP can then be evaluated: (1) Supply of energy-related molecules to the actin CSK dynamics; (2) Stabilization of newly formed actin CSK e.g., through cross-linking or reinforcement at PM-anchoring sites. We further apply mechanical stimulation to enhance cell migration and augment repair.

Results: The above mechanobiological approaches were tested in cell culture models using relevant cell lines (myoblasts, pre-adipocytes and fibroblasts) and were found promising in potentially revolutionizing PUP thinking. Additionally, migration assays under sustained low-level deformations to cells exhibit enhanced mass cell migration to damage-site gaps, through mechanotaxis.

Conclusion: Mechanobiological PUP research is still in its infancy. However, cell culture models indicate that manipulation of cell mechanostuctures and dynamics, combined with optimal deformation levels in non-damaged or already damaged (wound bed) tissues can be used for next-level evolution of PUP technologies. In particular, current devices that passively or actively deform tissues, respectively, e.g., prophylactic dressings or negative pressure therapy systems, can be redesigned to enhance cell tolerance to loads and optimize reparative mechanotaxis through mechanobiological knowledge.

References:

[KS 6.1] TECHNOLOGY UPDATE ON ELECTRICAL STIMULATION AND WOUND HEALING

Michael Clark
Welsh Wound Innovation Centre, Ynysmaerdy, United Kingdom

Learning objectives of the presentation: Understand the modes of action through which electrical stimulation may influence wound healing.
Understand the different technologies used to stimulate wounded tissue.
Understand the strengths and weaknesses of the clinical evidence that electrical stimulation affects wound healing.

Overview of the key messages: Electrical stimulation of skin wounds has a long history dating back to the 16th century with the application of electrostatically charged gold leaf onto wounds. By 2014 the use of direct contact electrical stimulation in the treatment of recalcitrant category II pressure ulcers and any full thickness pressure ulcer was considered to be a recommendation supported by A level evidence and likely to do more good than harm to patients with uncertainty over the value of alternative therapies such as pulsed electromagnetic fields and pulsed radio frequency energy. Uncertainty was also expressed regarding the role of electrical stimulation in pressure ulcer prevention. More recently, interest in electrical stimulation of wounds has continued with at least 5 case series and 5 randomised controlled trials reported since the beginning of 2017.

This presentation will consider the various modes of action proposed for electrical stimulation in wound healing with discussion around the latest technologies used to stimulate wounded tissue. This will include so-called combination therapies involving the use of electrical stimulation with ultrasound. Finally, a recent case series of patients with lower leg wounds will be reported where the wounds were treated with a novel neuro-muscular electrical stimulation device.

Conclusion: Despite continued interest in the use of various forms of electrical stimulation in wound healing there remains uncertainty over the best treatment regime.
[KS 6.2] PHOTOBIO MODULATION (PBM) IN TISSUE REPAIR AND WOUND HEALING

Marco Romanelli
Azienda Ospedaliero-Universitaria Pisana, Department of Dermatology, University of Pisa, Pisa, Italy

Learning objectives of the presentation: To review the role of photobiomodulation in managing chronic wounds

Overview of the key messages: The disorders that may be treated with visible light phototherapy cover a broad range of conditions, from improvement of both acute and chronic wound healing process, to the treatment of different skin disorders such as acne vulgaris, psoriasis and hair growth. There has been an increasing amount of biomedical research to substantiate physiological responses to visible light. The first consideration involves the assumption that low power visible light have an effect on a living biological system, the photons must be absorbed by electronic absorption bands belonging to some molecular chromophore or photosensitizer. The second important consideration involves the use of the definition of photobiomodulation (PBM) as the most suitable term to describe the molecular process and resulting beneficial photobiological responses involved in the treatments of nonthermal low-dose light therapies. Moreover, even though therapeutic doses are poorly defined, it should be noted that low-dose light therapies follow a biphasic response that is described by the Arndt–Schulz law, where a weak stimulus can improve a specific biological function and a stronger stimulus abolish the activity or may be toxic.

Conclusion: New treatments for chronic wounds have led to improvements in lesion management and in the quality of assistance provided by medical and paramedical staff, but lesion monitoring methodologies have not kept pace with this progress. The constant improvement of diagnostic and therapeutic procedures, together with the increase of life lasting, results in a higher frequency of patients suffering from chronic cutaneous ulcers. Due to the high costs these pathologies imply for treatments and often poor outcomes in terms of quality of life, a decrease in patients’ hospitalization, without a corresponding worsening of the quality of therapy, would provide important benefit. Moreover, since the healing process is remarkably slow, the clinical perception of the phases that lead a chronic wound to complete restoration is often penalized; this effect is dramatically amplified in those cases in which the patient is followed by more than one operator.

[KS 6.3] EFFICACY OF LASER THERAPY AT DIFFERENT WAVELENGTHS ON PRESSURE ULCERS AND ITS EFFECT ON SERUM LEVEL OF IL-6, TNF-α AND IL-2

Jakub Taradaj
Academy School of Physical Education, Department of Physiotherapy Basics, University of Manitoba, College of Rehabilitation Sciences, Katarzyna, Poland

Learning objectives of the presentation: To evaluate the effect of laser irradiation at different wavelengths on the activity of inflammatory mediators at particular stages of the wound healing process.

Overview of the key messages: Forty-three patients were recruited, treated, and analyzed (group A - 940 nm: 11 patients; group B - 808 nm: 10 patients; group C - 658 nm: 12 patients; group D - sham therapy: 10 patients). Patients received a basic treatment, including repositioning and mobilization, air pressure mattress and bed support surfaces, wound cleansing and drug therapy. Additionally, patients received laser therapy once a day; 5 times a week for 4 months in use of a semiconductor lasers (GaAlAs) which emitted a continuous radiation emission at separate wavelengths of 940 nm (group A), 808 nm (group B) and 658 nm (group C). In group D (sham therapy) laser therapy was applied in the same manner but the device was off during each session (only the applicator was switched on to scan pressure ulcers using none coherent red visible light). The positive changes in the measured serum interleukin (IL-2, IL-6) and cytokine (TNF-α) parameters appeared to be connected only with the wavelength of 658 nm. The significant change in pro-inflammatory mediator levels [interleukin 2 (IL-2) with p < 0.001 and interleukin 6 (IL-6) with p < 0.006] was noticed after two weeks of laser therapy. In the other groups, the inflammation was also reduced, but the process was not as marked as in group C. Similarly, in the case of tumour necrosis factor (TNF-α) concentration, where after two weeks of treatment with irradiation at a wavelength of 658 nm, a rapid suppression was observed (p < 0.001), whereas in the other groups, these results were much slower and not as obvious. Further, the analysis shows that there were no differences between groups A (940 nm), B (808 nm) and D (sham therapy), which indicates that laser therapy at these wavelengths does not bring an effective anti-inflammatory effect. However, the results in group C (658 nm) were significantly better than those obtained in the others groups

Conclusion: It seems that the inhibition of inflammatory is connected with laser irradiation at a wavelength of 658 nm and its influence on efficient healing rates of pressure ulcers (observed in RCTs). Laser therapy at wavelengths of 940 and 808 nm does not significantly affect the above-mentioned repair processes, which may explain its low effectiveness in the literature of the treatment of pressure ulcers and contributes to the confusion when determining the effectiveness of laser therapy.
Learning objectives of the presentation: Specific aspects regarding the use of oxygen (O2) in wound healing; the role of O2 and hypoxia in the wound healing process; patient perspectives; the cost-effectiveness of O2 therapies as well as discussions of what remains controversial and suggestions for future actions are detailed as for EWMA document. [1]

Overview of the key messages: Sufficient availability of O2 is essential for healing of wounds. The patient’s perspective seems likely to have an impact on their uptake, experience and the perceived success of O2 therapy. This is a general term that includes Hyperbaric Oxygen Therapy (HBOT) and Topical Oxygen Therapy (TOT). HBOT is well-established. TOT remains controversial. There is evidence that HBOT improves healing by reoxygenation of tissues, exerting an anti-inflammatory effect, decreasing inflammation and oedema, stimulation of angiogenesis and vasculogenesis as well as stem cells in specific subpopulations. The clinical evidence for the efficacy of TOT is not homogeneous and ranges from uncontrolled case reports to RCTs with some limitations. In spite of this TOT is easy to handle, safe, may be potentially effective and easily carried out in everyday clinical or home-based practice. The important question about the concomitant action of TOT with other therapeutic procedures, including HBOT, vascular interventions or skin transplantation, is still unanswered. Position statements for TOT for chronic wounds by the Undersea and Hyperbaric Medical Society (UHMS) and the International Working Group on Diabetic Foot (IWGD) stated that application of TOT should not be recommended before having scientific evidence of its effectiveness. [2] The value of the HBOT for the money spent has been estimated in several countries considering the Number Needed to Treat (NNT). In all the countries evaluated, the HBOT cost is from neutral to likely saving compared to the cost of amputation standardized for the NHS-UK value (except Norway and the US due to the high cost of HBOT sessions). [3-4]

Conclusion: Oxygen is a pivotal substance in wound healing and the clinical and scientific interest on its role will improve in the future. For further clinical decisions it would be meaningful to improve O2 measurements techniques. There is a distinct need for well-designed prospective and controlled studies to critically evaluate the efficacy and effectiveness of O2 treatment for the management of non-healing wounds. In particular with increasing antibiotic resistance the antimicrobial effects of O2 should be part of future strategies.

Reference:

Introduction: Sustained deformations cause the primary cell and tissue damage in pressure ulcers by producing cell distortions that within 10s-of-minutes affect cellular integrity and function. Plasma membrane poration in deformed cells has been demonstrated experimentally, altering membrane transport and inevitably causing en-mass loss of cell homeostasis, followed by necrotic/apoptotic cell death. An inflammatory response including edemas develops, eventually leading to macroscopic damage spread across tissue layers. The fundamental design requirement from medical devices for which pressure ulcer prevention (PUP) claims are made, or any other device that may apply deliberate or unintentional mechanical loads onto tissues, is therefore alleviation of skin and deeper tissue deformations.

Methods: This talk explores implications of the above engineering requirement and how it should be met for effective PUP. Specifically, design considerations for PUP by reducing tissue exposure to sustained deformations are primarily: (1) Maximization of the device-body contact area; (2) Minimization of device-body contact forces, particularly frictional forces; (3) Compatibility of mechanical/thermal properties of the device to those of contacting tissues; (4) Stability of the aforementioned properties over the time of intended use, for continuous protective efficacy, given potential exposure to microclimate, body fluids and wear- and tear factors.

Results: Examples describing medical scenarios relevant to implementation of the above engineering design criteria will be illustrated, mainly using finite element modelling, to visualize tissue deformations resulting from contact with medical devices. Specific considerations leading to a absorbance of mechanical loads in devices and hence to relief of tissue loads will be highlighted and discussed.

Conclusion: Bioengineering does great service to PUP through innovative, integrated experimental-computational design of safer environments for at-risk patients. Holistic PUP strategy should generalize the above design criteria to all medical devices, either those that are prescribed specifically for PUP e.g. support surfaces or prophylactic dressings, or devices given for other medical reasons that may impose risk for tissue damage.

References:
**[KS 7.2] CLINICAL OBSERVATIONS AND PREVENTION IN YOUNG POPULATIONS: HOW TO ORGANISE A NURSING TEAM FIGHTING AGAINST MEDICAL DEVICE-RELATED PRESSURE ULCER IN BABIES**

Anna-Barbara Schlüer  
University Hospital Zurich, Clinical Nursing Science, Zurich, Switzerland

Learning objectives of the presentation: Pediatric patients are vulnerable to Pressure Ulcer development. Critical ill pediatric patients undergo intense treatment and care with a high need for device related live saving strategies. Devices that affect the skin are a major risk factor for pediatric patients. Category 1 Pressure Ulcers are a major nursing care issue in neonates and infants, and require appropriate preventive measures to avoid any further harm to the vulnerable skin.

Overview of the key messages:
- Strategies to enhance the knowledge and skills of nurses to detect potential harmful medical devices in their patients.
- How to enhance the responsibility for preventive interventions in nurses when it comes to pressure ulcer risk in infants.
- Proposition of potential good practice examples how to implement effective pressure ulcer preventive interventions driven by nurses.

Conclusion: It is vital that pediatric health care staff are trained to recognize the early stages of pressure ulcers. Specialized preventive interventions based on the specific needs of the pediatric population are mandatory, including a careful assessment of younger patients with regard to their inability to distinguish and sense pressure on the skin adequately.

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**[KS 7.3] UNDUE PRESSURES, MATERIALS AND PROPOSITIONS: EXPLORING THE COMPLEX WORLD OF MEDICAL DEVICE-RELATED PRESSURE ULCERS IN ADULT PATIENTS. IS THERE A PLACE FOR "SMART MATERIALS"?**

Dan Bader  
University of Southampton, Faculty of Health Sciences, Southampton, United Kingdom

To achieve critical functionality, many medical devices must exert mechanical loading to a range of soft tissue sites with tolerance levels compromised by ageing and co-morbidities, such as diabetes and neuropathy. This mechanical state presents a complex interaction and can lead to tissue breakdown, in the form of medical device-related pressure ulcers (MDRPU). In other settings, active and passive changes in lying and sitting postures can be introduced as a preventative measure to relieve pressures. However, functional medical devices are generally in a fixed position for sustained periods with limited capacity for off-loading. This presentation will highlight the current state in which devices are based on generic designs, not accommodating for patient variability and utilise relatively stiff materials, which do not match the mechanical compliance of potentially vulnerable skin. In addition, there is also inadequate guidance as to how the devices should be applied in the clinical setting. It will also discuss the evaluation of different existing medical devices in terms of the skin response (Worsley et al. 2016; 2018). Such studies have identified many of the critical features for future designs based on a raft of measurement techniques, incorporating sensors to alert early signs of damage, and the potential of novel smart materials to control the conditions at the device–skin interface. The overall goal of these improved designs is to reduce the incidence of MDRPUs, thus minimizing device rejection with the associated cost implications.

References:

Serena Crucianelli
Bambino Gesù Children’s Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy

Introduction: The improvement of resuscitation procedures dramatically improved the rate of survival of critically ill children and evolution of related devices. This kind of assistance is carried on in technological settings by the means of fine monitoring and infusion lines departing from and arriving to the child’s body. Benefits represented by intensive care can be easily wiped out by injuries that can occur when the use of devices is not coupled with the knowledge of their effects on skin integrity and the peculiarities of child’s skin.

Materials and Method: From January 2015 to January 2018, all children aged from 0 to 14, admitted to Intensive and semi intensive care units at our institution were included in our study and screened for pressure injuries of any stage deriving from internal and external devices. Patient’s features, data and anamnesis were recorded together with localization, stage and kind of injuring device. The results have been discussed with leading nurses of analysed units and preventing measures practically showed to assistance-nurses during daily counselling and formative events.

Aim: The aim of this study is both assessing the incidence of device-related injuries at the Italian Paediatric referral Hospital and sensibilizing Intensive and sub-intensive care nurses to the importance and need of preventing measures as well as sensibilizing bio-engineer and industries in producing shapes and material thought for children’s skin.

Results: In 3 years 1279 consecutive critically ill patients admitted to PICU and sub-intensive units at our institution (35 intensive care beds) were screened for device related injuries. The incidence in 2015 was 14.8%, whereas decreased to 4.2% at the end of 2017. A total of 294 device related lesions were reported in the study; respectively. Ulcers passed from stage IV-III (58%) to stage I-II (84%). The external medical devices (73% of lesions) resulting more involved were infusion lines (including ECMO), airways devices (nasal cannula, n-cap), G-I devices (nasogastric tube, temperature-oxygenation-pulse probes, cardiac monitoring (ECG derivations), neurological monitoring (bis, EEG derivations) orthopedic devices (cast and external fixators). Prevalence of injuries caused by internal devices (27%) as synthesis materials, internal defibrillators, pacemakers, pedestal. No device-related injuries during years 2017 influenced dismissal time. The incidence of injuries related to external devices was inversely proportional to the ratio nurse:patient; the presence of a tissue viability nurse working in the Unit, and to pre-existing skin condition whereas it resulted directly proportional to the number of devices, to child’s comorbidities (hemodynamic instabilities, previous major surgery, requirement of active ventilation assistance, infections, and multiple therapies). Variables related to internal devices causing injuries were not all standardisable but most of them dealt with surgery (incorrect positioning, incorrect surgical procedure) or immediate post-operative time (infection of surgical site, incorrect offloading, and dislodgement).

Conclusion: Data and results acquired during these three years of study confirm that patient’s tailored preventing protocol together with the presence of an adequate number of trained nurses can counteract onset, severity and sequelae of device related pressure injuries. Particularly, the prevention of internal devices implies the involvement of surgeons. Above all, devices thought for children should reflect necessities, skin peculiarities and solve lesivity created by shapes and too hard materials.

Reference:

[KS 8.1] SIMPLIFIED, PORTABLE, CANISTERLESS NPWT- SYSTEMS: A LEADING TECHNOLOGY WITH PSYCHOLOGICAL OPTIMAL BENEFITS

Valentina Dini
Dept. of Dermatology, University of Pisa, Pisa, Italy

NPWT has a role in managing chronic, complex, and infected wounds. Clearly, NPWT has changed the approach to the management of wounds. Technological advances in the interface dressings, occlusive drapes, the user interface, solution delivery, and portability have triggered spikes in the number of publications in the past and will similarly result in a greater number of future publications.

Negative-pressure wound therapy has developed since the use of vacuum-assisted closures in the early 1990s. The healing mechanism of NPWT is classified as follows: wound shrinkage or macrodeformation, microdeformation at the filler – wound surface interface, fluid removal and stabilization of the wound environment. Macrodeformation refers to a kind of wound shrinkage, and microdeformation refers to the process whereby undulation is induced in the wound surface by the negative pressure of NPWT suction. Fluid removal reduces compression of the microvasculature and increases blood flow. NPWT removes toxins, bacteria and exudate together with fluid, which contributes to the stabilization of the wound environment. Portable NPWT functions in the same manner as conventional NPWT. Moreover, portable NPWT devices enable homecare NPWT and afford increased mobility to patients, which gives the patients better quality of life than standard NPWT systems do.
[KS 8.2] USE OF NEGATIVE PRESSURE WOUND THERAPY TO PREVENT SURGICAL SITE INFECTION (SSI)

Steven Jeffery
Queen Elizabeth Medical Center - University Hospitals Birmingham NHS Foundation Trust, Birmingham, United Kingdom

Learning objectives of the presentation:
- To investigate the consequences for patients of developing a Surgical Site Infection (SSI).
- To review the current evidence base in this topic.
- To evaluate the role of NPWT dressings in the reduction of SSI.

Overview of the key messages: Surgical site infections (SSIs) incur a substantial cost and resource burden for patients and health care providers. As a result of developing an SSI, patients may require a longer length of stay, a possible delay in adjuvant therapy, and adverse psychological effects.

Conclusion: The burden of evidence points to negative pressure dressings applied to closed surgical incisions results a significant reduction in both wound infection and seroma formation.

[KS 8.3] HEALING EFFECTS ON NEONATAL AND PAEDIATRIC WOUNDS TREATED WITH A NEGATIVE PRESSURE WOUND THERAPY: NO MORE INTO THE BLACK LIST FOR SMALL PATIENTS

Guido Ciprandi
Bambino Gesù Children’s Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy

Background: NPWT is a simple and safe procedure for complex pathologies in a challenging heterogeneous age and usually for small patients affected by multiple comorbidities. The aim of this monocentric experience is to demonstrate the positive undeniable outcomes irrespective of age, weight, severity of the treated wounds and admission into critical areas.

Methods: We realized a prospective study on 573 patients aged from premature age up to 18 years, average 6.2yrs. A whole amount of 612 wounds were treated with a pNPWT during a 10.2yrs period, from January 2007 up to December 2017. All different NPWT modalities were available, such as CI, instill, canisterless, mechanical technologies. The Skin Care Team (nurse practitioners, plastic, cardiothoracic and orthopaedic surgeons, neurorehabilitator, epidemiologist) analyzed the data collection forms, focusing on age, infection, pain related procedure, adoption for complex wounds other than pressure ulcers, delayed primary closure, major surgery, migration and heal stability with an average 6 months follow up.

Results: 24% aged less than 1yr and 6% were prematures. The average duration was 16 days. 56% were submitted to a traditional NPWT, whereas 38% were simplified and 11% CI-NPWT. The only cause for a non-decreasing size was a deep infection observed in 6% of the cases. 12% of children received a major surgical procedure (skin grafts 8%, flaps 4%). 3% of patients were lost to follow-up. Other than on PUs, pNPWT has been successfully applied on wounded babies affected by huge abdominal wall lesions, craniofacial soft-tissue defects, gangrenous facial diseases and autoimmune complex wounds. The child’s comfort as well as the mother’s acceptance has been verified respectively on 95% and 92% of the situations.

Conclusion: More than two hundred wounds pertinent to congenital or acquired severe conditions could be positively treated with pNPWT principles, with only minor and transient complications. NPWT have to be considered no more than a toy, not invasive, touchable, no more than a complex dress, not interfering with social activities and the caregiver nursing easy to be achieved. Independently from the body area, pNPWT is tailored on the situation as well as the fillers and liners are. Wounded prematures and micro premies, born before 26 weeks of gestation, can be safely treated using microporous thin foams, negative pressures not exceeding 40mmHg, low intensity and intermittent modality.

References:
FOCUS ON PERSONS WITH SPINAL CORD INJURY: HOW TO ASSIST THEM IN POSTURE AND MOBILITY

Luc Téot¹, Sergiu Fluieraru¹, Julian Vitse¹
¹ Montpellier University Hospital, Plastic and Reconstructive Surgery Department, Wound Healing Team, Montpellier, France

Negative pressure was developed during ages, the most prominent step having been realised by Argenta in 1997 who proposed a kit including a pump, a foam and connections, the wide being realised via an adhesive film. At this time the skin defects including pressure ulcers started to be treated using a topical negative pressure machine. In 2015 Dumville concluded in a Cochrane review that there was no benefit in managing pressure ulcers using NPWT, in spite of more than 930 articles reporting positive results from clinicians found in the literature. Since 2012 the instillation therapy combined with a negative pressure wound therapy machine allows an extra promotion of granulation tissue estimated to 30% (Kim & Attinger) when using saline (Kim & Téot), and more recently the authors developed new foam able to cover the deep part of pressure ulcers in less than 6 days. This fenestrated foam is able to debride sloughy tissues without the need for a surgical debridement. The mode of action is still to be confirmed but clinical observations show that undesired tissues are scratched from the ground and directed towards the top of the microcolumns inside the fenestrations. A large randomised controlled study focused on pressure ulcers is necessary to confirm the first clinical series recently published.

References:
[1] VAC machine
[2] VAC instd

HEALING WITH NPWT: THE STATE OF THE ART IN 2018

FOCUS ON PERSONS WITH SPINAL CORD INJURY: HOW TO ASSIST THEM IN POSTURE AND MOBILITY

Anthony Gélys¹, Violaine Leynaert¹, Jean Luc Ducros³, Brigitte Baroix³, Christian Herlin¹, Benoit Nicolas³
¹ Société Française de l’Escare, Centre Mutualiste Neurologique Propara, Montpellier, France
² Centre Mutualiste Neurologique Propara, Montpellier, France
³ CHU Lapeyronie, Département de Médecine Physique, France

Pressure ulcer (PU) is a common secondary condition following spinal cord injury (SCI). Its prevalence is estimated between 30 to 40 percent in Western Countries, and is thus a major public health issue in this specific population. As sitting position is the main posture in everyday life in persons with SCI, most of PU are localised on the pelvic area, more precisely on the ischiatic, trochanteric or sacro-coccygeal areas. PU prevention is both based on nutritional balance, adequate prevention devices choice (cushion, mattress…) and self-management techniques.

PU prevention devices prescription requires a seating and mobility multidisciplinary approach, including technical aids for posture and mobility (wheelchair, transfer devices). Beside cutaneous dimension, clinicians need to take into account postural deficits and their reducibility. In persons with SCI, a special attention should be paid to orthopaedic consideration, especially to weight bearing shoulder evaluation. Finally, PU prevention technical aids choice require a precise estimation of the technical aids impact on daily life activity, and often needs several trials in ecologic conditions.

The compromise between these dimensions can be hard to reach and clearly justifies a methodical and multidisciplinary approach, as well as a structured long term follow-up.
Learning objectives of the presentation: Despite high quality guidelines underpinning pressure ulcer care (EPUAP/NPUAP/PPIIA, 2014), pressure ulceration still poses a significant financial impact on health care services in treatment and staff costs as well as having a profound effect on the health and quality of life of individuals suffering from them. A review of the international literature yielded only four studies that explored the role of the occupational therapist in pressure ulcer care, none of which identified the use of technology as a tool in daily practice.

To explore the outputs of technologies such as interface pressure mapping systems and accelerometers in enabling the therapist to accurately monitor seated behaviour and enhance practice through targeted interventions to prevent sitting acquired pressure ulceration.

Method: Reviewing the findings of two recent research studies conducted by the author with 'at risk' cohorts (spinal cord injury; elderly orthopaedics), using accelerometry and seated interface pressures, this paper will highlight how useful this technology is in clinical practice to monitor weight shifts and repositioning behaviours.

Overview of the key messages: Both studies illustrated that the majority of individuals did not adhere to the frequency or magnitude of movements currently recommended to redistribute seating interface pressures. When repositioning was performed it was ineffective in reducing seated pressures.

Conclusion: In an era of personalised medicine, technology has an important role to play in providing the service user, caregivers and healthcare staff with important biofeedback information about seated behaviours, particularly those that minimise the risk of developing sitting acquired pressure ulcers. This information can augment occupational therapists’ clinical decision-making in maximising active pressure ulcer prevention.

Learning objectives of the presentation:
- To understand the role of the podiatrist as part of a pressure ulcer prevention team.
- To understand the unique anatomy of the foot, its compensatory mechanisms in order to maintain ambulation.
- To understand the importance of the absence of pain in maintaining ambulation.
- To be able to understand the role of footwear in the prevention of pressure ulceration of the foot and how to advise on shoe types.
- To understand the role of systemic disease on the structure and function of the foot.

Overview of the key messages: This presentation will give the delegate tools to complete a basic foot and mobility assessment in order to identify risk factors which are not identified in current assessment tools.

As part of a holistic patient assessment the feet and shoes should be examined. Pain free ambulation is important in order to prevent the development of pressure ulcers in ‘at risk’ individuals and keep them moving. The podiatrist plays an important role educating in self-care and prevention strategies as part of a multidisciplinary team.

Certain systemic diseases complicate the management of pressure ulceration on the foot and increase the risk of developing such ulceration. The management of such systemic diseases in order to promote long term gains in health related quality of life and pain free ambulation is imperative.

Conclusion: Podiatrists are an integral part of the pressure ulcer prevention team. Through assessing footwear and ambulation as part of a multidisciplinary team Podiatrists are able to put in place interventions to promote pain free ambulation both in pressure ulcer prevention and treatment. Every team needs a podiatrist!
For certain categories patients preventing pressure ulcers is a lifetime job, they are at risk 24 hours a day, need to prevent and be observed all the time. A great deal of these individuals have some kind of care. Many programs to prevent pressure ulcers like Zero Pressure Ulcers or the SSKIN-bundle are focused on the carers role. 

There is a considerable amount of people living on their own while at risk for pressure ulcers, without carers fussing around all the time. Literature describes how educational programs and electronic reminding systems help the individual for some time, but that motivation after time is dwindling. 

Carers and therapists have a very important role to keep the individuals motivation up. Do therapist realise this role!

**Learning objectives of the presentation:** Organization of a wound care unit in 18 hospitals in northern Italy

**Overview of the key messages:** Why and how to organize a wound care unit in more than one structure:

The Wound Care Unit (WCU) of the Istituti Clinici Zucchi Monza was founded in the Gruppo San Donato (GSD) University & Research Hospitals in 2002.

It was born as an ambulatory activity using surgery ward for aggressive treatment. But we early felt the need to grow more with our activity, creating a complex wound care unit with autonomous ambulatory spaces, an autonomous ward with 20 beds and a dedicated staff of physicians and nurses. Then we chose to maintain the name of “Centro di Vulnologia”. The ambulatory activity grew to about 100,000 performances in a year. In 2017 we thought that our experience in wound care was mature enough and it was necessary to involve all hospitals in GSD, ensuring the standards of excellence of our WCU in each of them. We kept the concept of our team work unaltered: a team where there are specific and complementary skills, a team where everyone has his role and his task, but where we all have the very same goal.

The coordinated, multidisciplinary approach, looking to the new concept of regenerative medicine is fundamental in each of the 17 hospitals. The extension of the wound care activity in 17 hospitals of our group can guarantee the presence of specific competencies in wound care, shared guidelines and protocols, and of course, of effectiveness and efficiency that could allow a good performance in the treatment of our patients, even with considerable economic savings, in every single one of them.

We aim to create a team of competent professionals, trained and interested in wound care and in the regenerative medicine, each one in his specific fields of competence. This has happened; this is still happening and will continue to happen thanks to specific training meetings and residential courses in our Wound Care Unit. The Wound Care Unit of the GSD University & Research also has competence and study groups in preparation of protocols in prevention of pressure ulcers, in nutrition, in wound care, in prevention of surgical site complications, and in NPWT.

Like Keith Harding once wrote: “If you always do what you’ve always done, you’ll always get what you’ve always got.”

**Conclusion:** Guarantee the unity of guidelines and shared protocols for excellent performances.
[KS 10.2] CRITERIA FOR "QUALITY" DEFINITION OF THE
SO-CALLED ADVANCED DRESSINGS AND NEW
TECHNOLOGIES

Alessandro Greco
Outpatient Wound Care Centre, Local Health Care System Frosinone, Rome, Italy

To obtain maximum performance from dressings under various clinical conditions, suitable parameters to
assess the dressing quality need to be identified. To date, there are few standardised tests available for assessing
the quality and performance of the dressings in an objective and non-operator dependent way; moreover,
there are no well-defined criteria for assessing the efficacy and quality of wound dressings. The evaluation of
dressings is often simplistic and based on the subjective opinion of the health-care professional.

In this talk the author will introduce a new paradigm: to identify specific parameters suitable for measuring
the performance of the so-called advanced dressings; and to recommend laboratory tests able to evaluate
these specific criteria in an objective manner.

[KS 10.3] HEEL PRESSURE INJURIES: NEED FOR A
CONSENSUS CONFERENCE

Massimo Rivolo
Accelerate CC, Italy

Learning objectives of the presentation:
- To provide an overview on aim and scope of the International Consensus Conference the Italian Nurses’
  Association for Wound Care is organizing.
- To explain the six areas AISLeC has investigated and provide a rationale for them.

Overview of the key messages: To understand the importance of the assessment and management of
Heel Pressure Injuries (HPIs) and the need of having, whether it is possible, good evidence-based
recommendations in the clinical settings. The areas taken into consideration are: 1) vascular assessment, 2)
local treatment stage I and II, 3) local treatment stage III and IV, Depth unknown (DU) and suspected deep
tissue injury (SDTI), 4) referral criteria 5) biophysical agents 6) offloading devices. AISLeC has also included
three populations: Adults, Diabetics a Pediatrics.

Conclusion: The CC will give the opportunity to start a formal process to define therapeutic pathways on
managing HPIs and it will open a new series of clinical questions for further research. The formal
recommendations will be presented in November in Milan in occasion of the National Congress.
[KS 10.4] ACHIEVING EVIDENCE-BASED PRACTICE: CALCANEAL ULCERS’ MANAGEMENT IN INFANTS AND CHILDREN

Valentina Vanzi
Bambino Gesù Children’s Hospital, Center of Excellence for Nursing Scholarship, Rome, Italy

Learning objectives of the presentation: Heel ulcers are a widespread and costly health-care issue. Although they represent a major burden to patients and caregivers and have a harmful effect on patients’ quality of life, their aetiology is poorly understood and there is a lack of evidence-based research on their prevention and management. This critical issue concern children and infants as well and health care professionals caring for these vulnerable patients need to be able to recognize this clinical problem promptly and to treat it in an appropriate way, following evidence-based wound care principles.

Overview of the key messages: Empirical research about pressure ulcer frequency and most affected anatomical locations in the paediatric and neonatal population is scarce. Although children and infants are often excluded from PUs prevalence studies, several epidemiological studies show a total PU prevalence rate variation between 0.47% - 27.7% for this specific groups and among them from 3.6% to 50% are heel ulcerations [1,2]. Considering the anatomical and physiological differences between adults and children, serious concerns arise about the use of adult protocols and products for the management of calcaneal ulcers infants and children. Moreover, there is a lack of pressure-relieving devices such as heel troughs and splints needed to reduce or relieve the pressure on the ulcer specifically designed for infants and toddlers.

Conclusion: Heel ulcerations represent a relevant but underestimated problem in ill children and infants. Regrettably, paediatric and neonatal wound care is still mainly based on deductive principles of adult wound care rather than valid and solid evidences. Further research is required to understand this phenomenon and to elaborate evidence-based recommendations that specifically address the paediatric population’s needs.

References:

[KS 11.1] PROTECTING THE SKIN OUR PATIENTS LIVE IN: IMPLEMENTING STRATEGIES TO PREVENT PRESSURE ULCERS

Helen Stropp1, Christina Lydon1
1 Tallaght University Hospital, Dublin, Ireland

Introduction: The PUTZ Team developed a number of pressure ulcer prevention strategies using the Plan Do Study Act cycle. The learning from PUTZ workshops indicated the importance of patient involvement so a TUH Pressure Ulcer Prevention Patient Information Leaflet was developed to inform patients about prevention, treatment and management of pressure ulcers. A PUTZ Staff Engagement Team was established to educate staff and monitor PUTZ progress on their allocated wards. The run charts enabled us to track progress to date. A number of strategies were implemented to assist in bringing the number of pressure ulcers to zero. SSKIN Bundle rolled out across all wards, Safety Cross to measure the incidence of pressure ulcers, PUTZ Equipment Audit, PUTZ Flag for patients attending dialysis, IRD Moisture lesion Pressure Ulcer Differentiation Chart to assist with diagnosis, Maelor Chart redesigned to increase compliance. PUTZ included in preoperative orthopaedic education for patients, included in the handover and safety pause. The PUTZ monthly statistics are sent to the Director of QSRM and the Director of Nursing who present them to the Executive Management Team.

What did you do and how did you do it? Which actions and steps did you take?
The safety cross was utilised on the wards to monitor the number of new pressure ulcers as well as, monitoring patients transferred/admitted with pressure ulcers. The 5 Whys is used as a method to identify the root cause of the pressure ulcer. This is to rectify the root cause to prevent another patient getting a pressure ulcer.

What were the results and improvements seen?
The number of newly acquired pressure ulcers has reduced by 50% The number of days free from newly acquired pressure ulcers is increasing.

Discussion and further steps: The Tallaght University Hospital PUTZ Team will continue the journey to zero by rolling out the PUTZ to all wards and sustaining the change through in-house collaboration.

Continue to use PDSA for developing further pressure ulcer preventive strategies. We will continue to audit the SSKIN Bundle for compliance. An eLearning programme for staff on pressure ulcer prevention will be developed.
[KS 11.2] AUDIT OF INCONTINENCE-ASSOCIATED DERMATITIS PREVALENCE AND SKIN BARRIER PRODUCT USAGE IN NURSING AND RESIDENTIAL HOMES IN WELSH HEALTH BOARD

Delia Keen1, Jaqueline Griffin1, Sarah Bradbury2
1 Powys Teaching Health Board, United Kingdom
2 Mediccanus International, London, United Kingdom

Introduction: Incontinence-Associated Dermatitis (IAD) is a widespread problem, particularly in long-term care settings, with confusion between IAD and pressure ulcers (PUs) leading to inappropriate care planning. Further confusion also arises due to the multitude of cleansing and barrier products available, causing inconsistencies with skin care across local areas.

A two-phased audit was undertaken in nursing and residential homes in a Welsh health board to determine the impact of staff education and implementation of an IAD prevention pathway on IAD prevalence and skin barrier product usage.

Method: Phase 1 collected data using standardised audit forms from 24 Nursing Homes and larger residential homes on IAD prevalence and the use of skin barrier products. Results revealed a need for further education relating to barrier products, their indications for use and correct application to further improve patient care.

An education programme was implemented with dissemination of a local IAD prevention pathway and skin care training delivered in varying formats by a registered nurse. A re-audit was conducted twelve months later using an audit form consistent with the baseline form. Returned forms were analysed using descriptive statistics for comparison with baseline data.

Results: A response rate of 75% (n=18) was received for phase 2, with information regarding 577 residents returned. 4.3% of residents with incontinence were recorded as having IAD, and a PU prevalence of 11.7% 67.1% of residents were being treated with a skin barrier product.

96.1% (previously 60.5%) of the skin barrier products in use were the formulary products of choice. 100% (previously 83.3%) respondents stated they used a skin barrier product for prevention of IAD and 66.7% (previously 70.8%) for IAD management. 27.8% of respondents stated they used a skin barrier product for preventing PUs, compared to 70.8% in the baseline audit.

Discussion: The baseline IAD prevalence rate was 5.2% and now stands at 4.3%. This is below the minimum documented prevalence suggested to be between 5.7% and 27% in long term care settings. Phase 2 results demonstrate significant changes in practice, particularly in closer adherence to a local prescribing formulary and increase in preventative application of skin barrier products to residents at risk of IAD. There remains some misconception that skin barrier products help relieve PUs, although this has dropped considerably.

Conclusion: Implementation of the education programme has revealed encouraging trends in practice, demonstrating the benefit of these interventions for carer knowledge and patient care.

References:

[KS 11.3] STUDENT NURSE PREPARATION FOR PRESSURE INJURY PREVENTION PRACTICE: A QUALITY IMPROVEMENT PROJECT USING SOCIAL MEDIA AND TEACHING ROUNDS

Julie Santy-Tomlinson1, Angela Oswald2, Karen Harrison2
1 University of Manchester, Division of Nursing, Midwifery and Social Work, Manchester, United Kingdom
2 Hull & East Yorkshire Hospitals NHS Trust, Hull, United Kingdom

Introduction: Most pressure injuries are preventable through simple actions. Despite the availability of evidence-based guidance, pressure injuries remain a problem for hospitalised patients (Sving et al 2014) with as little as 10% of patients receiving enough preventive care (Vandervee et al, 2007).

Gaps in nurses’ skills and knowledge are significant reason for lack of progress in reducing incidence (Simonetti et al 2015) and student nurses may not be sufficiently prepared to practice effectively (Cullen et al 2013), impacting on their practice as future qualified nurses.

Degree programmes include many aspects of nursing care and it is not possible for all aspects of practice to be covered in detail. The authors recognised gaps in local student nurses’ knowledge about evidence-based pressure injury prevention practice and the need to extend their knowledge so that, on registering, they were better prepared to lead effective preventive practice. To address these needs, a Service Improvement Project has been underway for the last 2 years. The aim of the project is to utilise student placements within the authors’ acute hospital UK NHS Trust to undertake clinically based education focused on pressure injury prevention and on engaging with patients.

Methods: Quality improvement project: The authors recognised gaps in local student nurses’ knowledge and the need to extend their knowledge so that they were better prepared to lead effective preventive practice. A 2 year ongoing Service Improvement Project aims to utilise student placements to undertake clinically based education focused on pressure injury prevention and on engaging with patients.

Two elements of the project will be discussed:
1. Using social media to engage with student nurses
2. The use of teaching rounds to facilitate improved knowledge

References:
Jeannie Donnelly
Belfast Health and Social Care Trust, Belfast, United Kingdom

Introduction: Within the author’s organization all pressure ulcers are investigated and classified as avoidable or unavoidable. ‘Avoidable’ means that the person receiving care developed a pressure ulcer and we, the provider of care, did not do one of the following:
- evaluate the person’s clinical condition and pressure ulcer risk factors
- plan and implement interventions that are consistent with the person’s needs and goals, and recognised standards of practice
- monitor and evaluate the impact of the interventions
- revise the interventions as appropriate

A review of Trust pressure ulcer incidents indicated that the main reasons why many pressure ulcers are deemed avoidable are errors in documentation. This paper will therefore describe a number of initiatives utilized by staff within the organization’s fracture unit to reduce gaps in SKIN Bundle documentation.

Methods: All pressure ulcer incidents were analysed over a 12-month period. A Pareto diagram was used to illustrate key themes. Following this, a local improvement group was established to test a number of initiatives using the IHI Model of Improvement [1]. These included ‘bedside handover’ and a red ‘Stop’ Sign. The impact of these initiatives was analysed using statistical process control charts [2].

Results: Initial analysis indicates that the number of errors in terms of documentation have decreased by 50%. As this project is ongoing, the full results will be reported at the conference. This will include a full analysis of outcome, process and balancing measures.

Conclusion: A fractured hip is a devastating traumatic experience, which can permanently alter the lives of elderly people - most do not regain their independent lifestyle and face ongoing disability and prolonged institutionalization. It is therefore important that these patients are not burdened with potentially avoidable complications such as pressure ulcers. Local improvement projects using the IHI Model of Improvement can help practitioners to test change on a small scale. It enables them to test new initiatives with minimal risks and expenditure (time, money) to patients and staff. Importantly, it allows staff to learn from ideas that work as well as those that do not.

References:

Franco Bassetto
Università Degli Studi DI Padova, Padova, Italy

Learning objectives of the presentation: This work wants to present the used of spare muscles surgical techniques as, for example, fasciocutaneous flaps or locoregional flaps, in the treatment of 4 degree pressure sores.

Overview of the key messages: Pressure sores are often present in patients who are bedridden for acute or chronic diseases. Unfortunately nowadays they represent the 18 to 26% of hospital accesses in European and North American Countries, and in USA they affected 1.5 to 3 million of people on 318 million of population, with a consequent huge cost for patients and their families not only from the economical point of view but also, and most of all, in terms of quality of life.

Even if we can recognize 4 stages of ulcers, only the III and the IV stages ask for a surgical therapy, in order both to prevent infections both to provide an adequate skin coverage to, for example, a bone exposure.

In these years many have been the surgical procedure proposed, but most of them required the “sacrifice” of a muscle, as the glutaeus maximus for the treatment of the sacral sores or the femoral biceps for the treatment of ischiatic sores. Nowadays the use of surgical procedures associated to additional other therapies, as, for example, a previous debridement due to the use of the negative pressure therapy with or without instillation, it has allowed us to use faster and “simpler” surgical techniques that provide for muscle sparing. These flaps can be mono or bilateral, they can be made to prone patients, and can be fasciocutaneous, locoregional, as for example the V-Y flap, or even of propeller type, that is a flap based on the capacity of the overlying tissue to rotate 180° on an axis formed by a single perforating vessel.

Also these flaps can present complications as necrosis, seroma and hematomas, and sometimes they required a secondary revision. In order both to prevent the onset of new pressure ulcers and to promote neoangiogenesis, they can also be intraoperatively associated to ancillary procedures as, for example, the lipofilling.

Conclusion: Nowadays the possibility to combine the additional procedures to the “traditional” surgical treatments allowed us to perform easier and faster surgery sparing muscles but equally providing adequate skin coverage.
**[KS 12.1] PRIMARY REPORT OF EFFICIENCY OF FAT GRAFTING IN PREVENTION OF ISCHIAL TUBEROSITY PRESSURE ULCER**

**Christian Herlin¹, Sergiu Fruianu¹, Farid Bekara¹, Luc Teot¹, Florian Boissière¹**

¹ Montpellier University Hospital, Plastic and Reconstructive Surgery Department, Wound Healing Team, Montpellier, France

**Introduction:** Fat grafting has been used for about ten years to prevent the occurrence of ischial tuberosity pressure sores (IPS), mainly in patients with spinal cord injury (SCI). There is no large-scale study that confirms the importance of fat grafting in primary or secondary prevention of the occurrence of IPS in patients with SCI (1). Given the significant incidence of IPS in the SCI population and the risk of recurrence after intermuscular coverage surgery (2), the existence of a minimally invasive method of primary or secondary prevention must be widely studied.

**Methods:** We performed a monocentric retrospective study of all paraplegic or tetraplegic patients linked to a SCI who had undergone fat grafting as part of a primary or secondary prevention of the occurrence of IPS.

**Results:** During the last six years, 38 patients received a fat grafting, 43% in primary prevention. The mean age of the patients was 41.8 years, the average number of procedures per patient was 2.2. The average quantity injected per procedure was 48.9 cm³. The most frequent donor sites were the thighs and the flank. During the last years, the procedures were performed without anesthesia in outpatient surgery. A discharge of 3 weeks was respected.

Only one complication was noted at the recipient site (hematoma). No complications at the donor site have been identified. Six patients (15.7%) presented in the post-operative period a 1 IPS despite this treatment, mostly often with grade 2-3 with a mean delay of 7.4 months.

**Conclusion:** Fat grafting is a safe method of primary and secondary prevention of the occurrence of IPS in SCI patients. Although the procedure is simple and reproducible, it is not yet sufficiently studied to be recommended on a large scale. It seems possible to improve greatly the efficiency of this procedure and to develop objective measures of increased risk of IPS over which an intermuscular augmentation procedure by fat grafting seems interesting.

**References:**


**[KS 12.3] SKIN-SPARING DEBRIDEMENT FOR NECROTIZING FASCITIS IN CHILDREN**

**Giorgio La Scala**

Service de Chirurgie Pédiatrique - CURCP, Pédiatrie, Hôpitaux Universitaires de Genève, Genève, Switzerland

**Learning objectives of the presentation:** Familiarize health professionals with necrotizing fasciitis presentation and treatment.

Demonstrate a new surgical approach to necrotizing fasciitis reducing the need for skin grafts and producing favourable aesthetic and functional results.

**Overview of the key messages:** Necrotizing fasciitis (NF) is a severe and rapidly-progressing soft tissue infection associated with sepsis and tissue destruction. Conventional surgical management calls for extensive debridement of necrotic fascia and overlying skin, usually requiring skin grafts for coverage, with significant aesthetic and functional consequences.

To reduce the morbidity associated with NF, we adopted a skin-sparing debridement approach for NF. Only clearly necrotic skin is removed, extending or adding skin incisions to excise underlying infected tissues. Dissection is facilitated by using a headlamp and long retractors. Marginal frozen sections of skin and soft tissues of normal appearance are obtained if showing persistent bacterial clusters or thrombosed vessels. Debridement is extended until healthy tissue is confirmed by histology. A negative pressure wound therapy (NPWT) device is applied on the operated area in most of the cases. Hyperbaric Oxygen Therapy (HBO) usually with two dives per day is performed at the attending surgeon discretion.

**Second look surgery is usually performed after 24 hours with debridement as necessary.** As soon as the wound and the skin appear well vascularized, closure is attempted.

Fourteen patients with histologically-confirmed NF were treated with this technique. Patients median age was 4.2 years (range 1.6-15.1 years). The majority of the initial lesions were caused by chickenpox (9/14). The lesions were located on the extremities for six patients, on the trunk for five and on the head and neck for three. Time from beginning of symptoms to emergency department consultation was 30 hours; interval from admission to surgery was 10.5 hours (1-27.5 hours).

Median fasciectomy was 2% (1-15%) of Total Body Surface Area (TBSA), with a median skin excision of 0.1% of TBSA (0.7-3%).

All patients received intravenous co-amoxicillin and clindamycin. Eight patients underwent HBO. Delayed direct closure was possible for all patients. Ten patients required admission to the intensive care unit; the median hospital stay was 10 days (5-43 days).

Median follow-up was 9 months (3-79 months). There was no mortality associated with this management.

**Conclusion:** Our skin-sparing surgical management of necrotizing fasciitis restricts skin excision to the area of definite skin necrosis, limiting skin excision to one tenth of the excised subcutaneous tissues and fascia, with long term favourable cosmetic and functional results.
**KS 12.4** PROPELLER FLAPS WITH REDUCED ROTATIONAL ANGLES: CLINICAL EXPERIENCE IN VARIOUS ANATOMICAL SITES

*Paolo Persichetti*, *Beniamino Brunetti*  
1 Campus Bio-Medico University, Rome, Italy

**Background:** Despite of the widespread use of 180-degree propeller flaps in the field of soft tissue reconstruction, less information is available in the current literature to standardize the use of propeller flaps with reduced degrees of rotation. The authors report their experience with propeller flaps with reduced rotational angles reviewing clinical applications and outcomes of the technique in a series of 40 consecutive reconstructions.

**Patients and Methods:** Forty complex defects of various aetiologies located in different regions of the body (head and neck, trunk, buttocks and perineum, extremities) were reconstructed with less than 180 degrees rotated propeller flaps. The technique was applied to patients presenting with a strong audible perforator detected in close proximity to the wound and the defect located in a position adjacent to the axis of the chosen perforasome.

**Results:** Defect size ranged from 2.2 to 15.9 cm. Flap dimensions ranged from 5.2 to 21.10 cm. The flaps were based on 1 (34) or 2 (6) perforators and were mobilized with an angle of rotation of 45, 90, and 135 degrees in 7, 24, and 9 patients, respectively. Mean operative time was 105 minutes. All flaps survived postoperatively. In only 4 cases (10%) partial flap necrosis was registered. All flaps achieved adequate and durable reconstruction with excellent contour, with a follow-up ranging between 6 months and 2 years.

**Conclusion:** Propeller flaps with reduced rotational angles represent a safe and versatile option to reconstruct complex soft tissues defects at different anatomical sites.

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**KS 13.2** OECD ACTION ON INTERNATIONAL MEASUREMENT OF PRESSURE ULCER PREVALENCE

*Ian Brownwood*  
OECD Health Care Quality and Outcomes, France

**Learning objectives of the presentation:** To appreciate the broader role of the OECD in monitoring health care quality and outcomes in the international context. To understand the current collaborative action being undertaken by the OECD with the European Wound Management Association (EWMA) and the European Pressure Ulcer Advisory Panel (EPUAP) on international pressure ulcer prevalence measurement. To provide some indication of future directions for the collaborative work to support national pressure ulcer management programmes.

**Overview of the key messages:** The OECD has an active program of work on measuring and reporting quality and outcomes of health care across its 37 member countries. This work has been underway for over 15 years. In framing its quality measurement efforts, the OECD focuses on clinical effectiveness, patient safety and person centred care. The OECD Working Party of Health Care Quality and Outcomes meets twice a year and oversees the research and development of international quality of care indicators. Pressure ulcer prevalence can extend to 30-50% of patients in care settings and through safer practices the incidence of care related pressure ulcers can be largely prevented. The OECD is now working collaboratively with the EWMA and EPUAP to explore approaches to international measurement and reporting on pressure ulcer indicators in acute and long-term care (for example, nursing homes) settings, to complement the OECD’s existing suite of international indicators and to help underpin the monitoring of national pressure ulcer prevention programmes across Europe and the OECD. The overall aim is to promote valid and consistent measurement methodology and definitions that are allow results to be compared at the organisational, national and international levels.

**Conclusion:** Current action is focussed on scoping the alternative measurement systems across Europe and the broader OECD membership for assessing patient safety in long-term care, including the potential to build on the existing infrastructure for national and international periodic point prevalence studies on related priority areas for patient safety.
Pressure ulcers remain a significant clinical challenge, contributing to a range of patient-related outcomes and increased health service costs. The early detection and prevention of pressure ulcers are essential in reducing the burden of chronic wound care. A collaborative research project has been established to investigate the potential of emerging technologies in the early detection and targeted prevention of pressure ulcers.

We have adopted a collaborative research approach involving multidisciplinary teams of bioengineers, biologists, chemists, medical, allied health professionals (AHPs) and nurses. Research has included the evaluation of the mechanisms by which skin and tissue are compromised during prolonged mechanical loading. This has involved a suite of techniques including physical assays, imaging, biosensors, and animal models. The research has showed promise for the use of the technologies in the early detection and targeted prevention of pressure ulcers.

New insights regarding skin and soft tissue have resulted from our research. For example, we have discovered that local tissue ischemia during sustained sitting and lying postures is a key factor in the development of pressure ulcers. Promising technologies have been developed to objectively evaluate these mechanisms and provide the means for patients and carers to improve self-care for pressure ulcer prevention. This research has shown the potential for technologies to provide a means to objectively evaluate therapeutic interventions, such as repositioning and bioactive technologies, to address the limitations with physical and biosensors. Additional development could result in a robust, cost-effective means to monitor individuals at risk of vulnerable skin over prolonged periods.

**References:**
[4] ... Evidence and Research 29;9:409-417
CONTINUOUS MOBILITY TRACKING AND ACTIVITY MONITORING USING SMART SENSOR TECHNOLOGY FOR EFFICIENT AND EFFECTIVE PREVENTION OF PRESSURE ULCERS

Nils Lahmann
Charité-Universitätsmedizin Berlin, Geriatrics Research Group, Berlin, Germany

Introduction: There has been a fast development in activity and mobility monitoring by sensor in the recent years. Sensors have become more efficient, reliable, smaller and inexpensive. Available sensor technology is able to continuously gather metric data regarding mobility and activity and transfer these data to those who care (nurses, relatives, next of kin). The objective of this presentation is to examine the possibilities of these new technologies for pressure ulcer prevention.

Methods: A literature review was conducted. In addition, because the development of new technical solutions is so rapid, internet pages were searched and experts in the fields were interviewed. Results were structured according their functional features and pros and cons of each solution will be discussed.

Results: Basically: Activity / Mobility monitoring can be distinguished in sensory solutions that are placed /ocated at the patient itself or at the patients environment (Beds/cushions/seats). There are available solutions do not primarily address pressure ulcer prevention. These are addressing the “life-style” market. There are already available sensory solutions that can be used as medical devices for pressure ulcer prevention. In a recently published study in 2018, Pickham et.al. confirmed the efficiency and effectiveness of these technologies in intensive care patients.

Discussion/Conclusion: Available medical devices that are primarily addressing pressure ulcer seemed to be very effective in pressure ulcer prevention. These solutions are still very expensive and are therefore in use for specific patient groups. However, since they do rely on the same technology there is a large potential in modifying available inexpensive life-style solutions, so that they can be used in regular pressure ulcer care.

ALTERNATING PRESSURE MATTRESSES VERSUS HIGH SPECIFICATION FOAM: RESULTS OF THE PRESSURE 2 RANDOMISED CONTROLLED TRIAL

Jane Nixon
Leeds Institute of Clinical Trials Research, University of Leeds, Leeds, United Kingdom

Learning objectives of the presentation: The PRESSURE 2 randomised controlled trial [1] has compared Alternating Pressure Mattresses and High Specification Foam in 2029 acutely ill, high pressure ulcer risk patients. Learning objectives include:

- Understand the study population and interventions used in the PRESSURE 2 mattress trial
- Understand the results of the PRESSURE 2 mattress trial and implications for practice

Overview of the key messages: Specialist mattresses minimise intensity and duration of pressure on vulnerable skin sites in at-risk patients. The primary objective of the PRESSURE 2 trial was to compare the time to developing a new PU Category ≥2, in patients using alternating pressure mattresses (APM) and high specification foam (HSF).

PRESSURE 2 was a multicentre, Phase III, open, prospective, randomised, adaptive double triangular group sequential, parallel group trial with a priori maximum sample size 2954. It was conducted in 42 secondary and community in-patient facilities, recruiting adult in-patients with evidence of acute illness and high PU risk. The treatment phase was 60 days maximum with a 30 day post treatment follow-up.

From August 2013-November 2016, 2030 patients were randomised (APM n=1017 vs HSF n=1013). Of 2029 ITT population 160 (7.9%) developed new PU Category ≥2. Both mattress groups were balanced for withdrawals, mattress compliance, deaths and there were no safety concerns.

The results (APM vs HSF) for the following will be presented:

- Primary endpoint: new Category ≥2s to 30 day post treatment follow-up
- Sensitivity analysis treatment phase new PU Category ≥2
- Secondary endpoints to 30 day post treatment follow-up:
  - new PU Category ≥1
  - new PU Category ≥3
  - time to healing of pre-existing PU Category 2
  - cost effectiveness
  - mattress compliance

In addition, a moderator analysis which explored the potential benefit of each mattress for known PU risk factors will be presented.

Conclusion: Overall the PRESSURE 2 trial PU incidence rate was lower than expected. Mattress choice will be informed by results of the PRESSURE 2 trial.

References:

Acknowledgement
This project is funded by the National Institute for Health Research HTA Programme (project number 11/36/33). The views and opinions expressed therein are those of the authors and do not necessarily reflect those of the HTA Programme, NIHR, NHS or the Department of Health.
EMBEDDING OF A NEW RISK ASSESSMENT PROTOCOL IN THE HOSPITAL ENVIRONMENT

Steven Smet
UZ Gent, Wound Care Centre, Gent, Belgium

The Ghent University Hospital in Belgium, developed during 2016 a new hospital wide prevention protocol. For the daily risk assessments, this new protocol focuses only on the major risk factors mobility and skin status.

The general aim of this new protocol is to simplify the process of daily risk assessments by making it as feasible as possible for the nurses and to stimulate the execution of the assessment at least daily. The whole protocol is also written out in simple flowcharts that can be easily followed by all the involved healthcare workers.

1.5 years after implementation, the first comparable numbers are collected and no increase in prevalence rates is noted in 2017. On the other hand, our screening of the patient files more than doubled till 82% and the use of dynamic mattresses went down with 27%. Repositioning of a risk patient is stimulated to the maximum.

With an adequate registration of the incidence rates in the near future, we hope to see a decrease in the hospital acquired pressure ulcers which can further support the execution, and also validation, of this new protocol.

References:

NATIONAL POLICY FOR PU PREVENTION AND MONITORING ON NATIONAL LEVEL

Andrea Pokorná¹, Nina Muniereva²
1 Masaryk University, Department of Nursing, Masaryk University, Department of Nursing, Brno, Czech Republic
2 Head of the Quality Management Center, Hospital Pilsen, Czech Republic, Plzen, Czech Republic

Learning objectives of the presentation: Epidemiology of PUs is the starting point and the cornerstone in nationwide policy implementation.

Appropriate terminology allows multidisciplinary communication and understanding.

Legislative standards must promote uniform procedures (preventative measures, data collection and treatment and support of continuity of care).

The correct identification of problems and their causes etiology with the recognition of competent persons is essential.

Overview of the key messages: The main features of national policy for the Pressure ulcers (PU) prevention and monitoring and its organization will be presented.

Possible barriers for national policy implementation will be highlighted.

The new nationally accepted dataset for data collection will be introduced (data set was verified in two round six months lasted pilot data collections in three faculty hospital).

PU monitoring is challenged by the enormous heterogeneity in clinical practice which is multifactorial influenced.

When implementing national policy for PU prevention and monitoring there is need for appropriate level of knowledge in responsible person.

It is necessary to use various forms and types of education which is attractive, easy available and updated in accordance with evidence-based knowledge.

When collecting data about the PU prevalence or incidence personal responsibility and team working must be supported as well as appropriate feedback (trueful and accurate data interpretation) and preventative correct measures must be applied.

Conclusion: The basic steps in national policy of PU prevention and monitoring implementation should be based on recognition of the current state in researched area. Pressure ulcers are monitored on local level with different methodology, and PUs are considered as nursing sensitive incidents. Physicians in the Czech Republic generally do not consider them a significant problem if they cannot solve them by the surgical intervention. The use of objective scales and appropriate differentiate diagnostic tools must be used and multidisciplinary approach should be supported. Implementation of the new nationally accepted procedures is always associated with the necessary investments in education, application of support prevention strategies and sharing of knowledge and skills for better quality of care.

References:
**[KS 16.1] TELEMEDICINE OR JUST BETTER WOUND CARE? TAKE HOME MESSAGE**

*Sergio Pilon*

The Ministry of Health, San Camillo Hospital, Roma, Italy

Learning objectives of the presentation: The so called “teledicine” isn’t a final goal: it is just a tool for a better patient care. When, what, were, who, why and how are the keywords. Ten years of experience will be discussed.

Overview of the key messages: Doctors and nurses are in the front line, but the manager, the technology and telecom companies are involved.
- When: Not always, but to choose the right moment in the ulcer healing history is a key for the success.
- What: It isn’t a matter of sending some pictures, it is a well-defined process to be defined and refined, also for the dressing strategy.
- Where: In nursing homes, at home, in hospital, all scenarios will be discussed.
- Who: The “front line” doctors and nurses, caregivers, patients, different roles, different scenarios
- Why: Because the only way is in many circumstances to provide state of the art wound care
- How: It isn’t part of the famous 5W of the journalism is the sixth important question.


Conclusion: Take care, teledicine is the key tool to shift from care to take care. It is not an option it has to become mandatory in wound care.

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**[KS 16.2] CHALLENGES IMPLEMENTING TELEMEDICINE: LESSONS LEARNED**

*Rolf Jelnes*

Wound Healing Clinic, Sygehus Sønderjylland, Sønderborg, Denmark

Learning objectives of the presentation: Since 2005 we have been working with telemedicine in handling of patients with chronic wounds. It serves as a communicational tool as well an educational tool, thus improving the care of these patients.

The concept is low-tech, a cell phone and access to the internet, pretty simple nowadays. Data is stored in a database, which is web-based.

After 4 years a Health Technology Assessment Report was made, pointing out the benefits and drawbacks. Overall it was positive.

Later it was decided, that the concept should be nationwide, supported by a governmental grant of R 4.000.000

As of today more than 27.000 patients are enrolled in the database.

Overview of the key messages: The technology has to be low tech and easily accessible.

It takes leadership in the process of implementation.

Accept that colleagues can present funny statements.

Accept that it takes time.

Conclusion: Keep up the spirit.

References:
**[KS 16.3] INTERACTIVE TELEMEDICINE IN NURSING HOMES FOR CHRONIC WOUNDS CARE**

**Nathalie Salles**, Aurelie Lasfargue, Laura Haw-Shing

1 CHU Bordeaux, France

**Introduction:** One of the priorities of the strategic plan of telemedicine deployment is to improve health management of patients living in nursing homes (NHS). In fact, the first aim of this plan is to improve access to care, especially for old, dependent with multi-morbidity patients living in NHS. Telemedicine could be a pertinent tool to improve quality of care and quality of life for these patients, with, for example, the possibility of taking care of NHS residents in their places of life and with their usual caregivers.

**Methods:** Literature data published by our team showed that interactive telemedicine is feasible in NHS, and is an appropriate tool for the care of complex situations such as chronic wounds. In another study, we reported that telemedicine made possible the realization of geriatric assessment, i.e., level of autonomy, cognitive status, and severity of comorbidities. In terms of care pathway, our results showed that interactive telemedicine enabled the avoidance of more than 70% of requests to specialists either with consultations or hospitalizations.

**Results:** Our results showed that telemedicine significantly improved wound healing, and it decreased dressing expenditure by reducing the pace of dressing changes (p = 0.005). Results showed an improvement in the quality of life of the residents with fewer trips to the hospital, sources of complications. Our results also showed that NH staffs were satisfied with the use of telemedicine for their patients, they felt less alone and could freely discuss about chronic disorders of their patients whether they were doctors, nurses or caregivers. Most of the time, beyond the reason of virtual consultation, exchanges permitted to give global geriatric evaluation and global propositions. For example, exchanges helped to educate healthcare providers on methods for assessing chronic wounds and methods of necrotic wounds debridement, etc. In a recent prospective study, we compared efficiency of telemedicine versus day hospital for the treatment of patients with complex chronic wounds. Preliminary results showed higher rate of recommendations applied in the telemedicine group compared to the day hospital group (OR: 15; CI 95%; [1.8-17], p=0.002). Interestingly, the results showed that telemedicine was as effective as day hospital care for chronic wounds care, based on colorimetric evaluation and wound area.

**Conclusion:** Telemedicine allowed the simplification of care pathways for dependent residents and the avoidance of the multiplication of interventions by specialized teams. NH residents could then have access to expertise in less than one week regardless of their geographical location.

**References:**


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**[KS 16.4] USE OF TELE-WOUNDS IN AN ITALIAN REGIONAL CONTEXT EXPERIENCE**

**Francesco Giacinto**, Ciro Falasconi, Elisabetta Giacinto, Manuela Germano, Domenica Cioffiletti

1 Azienda Sanitaria Provinciale Cosenza, Cosenza, Italy

2 Azienda Sanitaria Locale Napoli 1 Centro, Outpatient Clinic for Chronic Skin Wounds, Napoli, Italy

**Introduction:** As the number of people forced to bed or home because of chronic illness is increasing, Chronic Skin Wounds (CSW) are increasing as well; their cure and care represent an always more important problem both for human and economic resources of the health system, and they could become a real threat to the sustainability of the system itself.

**Methods:** In an attempt to improve care of patients affected by CSW, a telemedicine project was launched using tablets and a program (application, APP) for the management of pictures of wounds and of clinical data. A comparison was made for costs (number of home medical visits, mileage reimbursements) of the treatment of patients with CSW in two semesters: in the first (April 2016 - October 2016) patients were followed in the traditional way; in the second (October 2016 - April 2017) the Telemedicine project was used.

**Results:** The authors present the results of this experimentation carried out using technologies and tools of Telemedicine to highlight problems and needs in home care of CSW.

Data show the sharp decrease in the direct specialist/patient home visits with the use of tablets for telemedicine compared to those of the traditional home care model; reduction of physical distances between the user and the specialist, with consequent lower risk for the same and decrease of the kilometres travelled for the patient’s home meeting (i.e. decrease of the kilometic reimbursement indemnity). Total health expenditure of the NHS for home care of CSW, comparing the two periods, is reduced by 40 448. This amount, reduced by the teleconsultation costs totalling 20425, shows an actual saving amounting to 20023, which, calculated monthly, is 2860/month.

**Conclusion:** Data obtained show that IT and Telemedicine tools applied to cure and care of CSW care allow to obtain savings for both for economics and spent time, with an improvement of the results and of perceived quality of care. For these reasons, this modern therapeutic approach can represent a secure resource for the sustainability of the system of treatment of this chronic pathology, worthy of further studies.

**References:**


29th Conference of the European Wound Management Association

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FREE PAPER SESSIONS

Free paper session 1: Teamwork and pressure ulcer prevention and management in specific patient groups: Spinal cord, intensive care, operating room, elderly, palliative and disabilities (1)
Chairs: Valentina Dini, Marie-Line Gaubert-Dahan
1 Limitations of prophylactic film dressing for intraoperatively acquired pressure ulcers in spinal surgery patients. Investigation before the BOSS trial term. Norihika Ohura
2 Effect of cushions for usual/sports wheelchair on elite japanese male wheelchair basketball athletes. Nao Tamai
3 Epibole causing delayed wound healing in trochanteric pressure ulcers in spinal cord injury patients. Srinivasa Budithi
4 Interdisciplinary teamwork in prevention and management of pressure ulcer for people with spinal cord injury. Gunnbjørg Aune
5 Pediatric wound care in PICU: A 4 years survey. Giancarlo Antonelli
6 Reduction of pressure ulcer incidence in medical-surgical adult intensive care unit: Implementing the guideline recommendations. Maarit Ahtiala

Free paper session 2: Basic science: Biomechanics and aetiologies & Biophysical agents in pressure ulcer treatment: Novel therapies
Chairs: Cees W.J. Oomens, Yohan Payan
7 Dry skin in home care and pressure ulcer risk: A multi-center prevalence study. Andrea Lichterfeld-Kattner
8 CGRP contribution in adaptive adjustments of skin blood flow to pressures: A protection against pressure ulcers. Berengere Fromy
9 Corynebacterium striatum as an emerging multi-drug resistant, nosocomial opportunistic pathogen associated with chronic skin wound infection. Edoardo Virgilio
10 Comparing the effects of 3 different pressure ulcer prevention support surfaces on the structure and function of heel and sacral skin: An exploratory cross-over trial. Andrea Lichterfeld-Kattner
11 Innovative pressure ulcer prevention: Cell dynamics agents for mechanobiological protection. Daphné Weihs
12 Mini-invasive drainage to treat pressure ulcer deep recesses. Marco Cavallini

Free paper session 3: Teamwork and pressure ulcer prevention and management in specific patient groups: Spinal cord, intensive care, operating room, elderly, palliative and disabilities (2)
Chairs: Carina Bååth, Ulrika Källman
13 Migration of retained dressing materials causing non healing pressure ulcers in spinal cord injury patients - A case report. Srinivasa Budithi
14 Pressure ulcer prevention and intervention for patients undergoing lumbar spinal fusion surgery. Birgitte Skovgaard
15 Telemedicine between a rehabilitation center and nursing homes or home: Results after 650 teleconsultations for patients with heavy disabilities suffering from chronic wounds. Sandrine Robineau
16 A nationwide point prevalence of pressure ulcers in critically ill patients. The national French PRESSURE study: PREvalence of preSSure Ulcers in intensive caRe units. Brigitte Barrois
17 Real-time feedback of pressure points during surgery - a pilot study. Eva Sving
18 Developing a decision making tool for nurses to improve end of life skin care for advanced cancer patients: A qualitative exploratory study. Ray Samuriwo

Free paper session 4: Smart materials, sensor measuring, moving detection, “wearables”
Chairs: Luigino Santecchia, Nils Lohmann
19 Can the efficacy of pressure relieving strategies be assessed through the magnitude of movements performed? Silvia Caggiari
20 Innovative biofilm detection system for realizing biofilm-based wound management. Gojiro Nakagami
21 Robotic mattress for pressure redistribution and patient comfort. Aya Kitamura
22 Embedded sensing and actuating systems for pressure mapping and monitoring to prevent pressure ulcers. Ricardo Simões
Free paper session 5: Innovations in pressure ulcers prevention bundle: Patient safety, quality of care, evidence based practice and policy
Chairs: Ida Marie Bredeesen, Lena Gunningberg
23 Aminotistic spray gel vs silver spray powder: A prevention comparative randomized trial; Roberto Cassina
24 Skin blotting analysis of Interleukin 6 on the buttock of wheelchair basketball players; Takeo Minematsu
25 Monitoring pressure ulcers as adverse events: National use of the Global Trigger Tool; Lena Gunningberg
26 Reducing hospital acquired pressure injuries by implementing WOC nurse-led daily prevention rounds; Chungmei Shih

Free paper session 6: Negative pressure wound therapy: From premature to elderly patients
Chairs: Paolo Persichetti, Jakub Taradaj
27 Preliminary experience with the use of NPWT over exposed vessels: Do we have to revise NPWT contraindications?; Guido Pannini
28 Extravasation ulcer in newborn: When the immediate skin full-thickness loss may render a limb virtually useless. Needs for a prompt team-common action; Serena Crucianelli
29 The use of negative pressure wound therapy portable system in pression lesion; Simone Toscano

Free paper session 7: Medical device related pressure ulcers: Aetiology and research to enhance prevention at different ages and in different settings
Chairs: Amit Gefen, Jakub Taradaj
30 Pressure ulcers in hospitalized neonates. Rates and risk factors; Serena Crucianelli
31 Reducing intensive care medical device-related pressure injuries caused by nasogastric and endotracheal tubes: A pilot study; Fiona Coyer
32 Australian perspective in advancing clinical care to reduce neonatal skin injuries; Margaret Broom
33 Medical device related pressure injuries in the neonate: A multidisciplinary device specific approach to prevention and healing; Deanna Johnson

Free paper session 8: Multidisciplinary pressure ulcer prevention and treatment in our most fragile patients: From the premature to the aged population & Basic science: Biomechanics and aetiology
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34 Neonatal skin: How structural difference impact the diagnosis and healing of pressure injuries; Deanna Johnson
35 Pressure injury prevalence: A new look at an old process; Ann Marie Nie
36 The effects of two different pressure relieving support surfaces on the blood circulation deep in the tissues. A positron emission tomography (PET) study; Esa Soppi
37 The history of a multidisciplinary approach to pressure ulcer prevention in a general hospital; Dirk Milliau
38 Hyperkeratosis and delayed wound healing in pressure ulcers: A case series; Thuya Win
39 Biomechanics of heel pressure ulcers and the effect of Haglund’s deformity; Bethany Keenan

Free paper session 9: Innovations in plastic and reconstructive surgery for pressure ulcers
Chairs: Serena Crucianelli, Maria Ida Rizzo
40 Complex acquired skull defects reconstruction in children using a dural substitute and CI-NPWT: A palliative bridge against brain infections; Francesco Grussu
41 Flap coverage for treatment of pressure ulcers in spinal cord injury individuals: A single-or two stage reconstruction?; Marieke Brodfahr
42 Treatment of early-stage pressure injury by using autologous adipose tissue grafts; Tiziano Pallara
43 Pressure ulcers and spina bifida in the paediatric patient: A case series; Ann Marie Nie

Free paper session 10: Innovative methods, models and projects in pressure ulcer prevention and treatment
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44 Incontinence associated dermatitis (IAD) and perianal septic lesions in children with onco-haematological diseases. Results of a protocol applied for IAD systematic prevention and early treatment 146 patients later; Marjola Gjergj
45 Development of a working method for implementation of evidence-based measures to prevent pressure ulcers: Ulrika Kallman

46 Involving service-users in the Outcomes for Pressure Ulcer Trials (OUTPUTs) Project: Delia Muir

47 A structural equation model of pressure ulcer prevention action in clinical nurses: Okkyoung Park

STUDENT FREE PAPER SESSIONS

Student free paper session 1

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48 Soft tissue deformations under the weight-bearing sacrum while using a prophylactic dressing in combination with support surfaces: MRI studies: Lea Cohen

49 Durability of prophylactic dressings subjected to moisture is critical for effective pressure ulcer prevention; Dafna Schwartz

50 Investigating the effects of simulated prosthetic loading on lymphatic activity of healthy lower limb tissues: Jennifer Bramley

51 Dressings cut to shape alleviate facial tissue loads while using ventilation masks: Lea Cohen

Student free paper session 2

Chairs: Charlie Beetham, Rolf Jelnes

52 Using a health economic model to estimate the cost of managing pressure ulcers (grade 2-4) within an acute care setting in Ireland: A feasibility study: Aoife Reilly

53 The inflammatory response in IAD: Sofoklis Koudounas

54 The Outcomes for Pressure Ulcer Trials (OUTPUTs) project: A scoping review about outcomes used in pressure ulcer prevention studies: Anna Lechner

55 Improvement team for pressure ulcers prevention and treatment: A multidisciplinary approach in an orthopaedic and geriatric private hospital in Rome: Valeria Macari
[1] LIMITATIONS OF PROPHYLACTIC FILM DRESSING FOR INTRAOPERATIVELY ACQUIRED PRESSURE ULCERS IN SPINAL SURGERY PATIENTS. INVESTIGATION BEFORE THE BOSS TRIAL TERM

Norihiko Ohura1, Mine Yoshimura2, Masanobu Sakisaka2, Tokuya Sekiyama3, Yuta Terabe3, Yuki Morishige4, Tomoyo Taito5, Makiko Tanaka6

1 Kyorin University School of Medicine; Dept. Plastic Surgery, Mitaka, Tokyo, Japan
2 Kyorin University School of Medicine, Tokyo, Japan
3 Tokyo Medical University, Tokyo, Japan
4 National Cancer Center Hospital, Tokyo, Japan
5 Tokyo Nishi-Tokushukai Hospital, Plastic and Reconstructive Surgery, Akishima, Japan
6 Setagaya Medical Center, Japan
7 Yamaguchi Prefectural University, Nursing School, Yamaguchi, Japan

Introduction: Few have described dressings for preventing pressure injury in the operating room. We previously reported on the effectiveness of multi-layered soft silicone dressings in preventing intraoperatively acquired pressure ulcers (IAPUs) in surgical patients in the operating room (BOSS trial). Before the BOSS trial, we used film-based preventive dressings, according to the guidelines.

Aim: This dual-center retrospective study evaluated the efficacy of prophylactic film dressing in preventing IAPUs before the BOSS trial period.

Methods: We investigated the IAPU incident rate in all patients undergoing elective surgical surgery in the prone position using a Reclining-Hill frame, just as in the BOSS trial, between August 2014 and June 2015 using the medical records. Polyurethane film dressings were applied to the chest and both iliac crests at four anatomical locations.

Results: A total of 396 anatomical locations in 99 patients (age 62.5 ± 15.7 years, 66 males) were analyzed. As this was a retrospective study, category 1 pressure ulcers were defined as redness at 24 h after surgery. Seven patients (7.1%) developed IAPUs within 24 h postoperatively. Four patients had category I IAPU, and three had category II IAPU. While the incidence of IAPU was lower than in the BOSS trial, the ratio of category II IAPU was higher. In a multivariate analysis, a high body mass index (P = 0.0016, odds ratio 1.22, 95% confidence interval 1.08-1.40) and long surgery duration (P < 0.0001, odds ratio 2.47, 95% confidence interval 1.86-3.51) were extracted as independent risk factors.

Conclusions: The incidence of IAPU was lower in the present study than in the BOSS trial likely because, in order to ensure that the definition of category I redness was not obscured by the retrospective nature of the study, category I redness was defined as that at 24 h, not 30 minutes after surgery. Our findings of body mass index as a predictor and a higher number of Category II IAPUs than in the BOSS trial suggested that prophylactic dressings using film may not alleviate soft tissue distortion. The effectiveness of prophylactic film dressing for preventing IAPUs in surgical patients was therefore limited.

Reference:

[2] EFFECT OF CUSHIONS FOR USUAL/SPORTS WHEELCHAIR ON ELITE JAPANESE MALE WHEELCHAIR BASKETBALL ATHLETES

Nao Tamai1, Tamonon Maeda2, Takeo Minematsu2, Hiroshi Naguchi3, Gajo Nakagomi4, Kachi Tabunaka5, Hiromi Sanado6

1 The University of Tokyo, Department of Biomechanics, Global Nursing Research Center, Graduate School of Medicine, Tokyo, Japan
2 The University of Tokyo, Department of Gerontology, NUR/Wound Care Management, Graduate School of Medicine, Tokyo, Japan
3 The University of Tokyo, Department of Imaging Nursing Science, Division of Care Innovation, Global Nursing Research Center, Graduate School of Medicine, Tokyo, Japan
4 The University of Tokyo, Department of Imaging Nursing Science, Division of Care Innovation, Global Nursing Research Center, Graduate School of Medicine, Tokyo, Japan
5 The University of Tokyo, Department of Imaging Nursing Science, Division of Care Innovation, Global Nursing Research Center, Graduate School of Medicine, Tokyo, Japan

Introduction: Sports are important for maintaining physical and psychological health. However, athletes are at the risk of pressure ulcers (PUs) due to long-term sitting, the incidence of strong pressure/shear in the buttocks, and use of hard cushion for stability during competition. The occurrence of PUs in daily life is not very clear in wheelchair athletes. This study aimed to determine the scene of occurrence of PUs in wheelchair athletes using usual/sports wheelchair cushions.

Methods: This cross-sectional observational study was conducted in November 2017. A total of 10 elite Japanese male wheelchair basketball athletes with spinal cord injuries were recruited. Data on age, the presence of PUs, cushion type, maximum interface pressure, and contact area were collected. Maximum interface pressure and contact area were measured for each wheelchair. The paired Wilcoxon signed-rank test was used to assess the differences between usual and sports wheelchair cushions.

Results: The median age was 28.5 (range, 20-36) years. Two athletes had PUs (Stage II, Unstageable: I). Eight athletes had pigmentation or scarring in the ischial regions. Two athletes used urethane-form cushions, and eight athletes used air-cell cushions on usual wheelchair. All athletes used urethane-form cushions on sports wheelchair. There was no significant difference between usual and sports wheelchairs with respect to the maximum interface pressure at the ischial region. However, maximum interface pressure in usual wheelchair was higher than that in sports wheelchair (daily vs. sports = 200.0 vs. 124.5 mmHg, p = 0.11). The contact area in sports wheelchair was significantly larger than that in usual wheelchair (6614.2 vs. 777.0 cm2, p = 0.01).

Conclusions: Seating pressure was higher in a usual wheelchair. This could be because the contact area is larger due to fixation of buttocks using wheelchair seat belt in a sports wheelchair. Therefore, we consider that risk in a usual wheelchair is greater than that in a sports wheelchair for wheelchair basketball athletes in this study. It is important to check wheelchair cushions not only a sports wheelchair but also a usual wheelchair, and educate wheelchair athletes and staffs about the prevention of PUs.

References:
[3] EPIBOLE CAUSING DELAYED WOUND HEALING IN TROCHANTERIC PRESSURE ULCERS IN SPINAL CORD INJURY PATIENTS

Bara’ah Alshagoori, Thuya Win, Rami Al-Ahmar, Aheed Osman, Srinivasa Chakravarty Budithi
1 Midlands Centre for Spinal Injuries, Oswestry, United Kingdom
2 Jordanian Royal Medical Services, Amman, Jordan

Introduction: Pressure ulcers are a challenging complication in spinal cord injury patients, causing significant morbidity and mortality. Delayed wound healing in pressure ulcers is often multifactorial. Epibole is a phenomenon where the wound edges become rolled and nonproliferative resulting in arrest of progression of wound healing.

We present a case series of trochanteric pressure ulcers where epibole resulted in delayed wound healing and is only localized to the anterior wound edge.

Methods: We studied four spinal cord injured patients with trochanteric pressure ulcers, who were undergoing non-operative management. They were classified according to the European Pressure Ulcer Advisory Panel (EPUAP) classification. The healing process was monitored using Pressure Ulcer of Healing (PUSH).

Results: All the four patients studied had EPUAP classification. Grade 4 trochanteric pressure ulcers. Gradual reduction of wound size was initially noticed in all four patients. The epithelialization was noticed only on the posterior edge. Lack of epithelialization was noted in the anterior edge due to epibole which contributed to delayed wound healing. Two patients were successfully treated with surgical excision of epibole wound edge and the other two are waiting for definitive surgical excision and closure procedure.

Conclusions: Epibole is a recognized cause of delayed wound healing in pressure ulcers. The exact reason why this was only limited to the anterior wound edge in our case series is not known, but may be related to the presence of trochanteric bursa in that region. Surgical excision and closure are often required to stimulate healing process and achieve wound healing in these complex wounds.

Identification of epibole and early institution of remedial measures are needed to achieve successful outcome in pressure ulcers.

References:

[4] INTERDISCIPLINARY TEAMWORK IN PREVENTION AND MANAGEMENT OF PRESSURE ULCER FOR PEOPLE WITH SPINAL CORD INJURY

Hanne Haugland, Unn Svarverud
1 Sunnaas Rehabilitation Hospital, Department of Spinal Cord Injury, Nesoddtangen, Norway

Introduction: People with spinal cord injury (SCI) using wheelchairs are at high risk of incurring pressure ulcers. Obtaining such pressure ulcers are usually a serious and prolonged condition, which require systematic monitoring from various parts in the line of treatment. Sunnaas Rehabilitation Hospital has extended experience in monitoring patients with SCI. The interdisciplinary team is well aware of the challenges this population experiences.

Norway is a country with scattered settlements. Thus, use of teleSCI can replace travelling over long distances to receive good healthcare support. Our hospital has implemented teleSCI as a way to communicate with patients, colleagues and partners.

Objectives: To quality assure the interdisciplinary prevention and treatment of pressure ulcers in people with SCI. To increase the knowledge on SCI and pressure ulcers among patients and healthcare professionals within our own institution and toward community healthcare services.

Methods: Develop interdisciplinary procedures and work methods that assess activities within a 24 hour perspective. Utilize telemedicine where we follow up persons with SCI and PUs from their homes.

In addition, we also implemented education about SCI and PU via videoconferencing, webinars and an e-learning course.

Results: Based on interdisciplinary teamwork, clinical experience and literature review, a structured approach has been established, where user participation is crucial. Video conferencing is useful where patients and the interdisciplinary team in the community partake in a mutual online discussion on treatment and monitoring of pressure ulcers.

Feed-back from the homecare nursing staff has been good, implicating improved interaction between the specialized and local health care workers.

Conclusions: Changing the focus from treatment to prevention

The structuring and systematization within the framework of preventing and treating pressure ulcers has been ongoing for a long time, this has been achieved through a National patient safety campaign.

Systematization, predictability, a close interdisciplinary partnership, good documentation and early and close contact with primary care have given good results.

Other projects have been developed as a result of this work, which has led to change of focus on different issues.

We gain more and more experience, which benefits the patients. We have become more aware in relation to see 24 hours perspective and behaviour that can be harmful.

References:
Introduction: Neurological impairment, prolonged period of immobility in addition to the presence of mechanical ventilation and prolonged sedation represent sever risk factors in skin lesions development. In 2012, Bambino Gesù Children’s Hospital identified a Pediatric Skin Care Team (SKT) with the aim to bring out the level of complexity of skin lesions within Pediatric Intensive Care Units.

Methods: All patients admitted to PICU with neurological impairment and/or severe immobility in addiction to mechanical ventilation, prolonged sedation and presence or development of skin lesions were included. Whenever a skin lesion was present in those patients, the Skin Care Team was involved. For each recorded complex lesion, both the treatment plan and the detection of digital photographic images performed by SKT (at “start” of treatment and every dressing change). This helped the SKT to obtain information about the lesion: size, degree, presence and among of of exudate; to identify most appropriate medication, right time for subsequent changes and, finally the presence of avoidable risk factors. All parents, for the use of photographic images, had signed written consent at the time of admission in PICU.

Results: A number of 972 were patients admitted to PICU; all patients with a skin lesion and neurological impairment with immobility, mechanical ventilation and prolonged sedation during PICU stay were included. In 130 patients, a tracheostomy was present and 97 presented a neurological impairment and chronic mechanical ventilation; of those, 29 presented skin lesions secondary to pressure injuries (PI), for a total of 51 PI, with an average of 1.75 PI per patients. On the same time, forty-five skin lesions due to the devices (SL-D), nine Skin Break-Down (SBD) and nine Skin Tears (ST) had been developed during PICU stay. The ratio between skin lesion secondary to PI and those not secondary to PI was 51 to 63 respectively: this showed a higher level of risk for the development of skin lesions not secondary to PI during PICU stay.

Conclusions: Skin lesions not secondary to PI are more frequent in patients within PICU. Neurological impairment, long periods of immobility, mechanical ventilation and prolonged sedation are severe risk factors in development of skin lesions during PICU stay.

References:


Maaria Ahtiola1
1 Turku University Hospital, Turku, Finland

Introduction: Patients in intensive care units (ICU) have a high risk of developing pressure ulcers (PUs). Patients are severely ill and their ability to move is limited; they may have difficulties in expressing pressure-induced discomfort, pain and the need for changing position. The prevalence of PUs in intensive care varies from 5 to 30%, and the trend has been decreasing during the last two decades. PUs have a considerable risk of complications and the care and management of PUs carry high costs and workloads.

Methods: The modified Jackson/Cubbin (mJC) risk assessment scale was presented in the autumn 2009 together with the PU prevention protocols from the 2009 Guideline and updated 2014; risk assessment including clinical judgement, repeated skin assessment and care, improving the repositioning techniques, change of support surfaces according the patient risk. The mJC risk assessment scale was implemented into the electronic ICU database and documentation was also improved. Simultaneously a research program was started to investigate PU risk factors and to reduce the development of PUs in medical-surgical ICU treating about 1600 adult patients/year.

Results: In the unit of 160 nurses the use of mJC risk assessment scale resulted in similar risk assessment results and documentation and lead to uniform actions in PU prevention. The PU incidence decreased from 11.1% in 2010 to about 4% in 2015 and through 2017.

Conclusions: PU prevention and implementing the recommendations demands a long-term commitment, continuous training of the staff and support from the management. The effective measures to prevent PUs included a structured risk assessment, documentation, increased awareness through training, periodic reviews of the prevalence and incidence of PUs, implementation of evidence-based practices for prevention and renewal of support surfaces and limiting the number of different types of mattresses available. This makes easier for the personnel to choose the correct support surface according the patients needs.

References:
[7] DRY SKIN IN HOME CARE AND PRESSURE ULCER RISK: A MULTI-CENTER PREVALENCE STUDY

Andrea Lichterfeld-Kottner1, Nils Lahmann2, Ulrike Blume-Peytavi1, Ursula Müller-Werdan2, Jan Kottner3
1 Charité-Universitätsmedizin Berlin, Department of Dermatology, Venerology and Allergology, Berlin, Germany
2 Charité-Universitätsmedizin Berlin, Geriatrics Research Group, Berlin, Germany

Introduction: Advanced age and skin care dependency are risk factors for the development of skin dryness and other adverse skin conditions. Skin dryness has a negative impact on the quality of life and increases the risk for secondary cutaneous infections (1). Skin dryness may also be associated with PU development (2) but the empirical evidence is weak. Although the largest care setting, the prevalence of dry skin and possible associations with PUs in home care is unknown. The aim of the study was to measure the prevalence of skin dryness in the home care setting and to investigate possible associations with PUs.

Methods: A representative multicenter prevalence study was conducted in German home care services. A random selection of home care services and clients was performed. Instructed nurses using standardized forms conducted data collection. Demographic, functional and health variables were analyzed. Variables and characteristics of participants were analyzed descriptively using means, standard deviations, numbers, proportions and 95% CI. Prevalence of dry skin was calculated as numbers and proportions with 95% CI and separately for different body areas. A bivariate analysis was conducted to describe associations between subjects with and without dry skin. A binary logistic regression model was created.

Results: More than half of all participating clients (n = 923) were affected by dry skin (51.7% [95% CI 48.5 to 54.9]). The prevalence was higher in males and immobile clients. The distal extremities were most often affected. The PU prevalence was 3.6%. There was a strong positive association between skin dryness and pressure ulcers at the feet and leg areas (OR 4.2, 95% CI 0.9 to 20.3) but there was no association between skin dry and pressure ulcers at the trunk (OR 0.7, 95% CI 0.3 to 6.8).

Conclusions: Skin dryness seems to be a substantial health problem in the home care population that might be effectively treated by appropriate skin care regimens. Dry skin at the feet and legs may be considered as a risk factor for heel pressure ulcers. Results are supported by a previous study conducted in nursing homes and hospitals (2).

References:

[8] CGRP CONTRIBUTION IN ADAPTATIVE ADJUSTMENTS OF SKIN BLOOD FLOW TO Pressures: A PROTECTION AGAINST PRESSURE ULCERS

Bérengère Fromy1
1 Centre National de la Recherche Scientifique, Laboratoire de Biologie Tissulaire et Ingrénierie Thérapeutique, Lyon, France

Introduction: Pressure-induced vasodilatation (PV) delays the decrease in cutaneous blood flow produced by local application of low pressure to the skin, a physiologically appropriate adjustment of local vasmotor function. Individuals without a normal PV response have a high risk of ulceration, such as diabetic patients and elders [1, 2].

We aimed to study the role of calcitonin gene–related peptide (CGRP) in the skin defense, in particular the capabilities of the skin to adapt its microcirculation to pressures. These include defense properties to withstand low pressures delaying the onset of ischemia and recovery capabilities after a period of ischemia allowing reperfusion and re-oxygenation.

Methods: Using functional experiments on skin mechanical reactivity [3], we tested the ability or inability of the cutaneous circulation to adapt to locally applied pressure in anesthetized rodents. In addition, we used a protocol in which a compression was applied for 4 h and ischemic lesions were evaluated 24 h later. To study CGRP contribution, mice were treated with the CGRP antagonist α-CGRP(8-37).

Results: A local application of low pressure on healthy skin induces an increase in cutaneous blood flow that is altered following CGRP blockade. CGRP blockade also reduced reactive hyperemia following compression and the incidence and extent of the ischemic lesions were more pronounced in mice treated with α-CGRP(8-37).

Conclusions: CGRP is involved in the appropriate adjustment to pressure in the cutaneous microcirculation that protects healthy skin against pressure ulcers. Deprived of this physiological protection, mice treated with α-CGRP(8-37) showed an early decrease in cutaneous blood flow resulting from the application of very low pressures, reflecting a vascular fragility of the skin. High and prolonged pressures led to a severe ischemia but this persisted after compression release only in absence of reactive hyperemia, as demonstrated following CGRP blockade. In these conditions the incidence and extent of the ischemic lesions were more pronounced. Such an inability of the skin to adapt its blood flow to pressures could explain the higher risk of developing pressure ulcers in the presence of peripheral sensory neuropathy associated with reduced CGRP expression (diabetes, aging). In agreement with this, peripheral sensory neuropathy appears to be a critical factor in the prevalence and severity of pressure ulcers.

References:
[9] CORYNEBACTERIUM STRIATUM AS AN EMERGING MULTI-DRUG RESISTANT, NOSOCOMIAL OPPORTUNISTIC PATHOGEN ASSOCIATED WITH CHRONIC SKIN WOUND INFECTION

Edoardo Virgilio1, Antonella Teggi2, Maria Carmela Santino3, Maria Carmela Solmone4, Marco Cavallini4
1 Sapienza, University of Rome - Sant’andrea Hospital, General Surgery, Faculty of Medicine and Psychology, Rome, Italy

Introduction: Over the last two decades, the world literature has reported ongoing nosocomial infections with Corynebacterium striatum, most of which included bacteremia, central line infections, and, occasionally, endocarditis. However, as of 2018, little is known about its virulence factors that may contribute to healthcare-associated infections (HAIs). In recent years, moreover, C. striatum has been also isolated from other types of clinical cultures. In this regard, we investigated the incidence and association of this germ infection in patients affected with chronic skin wounds.

Methods: We retrospectively reviewed the electronic clinical registries of the patients with chronic skin wounds attending our surgical wound care center. In all patients, C. striatum was cultured from wound beds.

Results: From April 2016 (time of first isolation) to March 2018, 36 patients were found with C. striatum infection affecting their chronic cutaneous wounds. All strains showed multi-drug resistance; susceptibility was found only to linezolid (100%), vancomycin (95%) and tetracycline (40%). In the first two events, antibiotic treatment was managed by a consultant infectologist, whereas in the latter it was given by our surgical team. In 40% of specimens C. striatum infection was associated with other gram positive or negative germs (mostly Staphylococcus aureus and Escherichia coli), whereas 60% of cultures tested positive for C. striatum only. Twelve patients had pressure lesions (33%), eleven peripheral arterial disease (30.5%), ten diabetes mellitus (28%); in the last group, two subjects were under hemodialysis for chronic renal failure (5.5%). During therapy, three patients experienced anemia and one subject developed a decreased vision necessitating withdrawal of treatment. Average healing time was 4.3 months. In 30% of C. striatum infections healed after specific antibiotic therapy, following cultures have isolated infections sustained by other germs. At long-term follow-up, three cardiopatic patients have died of heart attack.

Conclusions: In the light of our results, C. striatum appears as an important opportunistic pathogen increasingly and significantly associated with chronic skin wound affecting the process of ulcer healing. Surgeons and physicians should keep in mind this kind of infection when addressing chronic skin wounds which do not heal after common measures.

References:

[10] COMPARING THE EFFECTS OF 3 DIFFERENT PRESSURE ULCER PREVENTION SUPPORT SURFACES ON THE STRUCTURE AND FUNCTION OF HEEL AND SACRAL SKIN: AN EXPLORATORY CROSS-OVER TRIAL

Tsenka Tomova-Simitchieva1, Andrea Lichterfeld-Kottner1, Ulrike Blume-Peytavi1, Jan Kottner1
1 Charité-Universitätsmedizin Berlin, Department of Dermatology, Venereology and Allergology, Berlin, Germany

Introduction: Special support surfaces play a crucial role in pressure ulcer prevention. In addition to the pressure redistribution properties in response to applied loads, these mattresses may also influence the skin microclimate. The aim of this study was measure effects of three different mattresses (gel, alternating air, basic foam) on the sacral and heel skin structure and function.

Methods: Fifteen healthy females (median age 66 years) were included in this study with cross-over design. They spent two hours in supine position on each of the support surfaces (gel, alternating air, basic foam). Following measurements were conducted under temperature and humidity controlled room conditions before loading, immediately after loading, and 20 minutes post loading: transepidermal water loss, skin surface temperature, erythema, stratum corneum hydration, epidermal hydration, skin extensibility, elastic function and recovery as well as skin roughness.

Results: After the loading period of two hours, the highest increases in transepidermal water loss, skin temperature, erythema, and skin hydration were measured on the heel and sacral areas in the foam group. The erythematous response on the sacral area was 3 times higher in the foam group (61 AU) in comparison to the gel and air mattresses (21 and 18 AU). Sustained loading appears to increase the maximal extensibility, which can be associated with structural changes. In the foam group, the mean roughness of the heel skin was decreased. Overall differences in the gel and air groups were minor.

Conclusions: The type of the support surface influences skin structure and function during loading. The standard foam was most exclusive for sacral and heel skin and caused higher tissue deformation at the heels. The gel and air mattresses presented better heat conductivity and ability to transport moisture, especially at the heel skin. Patients at pressure ulcer risk may benefit from being positioned on special support surfaces.

References:
Introduction: When dealing with deep pressure ulcers and subcutaneous infections, re-positioning and/or bed change is the main intervention to prevent further bacterial contamination; biologics and wound filling materials can be used in combination, but are not sufficient for complete healing.

Objective: The aim of this study was to present a novel and innovative pressure ulcer prevention method using cells to fill the deep recesses of the ulcer.

Methods: A combination of different cell types was used to fill the deep recesses of pressure ulcers. The cells were cultured from different donors and their combinatorial properties were evaluated in vitro and ex vivo.

Results: The cells showed promising results in promoting wound healing and filling the recesses of deep pressure ulcers.

Conclusion: This novel method offers a promising option for the treatment of deep pressure ulcers and subcutaneous infections.
[13] MIGRATION OF RETAINED DRESSING MATERIALS CAUSING NON HEALING PRESSURE ULCERS IN SPINAL CORD INJURY PATIENTS: A CASE REPORT

Srinivasa Chakravarty Budithi1, Bernhard Tins, Aheed Osman1
1 Midlands Centre for Spinal Injuries, Oswestry, United Kingdom
2 Royal Orthopaedic Hospital, Oswestry, United Kingdom

Introduction: Pressure ulcer is a significant cause of morbidity in spinal cord injured patients. It is becoming increasingly common to manage these patients in community which helps reduce the high costs associated with inpatient hospital stay. Regular dressing changes are needed in community as part of management of these pressure ulcers. Choosing the wrong type of dressing material to pack the wounds and loss of the material into the depths of the wounds will have disastrous consequences.

We report a case of rare complication of migration of retained dressing material in the pressure ulcer.

Clinical Details: A 67 year old male with T4 Frankel A neurological deficit following spinal cord injury developed a chronic right ischial pressure sore. This was treated in community with regular dressing changes by the district nurses. The wound was packed with various types of dressings. As it was not healing for more than a year, an MRI scan was performed which showed inflammatory changes in the soft tissues and possible changes of osteomyelitis in ischial tuberosity.

A fluctuant lump was noted over right trochanteric region which showed a foreign body on further investigations. Incision and drainage of this lump revealed a dressing material which had migrated from ischial pressure ulcer, which was evident on the radiological investigations.

Discussion: Retained dressing materials in deep wounds can provide a nidus for infection and can lead to non-healing of the wounds. This is a rare case of migration of the retained dressing material causing problems at a distant site.

Conclusions: There is a potential for retained foreign bodies in pressure ulcers to migrate. Health care professional should be cautious in avoiding retained dressing materials in pressure ulcers.

A high index of suspicion is needed to identify retained dressing materials in radiological investigations.

References:

[14] PRESSURE ULCER PREVENTION AND INTERVENTION FOR PATIENTS UNDERGOING LUMBAR SPINAL FUSION SURGERY

Birgitte Skovgaard1, Merete Lebeck Holm1, Henriette Djuurhus Appel1, Inger Okholm Petersen1
1 Silkeborg Regional Hospital, Silkeborg, Denmark

Introduction: Having enrolled a Quality Improvement and Patient Safety Program in 2013, the Elective Surgery Centre at Silkeborg Regional Hospital Denmark decided to focus on pressure ulcer (PU) prevention and intervention. We found that a continuous focus on auditing, quality assurance and development promoted the cooperation between the interdisciplinary team and our departments with the aim of facilitating a safe, well-documented and timely patient care. However, a retrospective study showed that more studies on spine fusion were required to research the link between BMIs < 25 and incidences of facial pressure ulcers, category I and II (1). Therefore we decided to identify PU prevention and intervention for spine fusion patients undergoing fast-track surgery in order to reduce in-hospital facial PU.

Methods: This retrospective study includes 44 fast track patients (study 1, 2014) and 18 spine fusion patients (study 2, 2018). All subjects were identified in the Safety Cross Calendar during the period of January 2013 to January 2018. The main question behind the two studies was: Where and how did the damage of pressure ulcers occur within the individual patient pathway?

Clinical measurement criteria (study 1 and 2): diagnoses, Body Mass Index (BMI) (2), gender, age, category of pressure ulcer, individualized risk factor, where did the pressure ulcer occur on the body. Criteria as to the prospective multidisciplinary team intervention in study 2: positioning, time of surgery and surgical positioning, was the PU recorded, minimized, the impacts of the prevention program.

Results: Study 1) 54 pressure ulcers occurred on 44 patients, category I and II. There was one pivotal finding with clinical relevancy for study 2: 10 out of 10 patients with lumbar spinal fusion surgery had post-operative facial pressure ulcers, and 8 out of 10 patients had BMIs > 25. Study 2) 18 patients with lumbar spinal fusion surgery had 2 post-operative facial PU and 13 out of 18 patients with BMIs > 25. The prospective intervention is in the period of 1st April to 30th of June 2018.

Conclusions: Study 1) As for now, our patient safety strategy to reduce facial pressure ulcers is: move the patient’s head every hour to the extent possible, change patient’s head position by tilting operating table a few degrees (Trendelenburg). Study 2) The findings and conclusion is available by August, 2018.

References:
**TELEMEDICINE BETWEEN A REHABILITATION CENTER AND NURSING HOMES OR HOME: RESULTS AFTER 650 TELECONSULTATIONS FOR PATIENTS WITH HEAVY DISABILITIES SUFFERING FROM CHRONIC WOUNDS**

Sandra Robineau1, Lomig Le Bihan2, Amélie Chapin3, Andrée Alice Alain1, Benoît Nicolas1
1 Pôle Saint Hélier, Rennes, France
2 Perse, Aulnay Sous Bois, France

**Introduction:** In 2014 we conducted a survey in Brittany to assess the incidence of pressure ulcers in the nursing homes. The result was 5.8% on average. Based on this survey, in 2014, our rehabilitation centre was selected for a regional telemedicine project on chronic wounds.

**Methods:** The aim was to improve the care access for patients with heavy disabilities suffering from chronic wounds in nursing homes or at home. Targeted population is constituted by patients whose access to care is decreased due to moving difficulties and whose healthcare team is in trouble in wound care but also disability, nutrition, etc. Our telemedicine team consists of specialist doctors and nurses for wounds. On request, the occupational therapist or dietitian is involved in the consultation (multi-disciplinary approach). The therapeutic proposal choice is made after collegiate discussion with the patient care team. This exchange time associates at the same time nurses and caregivers, the patient, family and doctor. A report is sent to the general practitioner.

**Results:** Since July 2014, over 650 teleconsultations have been done. 50% of requests come from the nursing home, 50% from nurses at home (30% pressure ulcers stages 3 and 4). The mean age is 74 years (20-101 years). In nursing homes people are older and pressure ulcers are more common. The duration of consultations is on average 30 minutes. In 30% of cases the teleconsultation is extended by a real live training time for the home-based nurse guided by the expert nurse of the telemedicine team (learning organization). Without teleconsultation, in 83% of cases transportation request for consultation would have been made, in 10% hospitalization. In 7% no request would have been done. More than 30000 km have been already avoided. In 2017 we conducted a satisfaction survey: 86% of the patients and more than 90% of the nurses are satisfied or very satisfied with telemedicine care.

**Conclusions:** These organization leads to an improvement of the quality of care by promoting access to care, by providing expertise directly to the home (multidisciplinary), by assisting the nurse at home to redo the dressing (training). Telemedicine can help us to teach the good practices and to spread evidence-based medicine especially to treat and if possible to prevent PU. These are the challenges for the health policy.

**References:**

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**A NATIONWIDE POINT PREVALENCE OF PRESSURE ULCERS IN CRITICALLY ILL PATIENTS: THE NATIONAL FRENCH PRESSURE STUDY: PREVALENCE OF PRESSURE ULCERS IN INTENSIVE CARE UNITS**

Brigitte Barrois1, Michel Philippe2, Gaël Piton3, Atika Youssouf4, Guillaume Decormeille5, Gwenaelle Jacq6, Benoît Nicolas7, Anthony Gélis8, Denis Colin9, François-André Allaert10
1 Perse, Aulnay Sous Bois, France
2 SRLF, FCS, Ponts de France
3 SRLF, FCS, Besançon, France
4 SRLF, FCS, Marseille, France
5 SRLF, FCS, Toulouse, France
6 SRLF, FCS, Versailles, France
7 Perse, Rennes, France
8 Perse, Montpellier, France
9 Perse, Le Mans, France
10 Cenbiotech, Dijon, France

**Introduction:** Pressure ulcers (PU) among hospitalized patients are associated with poor prognosis and high cost of care, especially among patients in intensive care units (ICU), high risk acquisition ward. PU prevention is one of the priorities for ICU teams. However, literature is scarce on the prevalence of PU in critically ill patients, and on PU risk factors.

The main objective of this study, conducted by the French national society for PU (PERS) and French Intensive Care Society (FICS - SRLF) was to describe prevalence of PU in critically ill patients. Secondary objectives were to describe ICU caring for patients, characteristics of PU, characteristics of patients with and without PU, and to identify PU risk factors.

**Methods:** It was a one-day nationwide point prevalence study performed in French ICU during June 2017. The same day presence or absence of PU was assessed in all hospitalized patients of participating ICU, as well as data on ICU, characteristics of patients, PU, and prevention means.

**Results:** Eighty-six ICU allowed the inclusion of 1228 patients. Median age and SAPS 2 score were 65 years (53.74) and 41 (29.75), respectively. The prevalence of PU among critically ill patients was 19%. Acquired PU in ICU was 12.7%. Most frequent PU locations were scarrum (57 %), heel (35 %), and face (9 %). PU associated with material use were found in 12% of the patients, mainly with the facial mask during non-invasive ventilation. Severe PU (necrosis or loss of substance) accounted for 36% of all PU. Means of PU prevention were mattress in 91.5% of patients, mobilization active in 43.8% and passive in 52.4%. Multiple logistic regression analysis identified that the risk factors independently associated with PU were weight, SAPS 2 score, use of corticosteroids, and neurologic disease. But, body mass index, age, and mechanical ventilation were not associated with PU.

**Conclusions:** This 2017 nationwide point prevalence study identified that PU are still present mainly in the most severe patients. Comparatively with previous French data in 1996, showing a 22% prevalence of PU, the actual 19% with 12% of new acquired PU emphasize the need to improve preventive programs – organization and devices.

**References:**
REAL-TIME FEEDBACK OF PRESSURE POINTS DURING SURGERY: A PILOT STUDY

Eva Sving, Lena Gunningberg, Carina Bödth, Catrine Björn

Introduction: During surgery patients have a high risk for developing pressure ulcers (PU) (1) and the PU incidence for patients undergoing surgery was in one study shown to be 20 % (2). The perioperative nurses have a responsibility to identify pressure points in order give PU prevention (1). However, there are limitations in the possibility to repositioning the patients during surgery. To have real-time feedback of pressure points could help to optimize the positioning and secure low pressure points. The aim of the study was to investigate the interface pressure during surgery and the incidence of PUs.

Methods: A pilot study with a quantitative approach. All patients admitted for general or orthopedic surgery during daytime (n=50) with an estimated time for surgery >30 minutes. The interface pressure from a continuous pressure mapping systems (CBPM-system) give continuous visible feedback of pressure points when positioning the patients preoperative and throughout the surgery. Data collection: interface pressure over bony prominences every thirty minutes, PU incidence after surgery and two hours postoperative.

Preliminary results: Included were 49 patients. In supine position the peak pressure varied between 28-255 mmHg and in side position between 44-192 mmHg. Eight patients’ had blanchable erythema directly after surgery and 5 patients had a PU (category 1) two hours postoperative.

Conclusions: The results showed a large variation in peak pressure during surgery, which could indicate usefulness of the CBPM-system. PU prevention needs to be a natural part to protect the patients from harm during surgery. However, in that effort the efficiency and usability of the CBPM-system during surgery need to be thoroughly investigated in forthcoming studies.

References:

DEVELOPING A DECISION MAKING TOOL FOR NURSES TO IMPROVE END OF LIFE SKIN CARE FOR ADVANCED CANCER PATIENTS: A QUALITATIVE EXPLORATORY STUDY

Ray Samuriwono, Josie Henley, Sally Anstey, Claire Job, Dot Williams, Jane Hopkinson

Introduction: The need to improve the quality of skin care for patients at the end of life has been highlighted in a number of reports (1). Nurses are said to have difficulties in making decisions about skin care because it may cause distress to a dying patient or their family. This study sought to develop a decision making tool (DMT) to help nurses to make appropriate decisions about the end of life skin care for patients with advanced cancer in hospitals.

Methods: A qualitative case study design was used to gather data through a triangulation of methods. This study gathered data through focus group interviews with 17 bereaved family members and nurses, 440 hours of non-participant observation on two hospital wards that deliver care to advanced cancer patients approaching the end of life as well as individual interviews with 12 key informants who were identified during the non-participant observation. Data were subject to thematic analysis informed by shared decision making theory (2, 3).

Results: We found that nurses’ decisions about end of life skin care for patients with advanced cancer are influenced by a number of individual, organisational, patient and family factors or cues. We also found that each nurse makes decisions about end of life skin care collectively with other nurses, healthcare professionals and clinical staff. We have also developed a theory and DMT which takes into account the fact that a nurse’s decision making about end of life skin care is a reflective, iterative, continuous process in which nurses take into account a number of factors and cues in clinical practice.

Conclusions: Our findings are consistent with wider literature on nurses skin care related decision making and general end of life care, but there are two novel findings. Firstly, nurses make and constantly review their judgements and decisions about end of life skin care with other nurses and healthcare professionals. Secondly, we found that each nurse makes decisions about the prioritisation and delivery of end of life skin care collectively with other nursing staff. Our DMT and theory can be integrated into logic models that are used in quality improvement projects and interventions for end of life skin care. This paper will describe the development of the end of life skin care DMT and theory.

References:
CAN THE EFFICACY OF PRESSURE RELIEVING STRATEGIES BE ASSESSED THROUGH THE MAGNITUDE OF MOVEMENTS PERFORMED?

Silvia Caggiari¹, Peter Worsley¹, Dan Bader¹

¹ University of Southampton, Faculty of Health Sciences, Southampton, United Kingdom

Introduction: Repositioning and pressure redistributing support surfaces represent primary interventions in pressure ulcers prevention, particularly for immobilized individuals. However, the efficacy of these strategies in terms of magnitude and frequency of movements has not been established [1]. The interaction between an individual and the support surface has traditionally been evaluated using pressure mapping systems over relatively short time periods. The technology has now evolved to monitor pressures over prolonged periods and estimate movement-related parameters. This study examines the performance of biomechanical parameters derived from a pressure monitor and accelerometers in detecting movements during prolonged lying postures. In addition, the relationship between biomechanical and physiological responses were observed.

Methods: Eleven healthy participants adopted different lying postures on a standard support mattress, by utilizing the head of bed (HOB) angle and an automated tilting system to achieve sagittal and coronal movements, respectively. A series of time-related biomechanical parameters were estimated using a pressure monitor [2] and accelerometers [3], the latter placed on the sternum, pelvis and thigh (Figure 1). Parameters included the centre of pressure (COP), inclination angles (IA) calculated from the accelerometric data, allied to transcutaneous gas levels (TcPO2, TcPCO2) at the sacrum, categorized according to established criteria [4]. These were used to investigate 1) sensitivity and specificity of the systems in detecting posture changes 2) relationship between biomechanical and physiological parameters.

Results: Data analysis revealed that at lower threshold values IA and COP were sensitive to detect posture changes. COP values were affected by the magnitude of repositioning, with a reduced sensitivity for HOB>40o (Figure 2). By contrast, specificity of both parameters were compromised at lowest threshold values, with the best results derived from IA. The majority of participants exhibited transcutaneous levels, which did not indicate compromised tissue viability during either supine or lateral lift postures. However, in some cases a reduced TcPO2 was recorded at higher HOB angles (i.e.>40o).

Conclusions: These findings revealed that posture changes can be detected by pressure monitoring and accelerometric systems, with parameter selection and thresholding impacting on sensitivity and specificity. These technologies have the potential to monitor repositioning strategies over prolonged periods (>72hours). The biomechanical parameters were also suitable in detecting smaller scale postural movements (natural and/or evoked) during static postures, a finding which required further analysis. In a sub-group of individuals ischemic physiological responses were observed for higher HOB angles associated with reduced TcPO2.

References:
[2] ForeSite PT, Xensor
[3] Shimmer, Ireland

INNOVATIVE BIOFILM DETECTION SYSTEM FOR REALIZING BIOFILM-BASED WOUND MANAGEMENT

Gojiro Nakagami¹, Adam Astrada², Aya Kitamura³, Takeshi Minematsu¹, Hiromi Sanada¹

¹ The University of Tokyo, Department of Gerontological Nursing/Wound Care Management, Division of Care Innovation, Global Nursing Research Center, Graduate School of Medicine, Tokyo, Japan
² The University of Tokyo, Department of Gerontological Nursing/Wound Care Management, Graduate School of Medicine, Tokyo, Japan
³ The University of Tokyo, Department of Skin care Science, Division of Care Innovation, Global Nursing Research Center, Graduate School of Medicine, Tokyo, Japan

Introduction: Biofilm plays an important role to hinder the appropriate wound healing process of pressure ulcers. For optimal wound bed preparation, biofilm elimination is a crucial key; however, clinicians could not determine whether there is the biofilm on the wound surface without invasive and time- and cost-consuming compounded procedure such as wound biopsy followed by electron microscopic assessment. We have invented a point-of-care biofilm detection system which visualizes the biofilm distribution on the wound surface noninvasively. This study aimed to offer an idea how this system could change the daily practice for pressure ulcer management based on biofilm assessment.

Methods: The biofilm detection system employs the wound blotting technique which captures small molecules including polysaccharide on the wound surface. Blotted membranes are then stained by alcin blue to visualize the biofilm component on the membrane. The staining process takes only 2 minutes and is easily performed at the patient’s bedside (Nakagami et al., Wound Repair Regen, 2017). For concurrent validity we compared the staining outcome with the results based on biofilm quantification from the tissue samples. For predictive validity, we prospectively observed the pressure ulcers to confirm whether the presence of biofilm on the wound surface precedes the delayed wound healing. Finally, we assessed the effect of biofilm elimination guided by this visualization method on wound healing. All research protocols were approved by the ethics committee.

Results: The intensity of visualized biofilm on the membrane significantly correlated with the concentration of extracted biofilm. When the pressure ulcer was positive for biofilm, the probability of delay in wound healing (ie: slough formation) was significantly higher than the case with negative result. Biofilm elimination confirmed by the biofilm visualization promoted wound healing in pressure ulcers.

Conclusions: Biofilm detection-based wound management using wound blotting is a promising measure to guide clinicians to perform a more precise elimination of bacterial bioburden.

References:
ROBOTIC MATTRESS FOR PRESSURE REDISTRIBUTION AND PATIENT COMFORT

Aya Kitamura1, Gojiro Nakagami2, Hiromi Sanada2
1 The University of Tokyo, Department of Gerontological Nursing/Wound Care Management, Tokyo, Japan
2 The University of Tokyo, Department of Gerontological Nursing/Wound Care Management, Division of Care Innovation, Global Nursing Research Center, Graduate School of Medicine, Tokyo, Japan

Introduction: Support surfaces are an important element in pressure ulcer prevention and treatment. We have developed a robotic mattress that is an air mattress with several functions for pressure redistribution. The robotic mattress continuously measures the interface pressure and automatically adjusts the inner air-cell pressure to the appropriate level. This feedback system is the reason why we call it a "robotic mattress." The mattress also has an automatic repositioning function that allows it to reposition slowly. Repositioning by nurses sometimes causes pain or hemodynamic changes in critically ill patients. This study is a case report that suggests that the robotic mattress supports patient comfort as well as pressure redistribution.

Methods: This case study was conducted by collecting data from the medical charts of an interdisciplinary pressure ulcer team at a hospital in Japan. A patient, a male in his 80's, was hospitalized because of burns to his face and neck. He had been receiving treatment for burns including an analgesic for pain and an antihistamine for itching. Nurses provided care, assessing his pain and itching based on his movement; however, it was difficult to assess and manage his pain and itching as he could not project his voice due to a tracheotomy. A Category II pressure ulcer with slough on the wound surface occurred in the sacral region, and an interdisciplinary pressure ulcer team was consulted.

Results: Whenever the nurses provided care and repositioning for the pressure ulcer, he moved to try to escape. The interdisciplinary pressure ulcer team therefore selected the robotic mattress for him because the frequent repositioning by nurses was causing him pain. The maximum interface pressure was maintained under 50 mmHg by the robotic mattress. The amount of slough on the wound surface and the wound size decreased one month after the introduction of the robotic mattress.

Conclusions: Robotic mattresses could provide pressure redistribution without pain and keep patients comfortable.

References:

EMBEDDED SENSING AND ACTUATING SYSTEMS FOR PRESSURE MAPPING AND MONITORING TO PREVENT PRESSURE ULCERS

Ricardo Simoes1, Susana Pereira1, Ricardo Carvalho2, Joana Almeida2, Joana Fonseca2
1 Polytechnic Institute of Covilhã and Ave, Barreiros, Portugal
2 Center of Nanotechnology and Smart Materials (Cenat), Portugal

Despite improvements in medical industry and healthcare, pressure ulcers prevalence remains high especially in hospitalized / bedridden patients. Pressure ulcers affect the patients’ quality of life and their caregivers, contributing to the increase of morbidity and, in some cases, of mortality rate, and significantly increasing direct and indirect healthcare costs [Bergman-Evans, B., et al, 2001, Primary Intention 9:88]. Among the prevention strategies and therapeutic approaches, the use of pressure reduction devices or support surfaces is very common. However, despite support surfaces allowing some pressure redistribution, it does not effectively remove body pressure from specific high pressure loci, which is one of the factors with greatest impact on the pressure ulcers development [Lyder, C.H., et al, 2008, “Pressure Ulcers: A Patient Safety Issue.” In Patient Safety and Quality: An Evidence-Based Handbook for Nurses, pp. 268]. Thus, devices capable to measure and mapping the body pressure, and in real-time actuate in order to redistribute localized pressure, is a promising path for pressure ulcers prevention.

The present work presents a new concept of a sensing plus actuation system that allows pressure ulcers prevention through a fast-acting relief of pressure on the specific affected area. The system consists of a pressure sensing matrix based on a resistive sensors network completely integrated into a textile substrate, coupled with a smart actuation mechanism based on shape memory materials that shift pressure away from pressure peak locations. The textile embedded sensors consist of two textile layers with integrated conductive yarn (silverized nylon yarn) which have been overlapped, creating crossing points between the conductive yarns, forming electrodes (with a semiconductor between them). Results of sensor tests show the influence of the number and arrangement of the conductive yarns on the sensitivity and accuracy of the sensor response. Also, different actuator geometries were benchmarked with a group of shape memory alloys and a mechanical displacement system, capable of holding a weight of 3 kg, was developed. The two components integrate as a complete device to be used for pressure ulcers prevention. The quantitative pressure mapping system in addition to pressure monitoring, will allow the actuation mechanisms control, through control algorithms responsible for triggering an immediate and automatic response based on pressure values read by sensors (i.e., the feedback from the textile sensors network), providing a smart, noninvasive and preventive actuation.
AMINOACIDIC SPRAY GEL VS SILVER SPRAY POWDER: A PREVENTION COMPARATIVE RANDOMIZED TRIAL

**Roberto Cassino**
1. CITTA’ Stud Clinic Institute, Diabetic Foot and Vulvology Center, Milan, Italy

**Introduction:** There is no scientific evidence in the use of topical materials to avoid the development of pressure ulcers in risky patients; barrier creams or oily products or ointments have evidence C in guidelines [1]. In Italy, the mostly use product is silver spray powder. The aim of this work is to demonstrate the effectiveness of an aminoacidic spray gel in the prevention of pressure ulcers [2] in comparison with silver spray powder.

**Methods:** From 2010 to 2016, we enrolled 500 patients at risk of bedsores development (Norton score <12), divided into 2 groups of 250 each in an alternate randomization. For two weeks, once a day on the skin above the bone prominences, we treated patients of Group A with silver spray powder and the ones of Group B with an aminoacidic spray gel. We evaluated local oxygen saturation before and after the treatment to analyze the eventual perfusional variation, using a brilliance oxygen satimeters [3]. We also visually assessed the risk areas (eventual appearance of “blanchable” and/or “not blanchable” erythemas).

**Results:**

<table>
<thead>
<tr>
<th>Silver Spray Powder (Group A)</th>
<th>RESULTS</th>
<th>Aminoacidic Spray Gel (Group B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>59.6% (149/250) Worsening</td>
<td>4.4%</td>
<td></td>
</tr>
<tr>
<td>15.2% (38/250) Improvement</td>
<td>85.2%</td>
<td></td>
</tr>
<tr>
<td>25.2% (63/250) No Change</td>
<td>10.4%</td>
<td></td>
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<tr>
<td>-0.9% Mean SpO2</td>
<td>+ 4.42%</td>
<td></td>
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<tr>
<td>-15% Maximum Range</td>
<td>+ 16%</td>
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</table>

**Conclusions:** In Group A most of patients worsened and about 1 out of 4 had no result; only 15% of them improved. On the contrary, in Group B only 11 patients out of 250 worsened, only 1 out of 10 had no result and 213 out of 250 improved the local oxygen saturation. The differences are statistically highly significant in any evaluated item. The clinical relevance of this work is that silver spray powder demonstrated to be no effective in bedsore prevention, at least in terms of perfusion, and that aminoacidic spray gel can help us to avoid skin pressure injuries in a statistically significant number of patients.

**References:**

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**SKIN BLOTTING ANALYSIS OF INTERLEUKIN 6 ON THE BUTTOCK OF WHEELCHAIR BASKETBALL PLAYERS**

**Takeo Minematsu**
1. The University of Tokyo, Department of Skincare Science, Division of Care Innovation, Global Nursing Research Center, Graduate School of Medicine, Tokyo, Japan
2. The University of Tokyo, Department of Gerontological Nursing/Wound Care Management, Graduate School of Medicine, Tokyo, Japan
3. The University of Tokyo, Department of Gerontological Nursing/Wound Care Management, Division of Care Innovation, Global Nursing Research Center, Graduate School of Medicine, Tokyo, Japan
4. The University of Tokyo, Division of Care Innovation, Global Nursing Research Center, Department of Imaging Nursing Science, Graduate School of Medicine, Tokyo, Japan
5. The University of Tokyo, Division of Care Innovation, Global Nursing Research Center, Department of Life Support Technologies (Molten), Graduate School of Medicine, Tokyo, Japan

**Introduction:** Wheelchair basketball players secure their legs to their wheelchairs with belts to ensure top performance, resulting in excessive pressure and share to their buttocks that could cause development of pressure ulcers. Although it would be useful to use biopsy sampling to ascertain the status of the buttock tissue, this test is not acceptable due to its invasiveness. Therefore, we attempt to evaluate tissue damage and recovery response of their buttocks by skin blotting, which is a noninvasive technique for evaluating the physiological status of the skin and underlying tissue (Minematsu 2014).

**Methods:** The subjects included 14 wheelchair basketball players attending camp training. Skin blotting samples were collected from their buttocks at morning (baseline) and night (after training) of the first day and the next morning (after rest). The target marker being measured was Interleukin 6 (IL6), which is a cytokine to inhibit inflammation and to promote regeneration of skeletal muscle. Albumin was an internal standard marker in skin blotting analysis. The signal intensity of IL6 was normalized by that of albumin and then expressed as a value relative to the baseline.

**Results:** Of the 14 subjects, two had pressure ulcers at baseline. The IL6 signal was detected in all samples. A significant proportion of subjects showed a decreased intensity of IL6 signal, whereas some subjects showed increased signal of IL6 after training. Although most subjects exhibited a recovery of IL6 signal level after rest, the subjects with pressure ulcers showed a weaker recovery.

**Conclusions:** Evaluation of IL6 by skin blotting showed the tissue response for damage and recovery of buttock tissue. This skin blotting method is an effective method for assessing the status of buttock tissue of wheelchair basketball players.

**References:**
Introduction: Pressure ulcers (PUs) are considered adverse events that cause suffering for patients and costs for society. Global studies examining PUs in hospital settings report PU prevalence from 0% to 46%. As part of the Swedish patient safety initiative, all hospitals have performed medical record reviews using the Global Trigger Tool (GTT) method since 2012. As prevalence studies provide only a snapshot of the PUs observed on a specific day, the GTT could provide a complementary perspective. The aim of this study was to examine the frequency, preventability, and consequences of hospital acquired PUs (Category 2-4) in hospitals.

Methods: A retrospective record review was performed using the Swedish version of the GTT. A total of 64,917 hospital admissions were reviewed. Data were collected for 2013-2016 for all 63 hospitals in Sweden.

Results: The prevalence of hospital acquired PUs (category 2-4) was 1%. Older patients, patients with acute admissions and patients who were relocated to a unit without specific competence and medical responsibility developed more PUs. Most PUs (91%) were determined to be preventable. The mean extended length of hospital stay was 15.8 days for patients with a hospital acquired PU.

Conclusions: The GTT provides a useful and complementary national perspective on hospital acquired PUs, informing health care providers on safety priorities to reduce patient harm. Nurse managers can use information on the preventability and the consequences of PUs, as well as evidence-based arguments for improving the health care organization.

References:
**Preliminary Experience with the Use of NPWT Over Exposed Vessels: Do We Have to Revise NPWT Contraindications?**

Guido Paolini, Diego Ceci, Fabio Santanelli di Pompeo, Matteo Atzeni

Introduction: The use of NPWT has become the gold standard for the debridement of difficult wounds. During the years the technique has been refined and some of its initial contraindications have been amended. Currently NPWT use it’s contraindicated over exposed vessels for the increased risk of acute bleeding. Nevertheless the availability of different devices, medications, pressure and time ranges allows to modulate the therapy according to the needs even when vessels are superficial or partially exposed.

Methods: Since 2001, at SantaAndrea Hospital in Rome, we used NPWT on over 80 difficult cases, such as post-traumatic lower limb wounds, surgical wound dehiscence and pressure ulcers. In three cases we dealt with exposed vessels. The etiopathogenesis was in one case a self-inflicted hand sub-amputation with exposed anastomosed vessels and loss of substance, a complex post-traumatic ankle and foot wound with exposed single arterial pedicle and a groin dehiscence after vascular bypass. Exposed pedicles were radial and ulnar vessels, posterior tibial vessels, and femoral ones. Patients were male and age ranged from 18 to 67 years old. Comorbidities were in one case psychiatric condition, in one case vascular anomaly with single artery post-traumatic foot and in one case diabetes and severe arteriopathy. All patient were under enoxaparin treatment.

Careful follow-up of patients and dressing were performed, so to detect eventual acute bleeding. Treatment was continued since a valid granulation tissue covering wounds was obtained.

Results: NPWT started at day first from trauma in two cases while at day 5 after anastomosis revascularization in one case. In all treatments a low and intermittent negative pressure (80 mm Hg) and an interpolated vaseline gauze were used; A soft gauze dressing was used in two cases, while a regular foam in one. Dressing change was performed every 72-96 hours. No bleeding during NPWT therapy was observed, except one case after surgical wound debridement that was solved with compression, flat dressing and NPWT suspension for two days. Mean NPWT duration was 31 days (range 25 to 51 days). Treatment was discontinued when granulation tissue allowed wound closure by flap or skin grafting.

Conclusions: The use of NPWT over exposed or superficial vessels is actually contraindicated. Our preliminary experience suggests the possible use of NPWT over exposed vessels with optimal results in selected cases when a careful hospital management is observed. Further clinical investigation is needed to validate the treatment because complications may be hazardous.

**References:**


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**Extravasation Ulcer in Newborn: When the Immediate Skin Full-Thickness Loss May Render a Limb Virtually Useless. Needs for a Prompt Team-Common Action**

Serena Crucianelli, Giancarlo Antonielli, Valentina Vanzi, Tiziana Sciannameo, Guido Ciprandi

Introduction: The incidence of extravasation episodes in a paediatric population raises to 22% for newborn with a continuous intravenous infusion. More recently some authors reported a 61% incidence of invalidating cicatrization and retracting outcomes, in a long term follow up. A fragile low-thickness skin is responsible in premature and newborn for an immediate tissue damage involving muscles and tendons. An early Team-treatment is mandatory for a drastical reduction of early-onset excessive deep draining and future disabilities.

Methods: During the last 24 months a prospective cohort study on 24 consecutive newborns with extravasation lower limb ulcer (EU) was conducted. Stop infusion, aspiration, labelling site, type of fluid/s, light squeezing and a lymphatic drainage massage were part of the initial treatment. Regardless of the skin-damage and agent all virtually useless limbs were submitted to a Negative Pressure Wound Therapy (NPWT) protocol using low pressure regimes (25mmHg), a continuous mobility and mild intensity. A split-thickness silver foam is everyday preferred. Two days after all patients experienced a treatment with an activated pad made of Hyaluronic Acid Sodium Salt 0.2% and equin collagen type LA sterile bandage is used as a secondary dress. Local sign and symptoms, pain and EU features were assessed after each pad exchange (every 48 hours). Punch biopsies were obtained in 4 newborn showing initial hypergranulating signs of the damaged tissues.

Results: An immediate pain resolution was achieved in all but five patients since the institution of the NPWT and the minimal residual noise ceased with the pad-dressing. Local tissue granulation has been verified as gradual and constant, without subsequent scarring effects, despite some deep tissue loss verified in 8 newborns. The first 3 months follow-up did not show any possible retracting deep scarring. In 4 newborn with mild hypergranulating effects tissue samples processed with TEM didn’t support differences in collagen organization and in fibroblastic features with only few/absent amorphous extracellular material encircling fibroblastic cells. A second two years follow up showed a complete mobilization of the ankle in all cases.

Conclusions: An immediate activation of the Team with a rapid implementation of the guidelines, the continuous suction limiting a persistent damaging contact-effect both from a quantitative and qualitative point of view and the instant adoption of a hyaluronic pad reduced to a minimum the final effects of a potential catastrophic event. As for pressure injuries, EU also have to be managed rapidly in these breakable by age patients.

**References:**


THE USE OF NEGATIVE PRESSURE WOUND THERAPY PORTABLE SYSTEM IN PRESSION LESION MANAGEMENT

Maria Emílio Gaspar Ferreira Del Cistia1, Danivea Bangiovanni Poltronieri Munhoz1, Amanda Brandão1

1 Hospital Israelita Albert Einstein, São Paulo, Brazil

Introduction: Diabetes Mellitus (DM) is a serious health problem with important chronic complications. Currently, negative pressure therapy is a widely used technology in the treatment of wounds that can be indicated in the treatment of deferred complex, as in wounds of people with DM. Due to few studies on the use of negative pressure wound therapy (NPWT) in the treatment of diabetic pressure lesions, the purpose of this study was to describe the experience of using this therapy.

Methods: A descriptive study, a case report, performed in a private hospital in the city of São Paulo. The evaluations and evolutions were performed through clinical observation and photographic records after informed consent was signed by the patient.

Results: Patient: S.B.K., 61 years old, female, history of diabetes mellitus; Transplantation of kidney and pancreas in 2003 and new pancreas transplantation in 2006 and current invasive melanoma. It evolved with a stage 4 pressure injury related to the use of an orthosis in the right calcaneus. Negative pressure therapy with installation of SF0.9% was associated with the use of an antimicrobial sponge. Performed exchanges every 3 days. Therapy was used for 21 days after the installation of conventional NPWT with the use of a double layer of sponge. Used pressure of 125 mmHg, high intensity and continuous mode. Dressings performed every 5 days for 3 months. After 120 days of treatment with NPWT which was suspended and changed to sterile dressing with silver for 60 days, complete healing of the lesion occurred. Afterwards, silicone foam without adhesive border was used for protection.

Conclusions: The use of negative pressure therapy as a coadjuvant in the treatment of pressure injury proved to be effective with obtaining initial wound cleaning, contraction of the edges, reduction of odor, reduction of edema, formation of granulation tissue with improved supply blood. There was a reduction in hospitalization time and a more effective healing process.

References:

PRESSURE ULCERS IN HOSPITALIZED NEONATES: RATES AND RISK FACTORS

Tiziana Sciannameo1, Guido Ciprandi1, Andrea Dotta3, Sonia Benelli1, Charlie Beetham1

1 Bambino Gesù Children's Hospital, Rome, Italy
2 Bambino Gesù Children's Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy
3 Bambino Gesù Children's Hospital, Department of Medical and Surgical Neonatology, Rome, Italy

Introduction: Neonates submitted to a Nasal Continuous Positive Airway Pressure (nCPAP) frequently experience pressure sores evolving in soft tissue necrosis, with permanent scar and nose deformities in more than 40% of patients. A new staging system and strategies of prevention are described.

Methods: All preterm and term neonates hospitalized in the Neonatal Intensive Care Unit of the Bambino Gesù Children’s Hospital and submitted to nasal CPAP were nasal monitored. The appearing sores were classified into 5 stages: I - not blancheable external erythma; II - both external and vestibular persistent erythemas; III - skin-surface erosion; IV - deep soft tissue erosion; V - cartilage necrosis and loss of the nasal shape. The prevention strategy focused on 5 main points: 1. use a proper fixation of prongs; 2. reduce device material’s density; 3. favor tools with low biological memory; 4. under value size or caliber of prongs; 5. prevent skin surface breakdown and protect tutorial skin-contact. A number of clinical audits were performed to educate all the stuff dealing with neonates in the NICU dedicated team was created in order to monitor the babies with CPAP. New materials were adopted after a review of the literature.

Results: Nasal sore was more frequent in premature infants, the severity of the lesions being greatest under 12 weeks of gestation. The worsening from stage IV to V has been considered the fastest one. Use of the five preventing steps reduced the total amount of nasal sore and the number of lesions staged IV and V.

Conclusions: An integrated and well prepared staff care team can reduce to a minimum the number of severe complicated pressure nasal sores during nCPAP thus reducing the number of future surgical reconstructive procedures during the high school time.

References:
REducing intensive care medical device-related pressure injuries caused by nasogastric and endotracheal tubes: a pilot study

Fiona Coye1, Jane-Louise Cook1, Amanda Vann3, Nicola Barker-Gregory1, Anna Doubrovsky1

1 Queensland University of Technology, Royal Brisbane and Women’s Hospital, School of Nursing, Faculty of Health, Brisbane, Australia
2 Queensland University of Technology, Australia
3 Royal Brisbane and Women’s Hospital, Australia
4 Redcliffe Hospital, Australia

Introduction: Medical device-related pressure injuries (MDRPI) are defined as injuries associated with the use of devices where the injury has the same configuration as the device. If critically ill patients have high rates of medical devices in situ, most commonly nasogastric tubes (NGT) and endotracheal tubes (ETT), increasing the risk of developing an injury from these devices. The aim of this study was to evaluate the feasibility and efficacy of interventions to reduce MDRPI caused by NGT and ETT.

Methods: This study used a multi-centre non-blinded randomised controlled pilot trial design. It was conducted in 2017 (11-month period) in two hospital ICU sites in one health service district in Australia. Patients who met the inclusion criteria (> 18 years, NGT and/or ETT in situ > 48 hours) were recruited. The primary outcome measure was the development of a MDRPI. The study comprised two arms: 1) NGT and 2) ETT. Each arm had two interventions using different securement methods to keep the device ‘free’ in the orifice, padding and 3-hourly checking of the skin under the device, and a control (standard practice). Patients were randomised to groups using computer-generated random number. Data was collected on patients demographic and clinical characteristics including skin inspection by research nurses. Ethical approval was obtained from the respective hospital and university Research Ethics committees.

Results: Excluding loss to follow-up, 59 patients completed the study; 14 patients in the NGT arm; 23 in the ETT arm, and 22 in both arms. Median age was 56 years (IQR 46-67), 53% were male (32/59), median length of stay was 7.2 days (IQR 5-12). In the ETT arm, one stage II MDRPI was detected on a patient’s lip. During the study period, 77 MDRPI were reported in patients not enrolled in the study with 33 attributed to NGT and 33 to ETT.

Conclusions: It is possible the extra surveillance provided to enrolled patients contributed to minimal MDRPI occurrences. Further research is required to determine appropriate securement and assessment of devices.

References:

[32] Australian perspective in advancing clinical care to reduce neonatal skin injuries

Margaret Broom1, Wendy Burton1, Leanne Ehrlich1, Ann Marie Dunk2

1 Centenary Hospital for Women and Children, Canberra, Australia
2 Canberra Hospital, Act. Health, Canberra, Australia

Introduction: Due to the sensitivity of neonatal skin infants are at high risk of skin injuries. Research has shown the major risk factors for acquiring a skin injury include prematurity, low birth weight and medical devices required to provide intensive care. Studies have shown extremely premature neonates have a 50% risk of acquiring a skin injury during their admission to the Neonatal Intensive Care Unit (NICU). A high percentage (20-30%) of these injuries are related to pressure from medical devices. In 2009 the Canberra NICU conducted a skin injury audit which recorded a 60% skin injury rate in the NICU population. Two main causal groups were identified: 1) medical devices (intravenous, blood collection and Continuous Positive Air Pressure (CPAP) equipment and 2) factors related to routine skin care (dry skin, excoriated buttocks). Since 2009 the Canberra NICU Skin Team have undertaken a continuous Quality Improvement Project to reduce skin injuries.

Methods: The team has undertaken a systematic review of policies, guidelines and clinical practices aiming to prevent skin injuries. A stage approach utilising the Quality Improvement Cycle: Plan, Do, Study, ACT, has been implemented to identify key problems and work towards improving neonatal outcomes. Research methods have included: validation study, clinical audit and multidisciplinary expert group forums. Approval from the local ethics committee has been gained for each project completed.

Results: Over the past 8 years the team have developed and validated a skin risk assessment and management tool (SMART) specific designed for and tested in a neonatal population. The tool assists staff in predicting infants at high risk of injury. Providing a skin care plan as well as preventative strategies to reduce the risk of injury. Aiming to reduce nasal pressure injuries they have also conducted a QI project to compare difference types of nCPAP interfaces that has led to updating equipment and clinical practice in the care of infants requiring nCPAP. One of these interventions is a nasal pressure injury care plan. Since the Canberra NICU Skin Team has been working to improve daily neonatal skin care the incidence of neonatal skin injuries has reduced from 60 to less than 30%, pressure injuries have also reduced from 30 to 15%.

Conclusions: Improving neonatal skin care and reducing the incidence of skin injuries in a NICU requires a dedicated team. Improvements can be made through research, updating equipment and challenging current care practices.

References:
MEDICAL DEVICE RELATED PRESSURE INJURIES IN THE NEONATE: A MULTIDISCIPLINARY DEVICE SPECIFIC APPROACH TO PREVENTION AND HEALING

Ann Marie Nie, MS, Adam Lokeh, Dr. 1
Deanna Johnson

Introduction: The high level medical needs of extremely preterm and sick infants demand medical interventions that too often result in unintended skin harm, including pressure injuries. The skin of extremely preterm infants is underdeveloped and the cell layers are significantly thinner. As a result, pressure injuries may present and progress differently than in the healthy adult. Pressure injuries on the neonate’s skin may be related to the device used to support or stabilize the infant. As the neonate’s body needs support, the pressure injuries are likely to occur on the chest, head, and extremities. The most profound immature skin barrier function of the neonate prevents the stratum corneum which provides the fragile patients with the barrier function. Inadequate barrier function results in increased propensity for absorption of potentially toxic substances. As a result, wound care products for neonates must be chosen carefully.

Methods: Pressure injury staging, current guidelines for taking care of the critically ill and prevention of device-related pressure injuries were reviewed. The NICU at Children’s Hospital of Minneapolis, Minnesota, United States produces a myriad of works. Bringing the key stakeholders together with select case reports will be reviewed for discussion. The NICU at Children’s Hospital of Minneapolis, Minnesota, United States produces a myriad of works. Bringing the key stakeholders together with select case reports will be reviewed for discussion.

Results: Pressure injuries in the neonatal intensive care unit (NICU) have immediate and potential long-term implications. Most pressure injuries in the NICU are caused by life-sustaining devices and critical monitoring equipment, which are critical to the neonate’s survival. The neonatal intensive care unit is a multidimensional environment, with a high risk of pressure injury occurrence. The use of pressure relief devices is complex and challenging. The NICU at Children’s Hospital of Minneapolis, Minnesota, United States produces a myriad of works. Bringing the key stakeholders together with select case reports will be reviewed for discussion.

Conclusions: Pressure injuries in the neonatal intensive care unit (NICU) have immediate and potential long-term implications. Most pressure injuries in the NICU are caused by life-sustaining devices and critical monitoring equipment, which are critical to the neonate’s survival. The neonatal intensive care unit is a multidimensional environment, with a high risk of pressure injury occurrence. The use of pressure relief devices is complex and challenging. The NICU at Children’s Hospital of Minneapolis, Minnesota, United States produces a myriad of works. Bringing the key stakeholders together with select case reports will be reviewed for discussion.

References:
INTRODUCTION: It is the standard of practice to perform a regular prevalence assessment of hospitalized patients’ skin for potential pressure injuries (PI). Greater than 50% of pressure injuries in pediatrics occur under medical devices. These injuries are easily mistaken for other types of skin injuries such as abrasions, friction, incontinence associated dermatitis, etc. A Midwestern pediatric hospital reviewed their PI monthly prevalence day process for improvement purposes. Re-education of a dedicated team yielded an increase in PI, largely device related.

METHODS: A literature search was performed in order to determine an evidence based approach to educate and perform a PI prevalence. The search yielded no peer-reviewed literature on how to perform a PI prevalence survey. Using the National Database Nursing Quality Indicators (NDNQI) literature on how to perform a prevalence survey, a new training and assessment program was developed and implemented that created a more standard approach to capturing potential pressure injuries.

RESULTS: An in-depth re-education on PI detection methods was undertaken by 30 clinical staff members, which included registered nurses and respiratory therapists, who became the organization’s unit based ‘Skin Champions’. Due to the increase in education, the detection of PI and PI rates increased within the hospital as anticipated. This was seen as a positive outcome as identification is the first step in harm reduction. The change in the process gave the Skin Champions tools for better detection and understanding of devices with high potential for causing pressure injuries and their differentiation from other wounds. This led to the development of better device-related prevention measures.

CONCLUSIONS: Reassessing established PI prevalence programs for purposes of process improvement may increase PI detection, however this increases awareness and allows a hospital system to implement prevention measures that will further assist in preventing harm to patients.

REFERENCES:

Ann Marie Nie1, Rachael Lamsal1
1 Children’s Hospitals and Clinics of Minnesota, Minneapolis, United States

THE EFFECTS OF TWO DIFFERENT PRESSURE RELIEVING SUPPORT SURFACES ON THE BLOOD CIRCULATION DEEP IN THE TISSUES. A POSITRON EMISSION TOMOGRAPHY (PET) STUDY

Esa Soppi1, Kari Kalliokaski2, Juhani Knutti2
1 Era Hospital, Outpatient Clinic, Internal Medicine, Helsinki, Finland
2 Turku Pet Centre,Turku, Finland

INTRODUCTION: Pressure and strain induce complex stress reactions within tissues which may be major pathophysiological phenomena in the PU development. Mechanical loading of tissues may cause critical deformation i.e. the deformation threshold is exceeded. Capillary flow changes may lead to hypoxia and reaching the hypoxia threshold. (Gefen 2015, Oomens 2015). We examined these phenomena on two different types of mattresses by applying low energy computerized tomography (CT) in combination with PET.

METHODLOGY: PET is an imaging technology enabling non-invasive study of physiological processes within different tissues. One of the most robust measures with PET is perfusion measurement with radiowater. We applied PET with CT to study the effects of mattresses with different functionalities on the blood circulation deep in the tissues. Healthy volunteers (N=8) lie supine (crossover design) on either foam mattress or computerized, individually and precisely adaptive minimum pressure air mattress (MPA). The region of interest (ROI) for PET was pelvic region soft tissues. Mattress-body contact area was measured in the beginning of the exposure on both mattresses. Subepidermal moisture and temperature from the skin-mattress interface was also recorded among others.

RESULTS: Skin temperature reached about 0.5-1oC higher values on foam than on MPA (p<0.001). The body-mattress contact area was significantly smaller on foam than on MPA (p<0.001). The body contour remains unchanged (CT images) on the MPA compared to foam which induced 1-28% (p<0.01) lateral spreading of tissues indicating major tissue deformation and strain. PET results show complex, dynamic and unexpected blood flow changes deep in the tissues between the mattresses which are dependent on the pressure on ROI.

Conclusion: The results indicate that on the foam mattress both hypoxia and deformation thresholds may be exceeded while on the MPA mattress neither will take place. These results are in concordance with clinical results achieved in RCT with the MPA, where the PU development was prevented in critically ill patients (RR 0, C) 95% 0.00, 0.42; p=0.0059, Takala et al 1996).

REFERENCES:
THE HISTORY OF A MULTIDISCIPLINARY APPROACH TO PRESSURE ULCER PREVENTION IN A GENERAL HOSPITAL

Brecht Serraes, Dirk Milliau, Eva Boel, Kevin Van Hulst, Karolen Van de Steene

Introduction: Pressure ulcers are globally considered and accepted as important indicators for the quality of (nursing) care. To gain insight into the magnitude of the problem, prevalence is one of the most common measures. The prevalence of pressure ulcers in European countries remains from 6.4% to 31.4% in nursing homes and 8.9% to 18.1% in hospitals (1). Prevalence studies of pressure ulcers in Belgium hospitals are limited. In 2011, a national study reported a pressure ulcer prevalence of 12.1% (Category I-IV) within the hospital setting. The aim of this study was to analyze the multidisciplinary approach on the prevalence of pressure ulcer category I-IV in a Belgian general hospital.

Methods: Data collection was performed by specialist ward nurses and wound care specialists included demographic data, risk assessment score on the Norton scale, prevention strategies, origin, location and severity of pressure ulcers.

Results: In 2012 a multidisciplinary approach was introduced, including: monthly ‘self-reported’ pressure ulcers by specialist ward nurses, independent bedside audits by wound care specialists, a mandatory reporting of category III and IV pressure ulcers to wound care specialists, introduction of a new prevention and intervention policy based on Pressure Ulcer Guidelines NPUAP-EPUAP-PPIA and establish pressure ulcer committee (present: Medical director, nursing director, wound care specialists, quality coordinator, hospital hygienists, care manager, investment and exploitation manager, head nurses and pressure ulcer nurse specialists).

The study is still ongoing, but the preliminary results show that the prevalence was reduced from 8.9% to 2.44% during the last ten years.

Conclusions: The introduction of a multidisciplinary approach since 2012 resulted in a significant reduction of the prevalence of pressure ulcers category I-IV. We noted a higher level of commitment to prevent pressure ulcers on the hospital wards.

Acknowledgements: Special thanks to the whole team who made this a success: Medical and Nursing Directors; Wound Care Specialists; Quality & Safety Team; Hospital Hygienists; Head Nurses; Ward Nurses; Pressure Ulcer Nurse Specialists for support and collaboration throughout.

References:

HYPERKERATOSIS AND DELAYED WOUND HEALING IN PRESSURE ULCERS: A CASE SERIES

Thuya Win, Bara’ah Alshagoor, Aheed Osman, Srinivasa Chakravarty Budhith

Introduction: Pressure ulcers in spinal cord injury (SCI) patients represent a challenging problem. The causes of delayed or non-healing of such wounds are often multifactorial, including cellular events in epidermis. Keratinocytes are major cellular component of epidermis and have crucial role in wound healing. Keratinocytes at non-healing edges of chronic wounds differ from normal healthy keratinocytes in basal layer. Keratinocytosis and hyperkeratosis in histology may reflect dysfunctional wound healing.

We present a series of cases where such histological changes were associated with poor wound healing.

Methods: A case series of 3 patients who had chronic pressure ulcers with histological findings of keratinocytosis and hyperkeratosis. The histological examination of the wound edges at the time of debridement surgery and the time taken for wound healing after definitive closure surgery were analysed. Data was collected retrospectively from case notes and electronic patient records.

Results: Patient A has L1 ASIA Impairment Scale (AIS) A SCI and presented with a chronic left ischial pressure ulcer. The wound failed to heal following debridement and closure surgery and only healed with secondary intention after about 6 months. The pressure ulcer recurred in the same area after 4 months.

Patient B has C7 AIS B SCI. He had a chronic sacral pressure ulcer for approximately 5 years. Staged surgical management with debridement and closure failed to achieve wound healing at the time of suture removal. It healed by secondary intention after 3 months.

Patient C had T12 AIS C SCI. He had a chronic right ischial pressure ulcer for about 12 months. Surgical management by wound debridement and closure a month apart failed to achieve wound healing, requiring repeat surgical procedures. It healed with secondary intention after 6 months.

The surgical management of chronic pressure ulcer wounds may need staged procedures and usually heal approximately 2 weeks after definitive closure surgery in majority of patients. However, the time taken for healing was significantly prolonged in three patients studied. Histological analysis of wound edges reported the presence of keratinocytosis and hyperkeratosis in all three of them.

Conclusions: Our findings suggest that presence of keratinocytes and hyperkeratosis in histology may have an association with delayed wound healing and poor surgical outcome. Further research is needed to evaluate the role of hyperkeratosis in delayed wound healing.

References:
BIOMECHANICS OF HEEL PRESSURE ULCERS AND THE EFFECT OF HAGLUND'S DEFORMITY

Bethany Keenan1, Sam Evans1
1 School of Engineering, Cardiff University, Cardiff, United Kingdom

Introduction: Pressure ulcers (PU) are primarily caused by prolonged pressure to the skin, which limits blood flow and subsequently injures the underlying soft tissue. Ulcers often occur at the skin covering bony prominences, but are most common on the back of the heel. PU management is a significant clinical issue and consumes a large percentage of NHS time and resources. Current clinical practice to help prevent heel ulcers involves either: repositioning the patient, and/or redistributing the pressure using a support surface. Support surfaces are designed to elevate and cushion the heel whilst restricting pressure, friction and shear from the surface of a bed in a non-ambulatory individual. A common clinical condition, which is poorly understood is Haglund’s deformity - an enlargement of the posterosuperior part of the calcaneus, which leads to bursal inflammation of the Achilles bursa. There is a clear need to better understand the soft tissue mechanics surrounding the heel, in contact with a support surface for preventing the formation of ulcers. This study investigates the geometric and morphological changes in the healthy and deformed foot, and how the biomechanics of the calcaneal bone and soft tissue is altered in an individual with Haglund’s deformity.

Methods: A novel 3D MRI technique was developed to clearly identify the anatomical geometry of the Achilles tendon, calcaneus, tibia and plantar fascia in the healthy and deformed foot. Image-processing software was used to create a finite element model (FEM) of the heel to investigate the internal stresses that occur when the weight of the foot is resting on a mattress. Mechanical testing was conducted on different support surfaces to determine their mechanical properties. A series of simulations were run to examine the stress at the point where the calcaneal tuberosity contacts the support surface to evaluate how the surface redistributes pressure and/or causes skin irritation.

Results: A 3D foot FEM is a valuable tool in predicting the sites of excessive internal stresses on the heel when in contact with different support surfaces. The different FEM models allow for the simulation of the healthy and deformed foot with a realistic behaviour (in terms of surface and internal pressures).

Conclusions: This study is part of an ongoing project that will lead to guidelines and/or a test method that can determine which products are effective in preventing ulcers. This will potentially aid clinicians and caregivers to ensure that patients receive the best possible care.

References:

COMPLEX ACQUIRED SKULL DEFECTS RECONSTRUCTION IN CHILDREN USING A DERMAL SUBSTITUTE AND CI-NPWT: A PALLIATIVE BRIDGE AGAINST BRAIN INFECTIONS

Guido Ciprandi1, Francesca Grussi1, Andrea Carac1, Urbano Urbani1, Mario Zama1
1 Bambino Gesù Children's Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy

Introduction: Wide full-thickness scalp defect coverage is challenging in children previously affected and treated for local neoplastic disorders involving skin, soft and bone tissues. When the use of a flap is not feasible or is considered a too heavy procedure, a fine option to be considered is a partial reconstruction with a dermal substitute, in order to avoid possible lethal infectious brain complications. This bridge solution is reported in a series of 5 consecutive patients.

Methods: 5 children aged 8 to 16 years (average 12yr and 6 mos) were treated because of 3 soft tissues malignancies (relapse of local malignant fibrous histiocytomas, giant cell tumour of soft tissue, dermatofibrosarcoma) and 2 complicated cerebral malignant idiopathic oedemas with local soft tissue loss. Residual full thickness skull defects were not amenable for a flap repair and a prompt no-bone reconstruction was done using a dermal two layers substitute, followed by skin graft stabilized with a low-pressure (-25/50 mmHg) CI-NPWT2.

Results: All children recovered without sign nor symptoms indicating a meningitis or a brain abscess (CT scans was done at 6 days, 4 weeks and two months after the procedure). All dermal substitutes were skin grafted after 10 to 15 days and supported with a CI-NPWT for 2 to 3 changes (8-12 days), without complications.

Conclusions: The use of dermal regeneration template for reconstruction of large full-thickness scalp and calvarial defect with exposed dura have to be considered when the natural flap option is not recommended because of a severe general impairment or a relapsing neoplastic preexisting head localization. A single-staged or two-staged procedure could be used in order to avoid major infective complications and brain loss from the bone defect. A low-pressure use of NPWT is of great help in reducing healing times as well as undue local seroma and blood collections. This bridge procedure, clearly advocated as a palliative procedure, avoid major infections and allows children to go back home in a short time.

[1] Dermal Regeneration Template - Integra
FLAP COVERAGE FOR TREATMENT OF PRESSURE ULCERS IN SPINAL CORD INJURY INDIVIDUALS: A SINGLE-OR TWO STAGE RECONSTRUCTION?

Marijeke Broafhart1, Erik de Laat2, Till Wagner2, Lisette Schoonhoven1, Emmy van de Burg1, DjJ. O. Ulich1

1 University of Applied Sciences Utrecht, Utrecht, Netherlands
2 Radboud University Medical Center, Nijmegen, Netherlands

Introduction: The procedure for pressure ulcer (PU) reconstruction, utilizing flap coverage, exist of a comprehensive ulcer excision, bone necrectomie and finally the flap coverage. There are two surgical approaches to reconstruct a PU: one-stage reconstruction or two-stage reconstruction.

One stage reconstruction consists of surgical debridement and flap reconstruction during one operation. Two-stage surgery consist of a surgical debridement and a final reconstruction in two sessions, with approximately four to six weeks between both sessions. In this period the patient is admitted to a nursing home or rehabilitation centre.

Methods: A retrospective, comparative study in SCI individuals with a single- or two stage surgical reconstruction between 2005 and 2016 was designed. A total of 81 records was included for analysis.

Results: The most performed surgical procedure was a reconstruction with the gluteus maximus flap (n=42), followed by the tensor fascia lata flap (n=10) and the gluteal thigh flap (n=7).

The primary outcome, the difference in occurrence of a recurrent PU in the reconstructed area (33.3% versus 31.6%), is not statistically significant between one-and two-stage reconstructions. Also, the mean duration to develop a recurrent PU between both surgical reconstructions is not statistically significant. Other surgical complications in the reconstructed area like wound hematoma, hemorrhage, seroma or (partial) flap failure did not differ significantly between both groups, apart from in total.

Conclusions: The recurrence rate of pressure ulcers in one-stage or two stages reconstructions in SCI individuals does not differ in this study. This also applies to the period of time in which a recurrent pressure ulcer occurs.

These results are of great importance in choosing for one-stage surgical reconstruction in patients with pressure ulcers because of a considerable reduction of the admission time of more than three weeks.

References:

TREATMENT OF EARLY-STAGE PRESSURE INJURY BY USING AUTOLOGOUS ADIPOSE TISSUE GRAFTS

Tiziano Pallara1, Giovanni Francesco Marangi1, Paolo Persichetti2

1 Campus Bio-Medica University of Rome, Dept. of Plastic, Reconstructive and Aesthetic Surgery, Rome, Italy
2 Campus Bio-Medica University, Rome, Italy

Introduction: Assessing pressure injury (PI) in early stages allows patients to benefit from adequate and safer treatment. Up to now, in addition to clinical evaluation, ultrasound evaluation seems to be the most suitable technique to achieve this goal. Several treatments are applied to prevent ulcer progression but none of them is totally effective. Furthermore, the in-depth knowledge of adipose tissue regenerative properties has led to a wide use of it. With this study the authors aim at introducing a new approach to cure and prevent the worsening of early-stage-PI by using autologous fat grafts.

Methods: The authors selected 42 patients who showed clinical and ultrasonographic evidence of early-stage PI, stage I and deep tissue pressure injury (DTRI). Values of skin thickness, subcutaneous vascularity, and fascial integrity were recorded both on the pressure injury area and the healthy trochanteric side, used as control region. Fat grafting was performed on all patients.

Results: Data measured before and after treatment were compared and statistically analysed. At three months, clinical findings and the abnormal signs detected through ultrasonography on PI, such as reduction of cutaneous and subcutaneous thickness, unclear subcutaneous layered structure, discontinuous fascia and decrease in subcutaneous vascularity compared to the underlying muscle, had all modified with respect to almost all the corresponding parameters of the control region. No complications were found.

Conclusions: Results highlight that the use of autologous adipose tissue grafts proved to be an effective treatment for early-stage-PI. Furthermore, this repeatable and mini-invasive method could be a valid approach for plastic surgeons, especially in the care of chronic bedridden patients.

References:
PRESSURE ULCERS AND SPINA BIFIDA IN THE PAEDIATRIC PATIENT: A CASE SERIES
Ann Marie Nie1, Adam Lokah1, Deanna Johnson1
1 Children’s Hospitals and Clinics of Minnesota, Minneapolis, United States

Introduction: The prevention and treatment of pressure injuries remains a persistent and costly challenge. Susceptibility to pressure injuries is elevated in patients with spina bifida and the treatment is profoundly complex. There is variation in the level of insensibility in this population; with many able to ambulate with assistance of adaptive equipment. This clinical picture of partial sensibility and ambulation unfortunately has fostered the perception that most of these patients must not require the same level of preventative care as other patient populations with spinal cord conditions. Beyond the challenges of prevention are the hurdles to treating the wounds of patients with spina bifida. Their comorbidities and behavioral impediments negatively impact care delivery and impede efforts to facilitate wound healing. It is our opinion that the hurdles to treating the wounds of patients with spina bifida should be assessed and offered the same surveillance and preventative care as their spinal injury cohorts. The Plastic Surgeon and CWOCN, NP must work collaboratively to assist in preventing, healing and avoiding recurrence of these challenging wounds.

Methods: Spina Bifida cases:
1. 16 year old non-ambulatory female with mild developmental delay, dense insensibility below the waist presented with a stage 4 coccygeal pressure ulcer present for approximately 14 months.
2. 13 year old non-ambulatory male with significant developmental delay, and autism spectrum disorder. Partial sensibility of the lower extremities, presented with years old unstageable coccygeal pressure ulcer. Eventually restaged as a Stage 4.
3. 10 year old fully ambulatory female with normal cognitive development and moderate sensibility of the lower extremities, presented with fever and concern for cellulitis of a stage 2 coccygeal pressure ulcer. The wound was restaged as a Stage 4.
4. 18 year old non-ambulatory female with normal cognitive development, dense insensibility of the lower torso and extremities, presented with a stage 4 pressure ulcer overlying her left iliac crest. The ulcer was present for over 8 years.

Results: All patients underwent surgical debridement. The CWOCN, NP managed the wounds until surgical closure, if appropriate. Negative pressure wound therapy was delayed in two cases for treatment of osteomyelitis. Two of the four underwent successful mycotic cutaneous flap closures.

Conclusions: Collaboration of the Plastic Surgeon and the CWOCN, NP several challenging patients had successful wound healing.

References:

INCONTINENCE ASSOCIATED DERMATITIS (IAD) AND PERIANAL SEPTIC LESIONS IN CHILDREN WITH ONCO-HAEMATOLOGICAL DISEASES. RESULTS OF A PROTOCOL APPLIED FOR IAD SYSTEMATIC PREVENTION AND EARLY TREATMENT IN 146 PATIENTS LATER
Marjola Gjergj1, Serena Fandi2, Serena Crucianelli2, Italo Ciaralli3, Guido Ciprandi2
1 Bambino Gesù Children’s Hospital, Oncology-Haematological Division, Rome, Italy
2 Bambino Gesù Children’s Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy

Introduction: Bacteremia and sepsis accounts for 30 to 45 % of febrile episodes in neutropenic onco-haematological (OH) children and are considered as the major cause of death during drug-induced bone marrow aplasia. Skin breakdown of perianal and genito-perineal (P-GP) areas is seen when an Incontinence Associated Dermatitis (IAD) occurs both due to the age as well as to OH diseases: unresponsiveness, exhaustion, impossibility to rotate together with dribbling of urines and fecal incontinence are all responsible for loss of skin integrity in the genital area.

Methods: A 3yrs monocentric prospective cohort study, designed including 146 paediatric patients (0-18yrs) presenting with febrile neutropenia. Patients affected by a late stage of disease were considered not eligible. A toe to thumb investigation was performed by a WOC nurse together with a plastic surgeon. When P-GP poor quality clean-up or IAD signs are detected an enrolling chart protocol for strict prevention or management is instituted. Data included the Parental and Child Patterns, OH disease stage, stool features, onset and type of wounds. 58 children (mean age 9yrs) with IAD experienced an advanced barrier film skin protectant instead of perineal skin cleansers, silicon sprays or ointments previously used.

Results: 58 out of 146 children showed clear evidences of IAD (39%). The immediate use of the advanced skin protectant (ASP) as an ultra-thin transparent barrier reduced the time required for dressing manoeuvres as well as consequent pain and stress. The Team spent an average of 8’ with ASP vs 18’ in the retrospective (control) group, and no pain referred at all, with respect to 40% of previous dressings requiring local anesthesia. In a retrospective study with multiple tools we observed a 14% of septic complications, reduced to 3.4% (2 cases) when using a waterproof barrier film for management of IAD. The immediate inspection of the IAD sites is easy and feasible also during difficult psychological situations and wounds did not get worse during the treatment.

Conclusions: In febrile neutropenic children affected by OH diseases, IAD manifesting in P-GP areas is a challenging condition leading to an acute sepsis and early death if not diagnosed and immediately treated. The use of a one and no more devices, transparent, easy to handle, resistant to a persisting incontinence, changed the face of our children, immediately reducing pain and the stress related to dressings, induced confidence thus ameliorating the nurse-doctor-patient relationship. The drastic reduction of septic complications is the final flagship of this study.

References:
[1] JMTM Gwlan AdvancedTM
[45] DEVELOPMENT OF A WORKING METHOD FOR IMPLEMENTATION OF EVIDENCE-BASED MEASURES TO PREVENT PRESSURE ULCERS

Ulrika Källman1, Lars Rex2
1 South Älvsborg Hospital, Development Department, Borås, Sweden
2 South Älvsborg Hospital, Hospital Management, Borås, Sweden

Introduction: At the hospital, we have been working for many years with pressure ulcers prevention. However, we found that still too many patients were affected by hospital-acquired pressure ulcers. Last year we therefore further intensified measures with the aim to achieve even better results. The aim was to develop a working method with complete compliance with evidence-based measures ensuring that correct actions really were being carried out.

Methods: The project was performed at micro and macro-level during the spring of 2017. On the micro-level (at the pilot wards, n=3) was a method of daily controlling and stock statistics established. A checklist with evidence-based measures was introduced to be used for all patients at risk for pressure ulcer. The head of the ward had daily follow-ups of implemented actions. On the macro-level, the project was anchored with the hospital director and relevant clinic administrators. A project group had monthly meetings with relevant ward managers for follow-up and learning. A working group of nurses and assistant nurses were also established for the development of the checklist and continuous exchange of experience monthly. Members of the project group performed daily checks throughout the journal system and followed-up the pressure ulcers documented during the last 24 hours, including all wards at the hospital (n=22). The results were measured by counting “pressure ulcer free days” (micro-level) and point-prevalence and incidence measurements (macro-level).

Results: When the structured working method was fully established, the pressure ulcer free days increased on the pilot wards, from 2 days to 90 days. The overall hospital pressure ulcer prevalence decreased from 4.4 percent (mar 2017) to 2.7 percent (mar 2018). The incidence were during January 2017 1.34 percent and one year later 1.22 percent.

Conclusions: Compliance to evidence-based measures and correct actions has the possibility to decrease the number of hospital acquired pressure ulcers. Our experience in implementing these structured working methods is that the manager’s commitment is extremely important in order to achieve success and create persistent change. Results of the new working methods are facilitated by whether there are employees on the wards who are motivated by progress and who really want to be involved in creating change. Different follow-up methods are of value to use to understand how, when and where pressure ulcers develop.

References:

[46] INVOLVING SERVICE-USERS IN THE OUTCOMES FOR PRESSURE ULCER TRIALS (OUTPUTS) PROJECT

Susanne Coleman1, Dehila Muir1, Jane Nixon1, Anna Lechner1, Jan Kattner2, Katrin Balzer3
1 Leeds Institute of Clinical Trials Research, University of Leeds, Leeds, United Kingdom
2 Charité-Universitätsmedizin Berlin, Department of Dermatology, Venereology and Allergology, Berlin, Germany
3 University of Lübeck, Institute for Social Medicine and Epidemiology, Nursing Research Unit, Lübeck, Germany

Introduction: In response to the use of variable outcome measures and subsequent difficulties in comparing treatment effects between pressure ulcer (PU) prevention trials, the Outcome for Pressure Ulcer Trials (OUTPUTs) project team, are undertaking work to develop a Core Outcome Set (COS) [1]. The project incorporates a scoping review to identify potential candidates for inclusion in the COS and consensus approaches to agree the final COS.

An important component of OUTPUTs and the focus of this presentation, is the involvement of service-users to ensure that outcomes are relevant to patients and carers. PUs are secondary to major acute and long-term chronic conditions which impact on mobility and general health, and this has influenced our involvement activities and approaches.

Methods: We conducted a focus group with service users to explore PU prevention outcomes identified in the scoping review and identify the outcomes of most importance to them. We also explored preferred strategies for continued service-user involvement in the consensus approaches. Focus group participants comprised members of an established group, the Pressure Ulcer Service User Network (PUSN), who were convened to improve the quality of PPI in Pressure Ulcer (PU) research. The focus group was audio-recorded and transcribed verbatim and a thematic summary of the discussions was produced.

Results: The results indicated confusion about what an outcome is; difficulties differentiating outcomes and interventions, differences between important outcomes for clinical practice, treatment trials and prevention trials; and that the appropriateness of outcomes may be influenced by the type of interventions.

Conclusions: The findings highlight the need to further develop approaches to facilitate improved understanding of PU prevention outcomes by service users, to inform the subsequent stages of the OUTPUTs project and wider COS development process.

References:
**A STRUCTURAL EQUATION MODEL OF PRESSURE ULCER PREVENTION ACTION IN CLINICAL NURSES**

Okkyoun Park

In Korea University Ansan Hospital, Ansan, Korea, Rep. of South Korea

**Introduction:** The purpose of this study was to construct and test a structural equation model for pressure ulcer prevention action by clinical nurses. The Health Belief Model and the Theory of Planned Behavior were used as the basis for the study (Figure 1).

**Methods:** Structured questionnaire was completed by 251 clinical nurses to analyze the relationships between concepts of perceived benefits, perceived barriers, attitude, subjective norm, perceived control, intention to perform action and behavior. Statistical programs were used to analyze the efficiency of the hypothesized model and calculate the direct and indirect effects of factors affecting pressure ulcer prevention action among clinical nurses.

**Results:** The model fitness statistics of the hypothesized model fitted to the recommended levels. Attitude, subjective norm and perceived control on pressure ulcer prevention action explained 64.2% for intention to perform prevention action (Figure 2).

**Conclusions:** The major findings of this study indicate that it is essential to recognize improvement in positive attitude for pressure ulcer prevention action and a need for systematic education programs to increase perceived control for prevention action.

**Figure 1.** Conceptual frame work of the study.

- X1=pressure ulcer development; X2=skin integrity problem; X3=patient’s comfort; X4=burden in the family; X5=theory workload; X6=severity of patient; Y1=importance of T2=importance; Y3=patient’s adherence; Y4=usefulness; Y5=practice; Y6=manipulator; Y7=patient and family; Y8=colleague’s work environment; Y9=behavior effect of prevention action; Y10=confidence for behavior; Y11=intention in all situation; Y12=intention in busy case; Y13=intention on critical patient; Y15=intention on pressure ulcer risk assessment; Y16=intention of prevention action; Y17=intention of preventive action; PUPA=pressure ulcer prevention action.

**Figure 2.** Path diagram of the model.

**References:**

[1] SPSS 22.0 and AMOS 22.0.


**SOFT TISSUE DEFORMATIONS UNDER THE WEIGHT-BEARING SACRUM WHILE USING A PROPHYLACTIC DRESSING IN COMBINATION WITH SUPPORT SURFACES: MRI STUDIES**


1. Department of Biomedical Engineering, Faculty of Engineering, Tel Aviv University, Tel Aviv, Israel

2. Medical Imaging Institute, Emek Medical Center, Israel

**Introduction:** Sacral pressure ulcers are the most common form of pressure ulcers (PUs) in bedridden patients. The risk for sacral PUs can be reduced by using protective support surfaces and equipment prescribed for sacral PU prevention.

**Methods:** In this work, we conducted MRI studies of sustained tissue distortion in healthy subjects protected by different combinations of medical devices and equipment in order to directly effect the specific protective devices on skeletal muscle, subcutaneous fat and skin tissue deformations under the weight-bearing sacrum. We specifically measured tissue thickness changes in the weight-bearing skin, subcutaneous fat and muscle directly under the sacrum and compared the following conditions: lying supine on a rigid surface – the bare MRI table, lying on a standard foam mattress, lying on a mattress plus using the multilayer prophylactic dressing, as described in Levy et al. papers [1,2], as well as simultaneously using the mattress, dressing and positioning system protective equipment.

**Results:** The complete protection suite, namely, the mattress, the multilayer prophylactic dressing and positioning system – all applied together, facilitated significantly lower deformation levels of each of the soft tissue layers (i.e., skin, subcutaneous fat and muscle, separately) as well as of the total soft tissue bulk, with respect to the rigid MRI table, by an average of 50%. Moreover, the addition of individual protective components to this protection suite or combinations thereof, i.e., only the mattress, or the mattress plus the dressing demonstrated a consistent trend of improved tissue thickness preservation with each added component. For fat, the aforementioned trend in tissue thickness preservation data was statistically significant as the Tukey-Kramer pairwise comparisons specifically indicated that fat deformation levels associated with each added protective component were significantly different from the rigid surface (p<0.001).

**Conclusions:** We found that adding the above protective means reduced the extent of sustained tissue deformations with each component adding additional protection in terms of tissue thickness preservation. Hence, using the above protective measures, separately or in combination, reduces the risk for sacral PUs, and the best outcomes are achieved when all the components are used together.

**References:**


[49] DURABILITY OF PROPHYLACTIC DRESSINGS SUBJECT TO MOISTURE IS CRITICAL FOR EFFECTIVE PRESSURE ULCER PREVENTION

Dafna Schwartz1, Ayelet Levy1, Amit Gefen1

1 Department of Biomedical Engineering, Faculty of Engineering, Tel Aviv University, Tel Aviv, Israel

Introduction: The sacral area is the most common site for pressure injuries (PIs) associated with prolonged supine bedrest. The multilayer prophylactic dressing, described in Levy et al. papers [1,2], demonstrated remarkable efficacy in reducing PIs to a nearly-zero occurrence in randomized clinical trials, which requires durability in delivering the protective effect to tissues over the time of use. Here we focused on the importance of durability of dressings for prophylaxis, and have investigated the potential consequences of compromised mechanical properties in wet dressings on their protective performances.

Methods: Using advanced computer simulations, we compared the state of mechanical loads in soft tissues near the weight-bearing sacrum in supine lying for two different designs of commercially available dressings marketed for prophylaxis.

Results: We have considered that the first design of dressing is more resistant to deformations along the direction of the spine but is compliant laterally (which is termed ‘deep-defense’). We further accounted for the capacity of that dressing to preserve the ‘deep-defense’ feature when being wet, as opposed to other dressings that are equally stretchable in all directions.

Conclusions: We found that the ‘deep defense’ feature of the dressing is critically important for it to provide effective, continuous and stable protection to tissues. Our present work hence provides additional important insights regarding the optimal design of dressings for a truly effective prophylaxis in real-world scenarios, with a focus on the feature of durability.

References:

[50] INVESTIGATING THE EFFECTS OF SIMULATED PROSTHETIC LOADING ON LYMPHATIC ACTIVITY OF HEALTHY LOWER LIMB TISSUES

Jennifer Bramley1, Alex Dickinson1, Luciana Bostan1, Dan Boder1, Peter Worsley2

1 University of Southampton, Faculty of Engineering & the Environment, Southampton, United Kingdom
2 University of Southampton, Faculty of Health Sciences, Southampton, United Kingdom

Introduction: After amputation, the soft tissue of the residual limb forms a critical loaded interface with the prosthesis. This generates pressure and shear at the skin-device interface, which can result in discomfort and soft tissue breakdown. One of the breakdown mechanisms involves occlusion of the lymphatic vessels, impairing removal of metabolic waste products and toxins. Lymphoscintigraphy has been used in a canine model to determine onset of impaired lymphatic clearance. Recently, researchers have used near-infrared (NIR) imaging to detect a fluorescent agent injected into human volunteers to characterise the lymphatic activity under pressure. This motivated the present study designed to develop a test protocol for assessing the lymphatic response of soft tissues to loads representing prosthesis use.

Methods: Approval was given to recruit non-amputee participants (ERGO29696). Indocya nine Green (ICG, 0.5 mL, 0.05% w/v) was injected sub-dermally between the toes. Pressures of between 20-60 mmHg, each for 10 minutes in 10mmHg increments, were applied to the calf using a turgidometer representing an in-take of temporary prosthesis used during early rehabilitation. Lymphatic activity was recorded by a NIR camera at the final 5 minutes of each inflation increment, followed by a 30 minute refraction period, in the most distinct lymphatic vessel (Fig1A, B). Lymphatic activity was quantified using droplet morphometry and velocimetry tracking. Lymphatic packets were identified, and transient events analysed to determine frequency, displacement and velocity.

Results: Data are presented for four participants. Compared with baseline activity, packet frequency decreased by at least 50% at 60mmHg (Fig2). Individual variation was evident, for example, participant 1 displayed only two small packet movements throughout the pressure application. At 50-60 mmHg, pooling at the cuff and backflow events were observed, but in two participants (2 & 4) there was sufficient accumulation to overcome occlusion, with high packet velocity. After pressure release, activity increased, returning to baseline after the refractory period.

Conclusions: Loads characteristic of temporary prosthesis use during early rehabilitation were shown to impair lymphatic activity in healthy individuals, at pressures as low as 20mmHg. However, some participants maintained lymphatic activity at 50-60mmHg. As further participant results are analysed, lymphatic activity trends and thresholds will be determined. The test protocol will be translated for prosthetic users, to enhance knowledge of soft tissue adaptation following lower limb amputation.

We acknowledge EPSRC/NIHR (EPN02723X1), JILS and RAEng (RF130).

References:
DRESSINGS CUT TO SHAPE ALLEVIATE FACIAL TISSUE LOADS WHILE USING VENTILATION MASKS

Lea Cohen1, Amit Gefen1
1 Department of Biomedical Engineering, Faculty of Engineering, Tel Aviv University, Tel Aviv, Israel

Introduction: Non-invasive ventilation (NIV) masks are commonly used for respiratory support where intubation or surgical airway procedure can be avoided. However, prolonged use of NIV masks involves risk to facial tissues, which are subjected to sustained deformations caused by tightening the mask and microclimate conditions. The risk of developing such medical device-related pressure ulcers can be reduced by providing additional cushioning at the mask-face contact areas.

Methods: We determined differences in facial skin and underlying soft tissue stresses while a NIV mask is being used, with versus without cushioning using cuts of the dressings, described in Levy et al. papers [1,2]. First, we developed a force measurement system consisting of five resistive flexible force sensors connected to a microcontroller board. The aforementioned system was used to experimentally determine local forces applied to skin at the bridge of the nose, cheeks and chin of six healthy subjects while using a medium-size NIV mask. We repeated measurements three times in each subject with versus without dressings cut to the shape of the individual face. Next, we used the 3D image segmentation and processing software [3] to generate a three-dimensional head model, (using the visible human project® image database), segment and mesh tissues in each transverse slice of the head, and segment the NIV mask and dressing cuts. Using the finite element method (specialized software [4]), we delivered the measured compressive forces per site of the face to the respective skin sites in the model. We compared maximal effective, shear and compressive stresses, as well as strain energy densities (SED) in facial tissues, with versus without the dressing cuts applied as cushioning.

Results: Application of dressing cuts alleviated exposure of facial skin and subdermal tissues to elevated stresses with respect to the no-dressing case. For example, adding cuts of the dressings reduced the maximal SED values at the skin by an average of 40% across the different sites of the face, with respect to the no-dressing case.

Conclusions: The dressings have shown substantial biomechanical effectiveness in alleviating facial skin and underlying tissue deformations, by providing localized cushioning to the tissues at-risk.

References:
[3] Scan-IP module of Simpleware®
[4] FEbio software suite

USING A HEALTH ECONOMIC MODEL TO ESTIMATE THE COST OF MANAGING PRESSURE ULCERS (GRADE 2-4) WITHIN AN ACUTE CARE SETTING IN IRELAND: A FEASIBILITY STUDY

Aoife Reilly1, Zena Moore2, Declan Patton2, Helen Strapp3, Jane Burns1, Jan Sorensen1
1 Royal College of Surgeons in Ireland, Dublin, Ireland
2 Royal College of Surgeons in Ireland, School of Nursing and Midwifery, Dublin, Ireland
3 Tallaght University Hospital, Dublin, Ireland

Introduction: A pressure ulcer (PU) is defined as a localised injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear. To date no studies within the Irish healthcare service have explored the cost of managing Pressure Ulcers (PUs) of all grades. As such, the exact economic impact of PUs within this setting remains largely unknown. The aim of this study was to explore cost implications of the management of PUs grade 2-3, within an acute care setting in Ireland, using a novel health economic model.

Methods: A retrospective survey design was employed to test the feasibility of using a health economic model to estimate the cost of grade 2-4 PU management. Data were collected from nursing and medical notes, from February to July 2017.

Results: Data were collected from the notes of 20 patients. There were 12 males and 8 females with a mean age of 68.95 years (range: 37-95 years). Six of the PUs were hospital acquired and 14 were community acquired. The average length of stay was 31.8 days (range: 5-119 days). Total cost of PU care for the 20 PUs was calculated at €17,903.28, with the mean cost per patient calculated as €895.2 (range: €75.7-€3,784.79).

Conclusions: PU management consumes an important portion of overall hospital expenditure. The model enabled capture of data required for this type of cost analysis, however, this should be undertaken prospectively. The retrospective survey design employed was unsuitable due to the inconsistent documentation of materials used and care provided, as well as difficulties obtaining unit and labour costs.

References:
Introduction: Incontinence-associated dermatitis (IAD) is an inflammatory skin condition caused by the prolonged contact of the skin to urine or faeces, and has been associated with the development of pressure ulcers. However, the underlying inflammatory mechanisms remain poorly understood. The aims of this study were to quantify inflammatory cytokine release in a human model of IAD, and to guide the development of future clinical studies.

Methods: Following ethics committee approval, ten healthy volunteers (aged 22–58 years) participated in this study. To simulate skin exposure to urine and faeces, synthetic-urine (s-urine, pH=7.92) and synthetic faeces (a proteolytic solution containing faecal enzymes and bile salts) were applied to seven sites on the volar forearm for two hours. An untreated control site was also included. Inflammatory cytokines were measured using a 15-minute exposure to s-urine and a two-hour exposure to faeces. Microdialysis samples were collected at baseline and throughout the study, whilst the measuring device was attached to the skin. After each challenge, cytokine amounts recovered (IL-1α, IL-1RA, IL-1β, IL-6, IL-8, TNF-α) were quantified by electrochemiluminescence (Meso Scale Discovery, USA).

Results: Following both skin challenges, an increase in cytokine levels was observed in both measuring device and microdialysis samples. A significant increase in the ratio of IL-1α/IL-1RA was seen following exposure to s-urine (p<0.05, Figure 1). Additionally, an increase in TNF-α was seen, however this was more marked following the proteolytic-solution, with a median ratio change to baseline of 7.25 (Figure 2). The microdialysis demonstrated a time-dependent increase in cytokine concentrations following exposure to both challenges.

Conclusions: This study has demonstrated the ability to quantify inflammatory mediators in an in vivo model of IAD using minimally invasive methods that would be suitable for clinical investigations. The inflammatory response was seen to develop in a time-dependent manner in relation to exposure to the challenges. These data also suggest slight differences in the inflammatory mechanisms of IAD, depending on the moisture source. Additionally, results suggest that in future studies, IL-1α and TNF-α might serve as responsive markers of skin damage caused by incontinence.

References:
[4] W. S. Sebota (Cuderm Corporation, Dallas, TX, USA)
IMPROVEMENT TEAM FOR PRESSURE ULCERS PREVENTION AND TREATMENT: A MULTIDISCIPLINARY APPROACH IN AN ORTHOPAEDIC AND GERIATRIC PRIVATE HOSPITAL IN ROME

Valeria Macari¹, Marilina Navisse¹, Francesco Bartolozzi²

¹ Casa Di Cura Villa Margherita, Roma, Italy

Introduction: Villa Margherita Private Hospital is a medical facility specialized in orthopaedic and geriatric services. Direction of the hospital has recently begun an improvement strategy focused on reinforcement of nurses’ specialization. Aim of this study is to standardize quality of health and to define a model of multidisciplinary intervention for prevention and treatment of pressure ulcers.

Methods: On December 2016 an “Improvement Team for Pressure Ulcer Prevention and Treatment” (TPUPT) was defined between physicians, surgeons, nurses and healthcare assistant. Goal of the team was to study literature and guidelines and define an internal procedure. Meanwhile two nurses attended a Master degree in Wound Care. On February 2018 a final version of the procedure was released and a model for wound management pattern was defined. A cost-effective analysis was developed on pressure alleviation mattresses that are available in the hospital.

Specific half-hour training sessions for all the healthcare workers of the facility were organized every month with theoretical principles and case studies.

Results: On the day of admission patients are evaluated by ward nurse using Braden Scale. If the patient results ad medium or higher risk, the Wound Care Nurse is called to evaluate him and to share the management of the lesion with the physician and the ward nurse. Push Tool is used to control the outcome. The Wound Care Nurse can choose which pressure alleviation mattresses assigns to the patient, according to the grade of the lesion. After the hospital discharge, members of the TPUPT take care of the patient at home.

A data collection on follow up of patients treated started in September 2017.

Conclusions: The TPUPT and the presence of Wound Care Nurse has been an important improvement for the quality of services in our hospital. Nurses’ specialization in this important field can create a point of excellence that lead, with the strict collaboration of physicians and ward nurses, to an important improvement in patient’s outcome. Despite an initial resistance due to lack of real comprehension of the aim of the TPUPT, first results seem to be encouraging for the future. The road is traced.

References:
Poster presentation A

12 September 2018, 13:00 – 14:30, Poster area in Emiciclo Hall

P1 Assessment of static overlays for pressure ulcer prevention: Aase Fremmelevholm
P2 Interdisciplinary teamwork in pressure ulcer investigation and prevention: Deborah Wickens
P3 A novel approach to involving patients and carers in pressure ulcer prevention: Deborah Wickens
P4 Nursing and ergonomics during decubitus change for prevention of pressure ulcers: Amanda Santos
P5 Difficulties found by the nursing team in the treatment of pressure injuries: Amanda Santos
P6 Reducing pressure injuries related to positive airway pressure ventilation masks: Chungmei Shih
P7 Preventing operating room sacral pressure injuries in the cardiac surgery population: Chungmei Shih
P8 Patient perceptions of pressure ulcer risk and potential factors affecting adherence to prevention strategies in community settings: Lisa Ledger
P9 The ABC of moisture injuries, a new protocol for the treatment and prevention of Moisture Associated Skin Damage: Kris Benaerts
P10 Use of a high endurance elastomeric skin protectant to treat severe IAD and MAD: Valerie Hanssens
P11 The impact of the Shanley Pressure Ulcer Prevention Programme (SPUPP) for older adults at risk of pressure ulceration, living in the community setting: Emer Shanley
P12 The epidemiology of pressure ulcer in Germany: Systematic review: Tsenka Tomova-Simitchieva
P13 ESCARRE: acronym used to structure the pressure ulcers prevention: Nicole Rabain
P14 French guidelines for medical and surgical care of pressure ulcers on spinal cord injured patients: Brigitte Barrais
P15 A new class of dressings for the care of exudative pressure ulcers (PU): Brigitte Barrais
P16 Verification of reduction of shear force in the sacral region by a new incontinence pad: Haruki Toda
P17 Prevention of heel blisters within orthopaedics: Caroline Renwick
P18 Pressure injury prevention: Nursing care in combination with medical equipment: Zdeňka Chalabalová
P19 Cost analysis of the use of a multi-layer polyurethane foam dressing for the prevention of pressure ulcers in elderly patients with hip fractures: Richard Searle
P20 Clinical effects of radial shock wave therapy on sacral pressure ulcer: A case report study: Robert Dymarek
P21 Extracorporeal shock waves for chronic wounds - a systematic review and synthesis of qualitative studies: Robert Dymarek
P22 Complementary pressure ulcers preparation for the treatment sessions with an extracorporeal shock waves: Izabela Kuberka
P23 Extracorporeal shock waves in pressure ulcers - analysis of potential mechanisms activated in vivo: Mirosław Sapel
P24 Measuring and comparing changes in dressings' properties over seven days of simulated prophylactic use: Evan Calf
P25 Interdisciplinary teamwork, leadership and staff competency are required to reimplement a prototype for preventing hospital acquired pressure ulcers: Anne Pontoppidan
P26 Educational text messaging for pressure ulcer prevention in people living with spinal cord injury who are newly discharged from hospital: A pilot study: Liang Qin Liu
P27 A family of microclimate manager coverlets does not alter immersion with 10 therapeutic surfaces: An extended study using the SS-1 Standard: David Newton
P28 The efficacy of the mobile 3-dimensional wound measurement system (3DWMS) in pressure sore assessment: Donghyeok Shin
P29 System approach in the wound care: Experience of the Sant'Andrea of Rome: Diego Ceci
P30 Can incontinence pads influence the skin response to pressure in combination with shear forces?: Luciana Bastian
P31 A bioactive device with autologous stem cells and platelet-rich plasma for surgical treatment of pressure ulcers in SCI patients: Alessandra Bertolo
P32 Implementing an interdisciplinary approach to pressure ulcer prevention in the community setting: Peter Worsley
P33 Pressure ulcer risk assessment: Risk factors and risk screening in older persons - a validation study: Aglícia Budri
P34 Improvement of visual differentiation diagnostic ability for the pressure injury of nurses for early detection of pressure injury: Minkyung Kim

P35 The sequential steps of conservative-reconstructive treatment of diabetic foot pressure ulcers: Panfilio Antonio Di Gregorio

P36 The use of modern technologies based on telemedicine in wound care: Experience in High-Tirrenian Region and the district of Cosenza (Calabria - Italy) ASP Cosenza, CAPT Praia a Mare, Advanced Outpatient Wound Care Clinic: Ciro Falasconi

P37 Antiseptics and control of bacterial load in venous ulcer: Ciro Falasconi

P38 Clinical decision support systems in wound care: Ciro Falasconi

P39 The importance of engagement and communication in the prevention of chronic skin lesions: Ciro Falasconi

P40 Incidence rate of pressure injury in the sick person: Viscoelastic foam mattress VS alternating pressure overlay mattress: Luís Paiva

P41 Importance of initial training in nursing in the acquisition of knowledge and skills to care for the person with wounds: Luís Paiva

P42 Influence of nutrition in the impact of pressure ulcers in hospitalized patients: Luís Paiva

P43 Sustaining an inter-professional prevention pressure ulcer guideline: The unique role of nurses: Eva Favre

P44 Successful application of NPWT and bioactive dressing composed of hyaluronic acid and collagen in the treatment of complex heel pressure injury: Valentina Vanzi

P45 Common devices and (un)common pressure injuries in a general paediatric ward: Keep the attention high! Valentina Vanzi

P46 The interdisciplinary team: An essential tool for diabetic patients affected by heal and rearfoot ulcers: Fabrizia Toscanella

P47 Diabetic foot off loading a complex assessment: Fabrizia Toscanella

Poster presentation B

13 September 2018, 10:00 – 11:00, Poster area in Emiciclo Hall

P48 ECMO in paediatrics: Preserving skin integrity: Charlie Beetham

P49 Skin breakdown prevention in septic children: Investigating criteria for a challenging prevention alarming a multidisciplinary team: Charlie Beetham

P50 One dressing to manage two out of four in T.I.M.E.: Roberto Cassino

P51 An off-label indication of a colostrum enriched hyaluronate cream: Roberto Cassino

P52 Technolytic Debridement: A non exuding procedure in sloughy deep bedsore: Roberto Cassino

P53 Re-homing of a wounded elderly patient: Check list for a caregivers relief: Marilena Tender

P54 In vitro evaluation of a silicone adhesive foam dressing in the management of pressure, friction and microclimate: Saul Di Polo

P55 PEP, Prevention Emergency Project: Jenny Delin

P56 Management of pressure ulcer with topical pharmaceutical composition containing as active ingredient a mixture of pollen extract and unsaponifiables fraction of wheat germ, soybean and olive oil: Data on a personal series on three years: Alessandro Ragna

P57 The clinical practices in treating heel pressure injuries: A national survey: Laura Stefanon

P58 Prospective observational study on pressure injury prevention in patients using an alternating-pressure mattress overlay: The Matcarp project: Sylvie Meaume

P59 Pressure ulcers and the role of therapy in managing pressure: Heena Mahmoud

P60 Outcome series of pressure ulcer reconstruction at a UK National Spinal Injuries Centre: Sukhpreet Gahunia

P61 The medical and nursing advice in wound care as strategy in the management of the preventive and therapeutic pathway of the patient with pressure ulcers: Francesco Uccelli

P62 The challenging in preventing pressure ulcers: What opportunities?: Sara Sandroni

P63 The use of a new natural advanced dressing in the treatment of pressure ulcers with critical colonization: Sara Sandroni
P64 Pressure Ulcer Prevention Programme (PURP) enabling clinically effective management of patients at risk of pressure ulcers: Kate Hancock

P65 Evaluation of an early stage pressure ulcer assessment device: Kate Hancock

P66 Epidemiological analysis of the NHS safety thermometer PU data: Kate Hancock

P67 Physical approach to infected pressure ulcers in a pediatric population: Impact of DACC non-medicated technology in bioburden management: Guido Ciprandi

P68 Teamwork: A skin care team journey in a children’s hospital: Gaetano Ciliento

P69 Nurses’ emotional responses to pediatric pressure ulcers and hard to heal wounds: A burnout syndrome: Gaetano Ciliento

P70 Atypical pressure ulcer presentation in paediatric disabilities and rare diseases: Personalized and properly tailored prevention: Serena Crucianelli

P71 A first observational study on prevalence of pressure ulcers in ASST Mantova: Rossana Rosini

P72 Use of adipose stem cells in pressure sores: Clinical experience: Elia Ricci

P73 Developing the Nursing Self-Efficacy in Pressure Ulcer management questionnaire (NSE-PU): Psychometric validation of a new measurement tool: Francesca Turrini

P74 Pressure injuries in spinal defect: Experience of wound care unit in Monza from 2013 to 2018: Maria Castoldi

P75 The use of stromal cells from adipose tissue in pressure lesions management: Cecilia Muscarà

P76 Patients with pressure ulcers: Who takes care?: Marta Vicedomini

P77 Fostering pressure injury prevention: The role of clinical nurse leaders: Marina Palombi

P78 The process management to administer a relevant social problem: Pressure ulcers. An experience: Cristina Luciani

P79 Quality of life in patients with with chronic skin lesions: Review of literature system: Daniele De Nuzzo

P80 The use of absorbent advanced dressing combined with single-use negative pressure wound therapy in a community setting: A case report: Sonia Donati

P81 The use of advanced dressing with bacteria-binding gauze with hydrogel: A case report: Sonia Donati

P82 Exploring/Examining tissue conditions below the skin: Diane Langemo

P83 The solution of hyperoxgenated fatty acids: An effective barrier for protection of skin: Stefania Fabrizi

P84 From debridement to the healing: A difficult pressure ulcer treated at nursing home care: Stefania Fabrizi

P85 The use of a biocompatible cell-friendly surfactant-based biomaterial with silver sulphadiazine 1%: A case report: Stefania Fabrizi

P86 The community nurse of reference: A valuable asset in preventing and managing pressure ulcers: Valentina Botarelli

P87 Biofilm complicating pressure ulcers: Long term effects of hypochlorous acid solution (AOS): A consecutive series of 45 patients: Benedetta Colasanti

P88 Bedsores treated with O2-O3 versus traditional treatment: Maria Cusmai

P89 Center of Excellence for Nursing Scholarship: Five years experience with pressure injury prevention: Silvia Sferrazza

P90 Medical device-related pressure injuries in an adult intensive care center: Amanda Brandão

P91 Factors associated with the development of medical device-related pressure injuries at an adult intensive care center: Amanda Brandão
**[P1] ASSESSMENT OF STATIC OVERLAYS FOR PRESSURE ULCER PREVENTION**

**Aase Fremmelevholm¹, Mette Bag Houstrup¹, Tue Kjølhede¹, Kristian Kidholm¹**

¹ Odense University Hospital, Odense, Denmark

**Introduction:** Pressure ulcers (PU) are common among admitted patients in developed countries and have severe consequences for patients as well as economy. At Odense University Hospital (OUH) alternating-air mattresses (AAM) are used in prevention of PU but new advanced static mattress overlays might be more effective for patients at risk of developing PU and have lower costs. Prior to a public procurement of mattresses for PU prevention, a Hospital-based HTA was carried out.

**Methods:** The HTA was nested within a clinical pilot-test at geriatric and orthopedic units at OUH where two types of a drained static overlays were tested during six months. Prevalence of PU was investigated six months before and after the implementation. Prevalence using advanced static mattresses compared to AAM was also investigated in a systematic literature review. Staff attitudes were examined in a questionnaire survey and focus group interviews. Patients who had tried one of the overlays and the AAM were interviewed and economic consequences were analyzed.

**Results:** Preliminary results indicate no difference in the prevalence of PU between the overlays and AAM (1510 patients in pilot-test). The questionnaire survey and interviews with staff showed mixed attitudes towards the overlays but the majority preferred using the overlays due to ease of use and perceived patient comfort. Interviewed patients preferred the new overlays compared to AAM because of less noise and improved mobility. The economic analysis indicates significant savings for OUH by using either of the two overlays compared to the AAM.

**Conclusions:** Both types of overlays are effective in pressure ulcer prevention and at lower cost than AAM. However, the overlays introduce challenges for the staff and clear guidelines for the selection of mattresses are needed. Overall, it is recommended that advanced static overlays are considered in the procurement of mattresses for pressure ulcer prevention.

**References:**


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**[P2] INTERDISCIPLINARY TEAMWORK IN PRESSURE ULCER INVESTIGATION AND PREVENTION**

**Deborah Wickens¹, Beth Maryon², Gemma Baker²**

¹ Harold Hill Health Centre, Tissue Viability, Romford, United Kingdom

² Nell’s London, United Kingdom

**Introduction:** All NHS organizations in the UK, use the Serious Incident (SI) Framework (2015) to investigate pressure ulcers. The previous process for investigating SI pressure ulcers acquired by patients under the care of the Trust caused concern amongst senior nurses. These focused on loss of clinical time and lack of evidence that findings were leading to an overall reduction of harm.

The initiative aimed to increase patient safety by releasing clinical time and supporting improvement work streams.

**Methods:** In March 2016 a pilot commenced with the aim of improving speed and consistency of learning from investigations. Each month a panel of clinical experts including investigating officers who are skilled in applying root cause and human factors analysis, TVNs, senior nurses and AHPs meet to apply a consistent investigation methodology for each case. Clinical staff are supported to attend panels and present each patient’s case using a ‘we want to understand how this has happened’ ethos. Contributory factors and root causes are identified and compared to identify themes in practice. Action plans to address these are developed and devised either locally to teams, or to a pressure ulcer working group.

**Results:** To date, 207 episodes of care involving the development of a pressure ulcer causing serious harm have been reviewed though the pilot. A 45% reduction in SI pressure ulcers has been recorded since the panel’s inception.

Working groups have developed actions to support holistic assessment and review of vulnerable patients and projects have included a single SSKIN assessment document, a simplified pressure ulcer screening tool, a patient focused pressure ulcer alert card, a free online educational resource for carers, residential home education initiatives and annual conferences.

Feedback from staff has been overwhelmingly positive:

“The whole process is much more meaningful for staff. Everyone that attended from my team has said how much more they have learnt from attending the panel even as a one off, much more than they ever did from the years of written reports that they just felt were a chore and very much that they were blamed for the pressure ulcers.”

**Conclusions:** The panel model of investigation has been key to engaging staff in the safety culture of the organization and supporting innovation via working groups. Staff involvement and representation from across professions within the organization is central to success.

**References:**

A NOVEL APPROACH TO INVOLVING PATIENTS AND CARERS IN PRESSURE ULCER PREVENTION

Deborah Wickens
1 Harold Hill Health Centre, Tissue Viability, Romford, United Kingdom

Introduction: Thematic investigation of serious incident pressure ulceration in NELFT has highlighted that lack of understanding of risk and strategies for prevention amongst patients and carers is a common contributory factor. In addition, audit within local secondary care facilities has shown that up to 2/3 of patients presenting to hospital with pressure ulceration have had no contact with formal nursing services prior to admission. The trust wanted to address this gap with a simple tool that could be personalized to help patients understand their risk and what they could do to prevent problems.

Methods: QI methodology was used to explore effective ways to communicate. The QI working group involved nurses in primary and secondary care, social workers and patients. The Trust had previously piloted a Red/Amber/Green risk assessment to be used between nursing teams in primary and secondary care. This tool was adapted to be shared directly with patients. Outcome measures were based on patient’s understanding of their risk of ulceration. Patients without capacity to recall their care were excluded from the study.

Results: Baseline data indicated that only 20% of patients understood their risk of pressure ulceration following discharge from a rehab ward. This was despite being given information on pressure ulceration as part of their discharge pack. The first PDSA showed little improvement, only 37% were aware of their risk. Investigation revealed that the alert card was being completed and placed in the discharge pack, but not alongside the patient. PDSA 2 therefore required discharging nurses to sit with patients to complete the card. 100% of patients were then able to describe their risk of ulceration.

Challenges remain. Process mapping as part of the QI project had highlighted the gaps in information sharing with colleagues in social care. The ultimate goal for the project is that a copy of the personal alert should sit with local authority carers who are seeing vulnerable patients daily. This has still not been achieved.

Conclusions: Having proved its potential this project is set to be rolled out across NELFT, a primary care provider with approximately 2.5 million patients in its care. It is also being piloted within secondary care organizations that work alongside NELFT in local communities and work continues to spread its use into secondary care.

References:

NURSING AND ERGONOMY DURING DECUBITUS CHANGE FOR PREVENTION OF PRESSURE ULCERS

Amanda Santos, Albert Oliveira
1 Centro Universitário Jorge Amado, Salvador, Brazil
2 Universidade Federal Da Bahia, Salvador, Brazil

Introduction: The movement of the client in the bed for pressure ulcer prevention (UPP) is a procedure that requires physical effort and the use of appropriate techniques by the nursing team. In addition, the change of position must take into consideration the maintenance of the comfort and safety of the client and the professional. Objectives: To carry out a review of the literature on ergonomics and nursing professionals during the bed recliner.

Methods: This is a critical review of the literature through searching the MEDLINE and SciELO databases, applying to the research the terms: ergonomics, nursing staff and change of decubitus.

Results: Frequent position changes help avoid muscle discomfort and disproportionate pressure resulting in pressure ulcers in the client, for which periodic decubitus changes are necessary. The improper postural position of the professional at the time of change of decubitus can cause serious osteo-articular and muscular changes. The possible factors that facilitate the execution of the activity of mobilization of the client in the bed are related to the use of appropriate techniques, use of instruments that facilitate the movement and adequate number of personal resources, besides the adoption of some postural positions and the observance of sufficient space to perform the change of decubitus.

Conclusions: It is important to emphasize the need to adopt correct postures in the execution of the activities developed by the components of the nursing team during the training of these professionals in projects of permanent education. The promotion of educational measures related to the execution of nursing work in order to minimize fatigue, pain and injuries can minimize the problem and the adoption of technological resources can facilitate the work.

References:
[P5] DIFFICULTIES FOUND BY THE NURSING TEAM IN THE TREATMENT OF PRESSURE INJURIES

Amanda Santos¹, Albert Oliveira²

1 Centro Universitário Jorge Amado, Salvador, Brazil
2 Universidade Federal Da Bahia, Salvador, Brazil

Introduction: Due to the increase in the longevity of patients with chronic diseases, hospitalization time has been increasing. The risk of development of pressure injury occurs more frequently in bedridden patients. Pressure injury is responsible for socioeconomic consequences for the health system as it increases morbidity and mortality, reduces the quality of life of patients, relatives and professionals who attend it, generating expenses in a context that is already very scarce. To carry out an integrative review of the literature about the knowledge presented by nursing professionals who work in the Intermittent Unit in the assistance to the adult and the elderly to patients with pressure injury.

Methods: The present study follows a qualitative method with an exploratory descriptive profile characterized as a bibliographic research. The articles selected were from Latin American and Caribbean Literature (LILACS) and the Scientific Electronic Library Online (SciELO), using the following descriptors: Pressure injury; Nursing; Nursing Assistance. Selected articles were selected, with text available online, published between 2001 and 2017.

Results: Current literature shows a lack of knowledge of nursing technicians to assist pressure injury. There is a consensus that prevention is a priority, since most pressure injuries can be avoided or at least their severity can be attenuated. Knowing that about 95% of pressure injuries are preventable, it is important to use all available means to perform effective prevention and treatment, as it is known that pressure injuries add to the patient’s physical and emotional suffering, reducing independence in performance of daily activities, as well as their rehabilitation.

Conclusions: The inefficient knowledge of the professionals along with the inadequate practices favor more the appearance of the pressure injuries. To remedy this problem, it is necessary to have a better understanding of these professionals on all the conceptions that result in their development, yet with attitudes towards ethical assistance and with total donation of the acquired care, obtaining adequate resources.

References:

[P6] REDUCING PRESSURE INJURIES RELATED TO POSITIVE AIRWAY PRESSURE VENTILATION MASKS

Chungmei Shih¹, Elizabeth McCarthy¹, Kristen Merriman¹, Kimberly Langner¹

1 Stanford Health Care, Stanford, United States

Introduction: Pressure injuries to the bridge of the nose due to positive airway pressure (PAP) ventilation masks are a significant problem in healthcare. Previous study has shown that protective patches placed under the margins of the masks do not reduce facial pressure injuries.

Prior to this quality improvement project at our hospital, the standard of care for patients requiring PAP ventilation was to use a silicone foam dressing on the bridge of the nose, followed by a full-face mask, and every 4-hour skin assessment. Despite the addition of a silicone foam dressing under the margins of the PAP mask and diligent skin assessment, pressure injuries continued to occur. From January 2016 to September 2017, there were 17 pressure injuries (primarily deep tissue pressure injuries) on the nasal bridge from the mask. The purpose of this project was to reduce the number of pressure injuries on the nasal bridge for patients requiring PAP ventilation.

Methods: This project was led by an interdisciplinary team of respiratory therapy, wound care and nursing. From October 2017 to November 2017, 50 patients requiring PAP ventilation were placed on the under-the-nose mask, which would not add any extra pressure to the nasal bridge protruberances. A silicone foam dressing was not utilized with the under-the-nose mask. Every 4-hour skin assessment continued to be the standard of care.

Results: During the 2-month trial, zero pressure injuries occurred in any of the 50 patients. No skin irritation or discomfort were reported. This new device delivered the necessary amount of pressure and allowed for an acceptable amount of air leak. In March 2018, the under-the-nose mask became the standard of care for all patients requiring PAP ventilation in our facility.

Conclusions: The outcomes that have resulted from this quality improvement initiative have been a result of the teamwork and collaboration among wound care, respiratory, and nursing. These results suggest there is a positive relationship between implementing the under-the-nose mask and decreasing the incidence of nasal bridge pressure injuries. Furthermore, the under-the-nose mask is cost-effective when compared to the non-reimbursed cost of a hospital-acquired pressure injury.

References:
[P7] PREVENTING OPERATING ROOM SACRAL PRESSURE INJURIES IN THE CARDIAC SURGERY POPULATION

Chungmei Shih¹, Heather Swan¹, Ninette Pierce¹

1 Stanford Health Care, Stanford, United States

Introduction: Prior to this study, standard measures to prevent operating room (OR) sacral pressure injuries (PI) for patients who underwent cardiac surgery longer than 3 hours included:

1) applying a sacral silicone border foam dressing
2) placing a gel pad under the sacrum buttocx area

Despite these preventive measures, there were still 9 cases (July 2016 – May 2017) of sacrum/buttock deep tissue PI identified in the cardiac surgery population (with OR time range from 8 to 16 hours). The purpose of this project was to reduce the number of sacrum/buttock OR PI in the cardiac surgery population.

Methods: This project was led by the OR Pressure Ulcer Prevention team (PUP team). The PUP team consisted of OR nurses, the wound care manager, OR educators, OR quality team, and OR management team.

- Root cause analysis: evaluated sacrum/buttocks OR PI cases in the cardiac surgery population.
- Literature review: studies suggested an air-inflated static seat cushion (ASSC) had the best pressure redistribution properties. 1-2

Pressure mapping: a healthy male volunteer was placed on a standard 3-inch memory foam OR table. A gel pad and an ASSC were pressure mapped under the subject’s sacral area in both frog-leg and supine positions.

- Soliciting cardiac surgeons’ support
- Providing staff education
- Conducting trial: 15 patients who underwent coronary artery bypass graft surgery had the ASSC under their sacrum during surgery. No complications were reported during the trial, e.g., shifting when in reverse-Trendelenburg position or sacrum/buttock OR PI.

Results: In May 2017, a sacral silicone border foam dressing and an air-inflated static seat cushion under the sacral area became standard measures for all patients requiring cardiac bypass during their OR procedure. Following implementation, there were zero OR acquired sacral/buttock PI identified in the cardiac surgery population (May to February 2018).

Conclusions: These results demonstrate a positive relationship between implementing the ASSC during surgery and decreasing the incidence of sacral/buttock OR PI in the cardiac surgery population. Furthermore, the ASSC is cost-effective and easy to use. We plan to expand the use of this preventive intervention to other supine OR cases such as colorectal and neuro procedures.

References:

[8] PATIENT PERCEPTIONS OF PRESSURE ULCER RISK AND POTENTIAL FACTORS AFFECTING ADHERENCE TO PREVENTION STRATEGIES IN COMMUNITY SETTINGS

Lisa Ledger¹, Lisette Schoonhoven², Peter Worsley¹, Jo Hope¹

1 University of Southampton, University of Derby, Derby, United Kingdom
2 University Medical Center Utrecht, Utrecht, Netherlands
3 University of Southampton, United Kingdom
4 University of Southampton, NHS Global Wessex, United Kingdom

Introduction: Pressure ulcers (PUs) remain a key priority for healthcare providers, with the cost of treating PUs considerable (1). PU risk assessment and subsequent preventative measures are seen to be central to prevention. However, little is known about the involvement of the patient in the risk assessment and decision-making process with the Health Care Professional (HCP) in the community. It is important to understand patient involvement and the potential effect this may have on subsequent adherence of patients to prevention strategies. The consequences of non-adherence include reduced efficacy of interventions, increased financial costs and risk of developing a pressure ulcer (2). The aim of this research is to investigate patient perceptions of their PU risk and potential factors affecting adherence to prevention strategies in community settings.

Methods: In the first phase, an integrative literature review was conducted with a number of databases searched using three overall search term categories (including synonyms) for ‘pressure ulcer’ and ‘patient involvement’. For the second phase, an explorative, qualitative research design was chosen to focus on the patient perspective of risk. An ethnographically approach will be used to collect a range of data to increase understanding of how individuals interpret advice/interventions and make decisions. Patients will be identified by the District Nurse as ‘at PU risk’ and living in the community. Purposive sampling will be used to obtain a mix of patients from different age, gender and ethnic groups. The data collection tools will include semi-structured interviews, observations of patient-HCP interactions and documents naturally occurring in the setting.

Results: The results of the integrative literature review found very little research around patient involvement in the PU risk and decision-making process. Key themes from the patient perspective included the importance of daily lifestyle, intention versus actual behaviour and patient involvement in decision-making (3). Clinical study is ongoing with pilot activities and interviews planned for August 2018. It is expected that preliminary results will be shared at conference.

Conclusion: This study should provide useful insights from a patient perspective which may have implications for HCPs working in the field.

References:
**[P9] THE ABC OF MOISTURE INJURIES, A NEW PROTOCOL FOR THE TREATMENT AND PREVENTION OF MOISTURE ASSOCIATED SKIN DAMAGE**

**Kris Bernaerts**, Annelies De Graaf, Caitlin Buynseels, Ingrid Keyaerts
1 University Hospitals Leuven, Wound Care Support Team, Leuven, Belgium

**Introduction:** Moisture Associated Skin Damage (MASD) can be divided into 4 types: incontinence-associated dermatitis (IAD) and intertriginous dermatitis. Periwound maceration or peristomal skin damage. IAD is the most common problem in healthcare. This can cause the patient a lot of physical discomfort, social and mental illness, and is a risk factor for developing pressure ulcers.

Due to recent innovations in the medical device industry and the development of a new classification tool (GLOBIAD) the development of a new protocol for treating and preventing of MASD whilst improving the quality of care for incontinent patients, became a priority.

**Methods:** During the validation of the GLOBIAD, we decided that this classification tool could contribute to a more targeted approach in the treatment and prevention. A new advanced elastomeric skin protectant was extensively tested on patients with simple to very complex MASD injuries.

Throughout the implementation of this novel skin protectant the protocol for MASD was reviewed, adjusted for evidence-based interventions and linked to the GLOBIAD. Moving forward a hospital wide awareness campaign and targeted training was put in place.

**Results:** The awareness campaign and training lead to a faster detection of risk patients by nurses and resulted in a quicker start of prevention.

We also saw notable positive effects by using the new advanced elastomeric skin protectant. After the first application patients reported significantly less pain and increased comfort. Only two applications a week are necessary instead of several applications per day. Unlike ointments and pastes the product does not require removal which also reduces the pain. The product is colorless allowing skin an tissue visualization. In addition, we could also see a faster positive evolution in healing rate even when exposed in the most harsh environments.

In terms of cost-benefit, we saw a time saving for nurses and a reduction in the use of the amount of wound edge protectors, pastes, ointments and ancillary products.

**Conclusions:** The new implemented MASD protocol incorporating an elastomeric advanced skin protectant provides patients and nurses benefits. Proper education and awareness campaign together with continuous coaching and bedside education are enablers for a successful implementation and the adoption of novel technologies.

**References:**


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**[P10] USE OF A HIGH ENDURANCE ELASTOMERIC SKIN PROTECTANT TO TREAT SEVERE IAD AND MASD**

**Valerie Hanssens**
1 UZ Brussels, Brussels, Belgium

**Introduction:** Severe IAD (Incontinence Associated Dermatitis) lesions, GLOBIAD (Ghent Global IAD Categorisation Tool) Cat 2A and severe MASD (Moisture Associated Skin Damage) lesions are associated with pain and discomfort for the patients and are resource intensive for health care professionals. Secondly, IAD is a risk factor for the development of superficial sacral pressure ulcers (Beeckman 2014) making it an important indication to treat in clinical practice. However, the continuous assaults of irritants on the tissue results often in an exacerbation of the IAD or MASD lesion. A novel elastomeric high endurance skin protectant was recently developed to manage (treat or prevent) those lesions even under harsh environment and enabling an environment for healing.

**Methods:** We evaluated a novel high endurance skin protectant to treat challenging cases of IAD and MASD lesions and also to prevent exacerbation of these lesions. In this poster we describe IAD and MASD lesions in 3 types of fistulas, a recto-vaginal fistula resulting in a GLOBIAD Cat 2A IAD, a leaking gastrostomy and an abdominal fistula, both leading to excoriated skin lesions.

**Results:** Despite the fact of continuous irritant exposure, we healed the lesions in a short period of time compared to our traditional way of treating them whilst preventing deterioration of the lesions. On average we needed 1 to 3 applications to have complete epithelialization. In 2 of the cases we continued the use of the product to prevent new lesions after healing.

**Conclusions:** In these challenging clinical situations, a novel high endurance skin protectant created an environment for healing of painful, partial thickness lesions (IAD Cat 2A), even under the harsh conditions of continuous irritant exposure created by the presence of a fistula. Pain reduction and relief was achieved and the patient’s quality of life was significantly improved. Based on these outcomes we decided to utilize the high endurance skin protectant in the prevention and treatment of severe IAD lesions.

**References:**


THE IMPACT OF THE SHANLEY PRESSURE ULcer PREVENTION PROGRAMME (SPUPP) FOR OLDER ADULTS AT RISK OF PRESSURE ULcerATION, LIVING IN THE COMMUNITY SETTING

Emner Shanley1, Zena Moore2, Declan Patton2, Tom O’Connor2, Linda Nugent1
1 Royal College of Surgeons in Ireland, Dublin, Ireland
2 Royal College of Surgeons in Ireland, School of Nursing and Midwifery, Dublin, Ireland

Introduction: In Europe the highest rate of growth in age groups is among older people. Given the relationship between ageing and reduced mobility, it is reasonable to assume that there is potential for increase in the incidence of pressure ulcers (PU) in this age group. Therefore, prevention of PUs is a key issue for enhancing health in the older population. Education is a means to empower people to take an active role in health promotion. With this in mind the SPUPP was developed to address the key tenets of PU prevention as described by the Guideline Bundle. SPUPP is a multimedia programme that uses electronic media, hard copy materials, activities and patient diary. The aim of this study was to explore the impact of SPUPP on older persons’ knowledge of and attitudes and behaviours towards PU prevention.

Methods: The design was a multi-centre RCT. Following ethical approval, older adults at risk of a PU, living in the community setting, were invited to participate. Using stratified random sampling, 64 older adults were randomised to control and intervention groups. The SPUPP was delivered to the participants on an individual basis, weekly, over a 20-day period. All participants completed a pre-validated knowledge questionnaire (KPUPP) and post intervention, in addition to an attitude and behavioural survey. Knowledge was scored from 0–20. Descriptive analysis was used to summarise, describe and explain the data. Inferential statistics were used to test for possible associations between variables, specifically, the McNemar’s test was used for repeated measures comparison of binary data, a t-test was used to analyse continuous data and Pearson’s chi-square analysis was used to analyse categorical data gathered from a single point in time.

Results: The participants ranged in age from 70–96 years and 75% (n=48) were female. Pre intervention mean knowledge scores were 11.68 (SD: 3.09, intervention group) and 11.68 (SD: 3.60, control group). Post intervention the mean knowledge score in the intervention group was 16.87 (SD: 1.87), and in the control group was 12.40 (SD: 3.2). The mean difference was 4.47 (95% CI: 3.19 to 5.75; p=0.00001). Positive changes were also noted in favour of the intervention group, regarding self-reported health behaviours and attitudes towards PU prevention.

Conclusions: The SPUPP positively impacted positively on knowledge scores of the participants and also positively influenced attitudes and behaviours towards PU prevention. Thus, this research provides useful information regarding the potential to enhance patient involvement in PU prevention.

References:

THE EPIDEMIOLOGY OF PRESSURE ULCER IN GERMANY: SYSTEMATIC REVIEW

Tsenka Tomova-Simitchieva1, Merve Akdeniz2, Ulrike Blume-Peytavi3, Nils Lahmann1, Jan Kattner2
1 Charité-Universitätsmedizin Berlin, Department of Dermatology, Venereology and Allergology, Berlin, Germany
2 Charité-Universitätsmedizin Berlin, Geriatrics Research Group, Berlin, Germany

Introduction: There are a number of methodological challenges to obtain accurate and generalizable estimates of pressure ulcer occurrence. The aim of this systematic review was to summarize pressure ulcer incidence and prevalence in Germany from 2010 to 2015.

Methods: Up until the end of February 2016 the databases PubMed, CINAHL, DIMDI, Web of Science, LIVIVO, Google, Google Scholar, as well as the publisher Springer and Thieme were searched. Two reviewers extracted the data. The risk of bias was systematically evaluated.

Results: Out of 67 studies and documents, 219 incidence and prevalence estimates were extracted. Most data sets were based on research conducted in hospitals. The majority of epidemiological figures comprised prevalence study results. If we consider methodological high quality studies only (low risk of bias), the prevalence in long-term facilities obtained through primary research was between 2% to 5% in hospitals between 2% and 4% and between 2% to 4% in outpatient settings (pressure ulcer category 2 and above). Routine data collections in hospitals present prevalences between 0.07% to 4.37% including category 1 and 1.55% up to category 2. According to a few epidemiological data of pressure ulcer incidence research the incidence rates in the long-term care varied between 3.09% and 3.80% and between 0.68% and 0.40% in hospitals (pressure ulcer category y 2 and above). There was no secondary data and no incidence rates available for outpatient settings.

Conclusions: The results of this systematic review indicate that pressure ulcers are common in all health care settings in Germany. Apart from methodological limitations, a high number of prevalence estimates could be identified and only few studies which investigated incidences. Further efforts must be undertaken to improve the pressure ulcer prevention in Germany.

References:
ESCARRE: ACRONYM USED TO STRUCTURE THE PRESSURE ULCERS PREVENTION

Nicole Robain1, Romy Perrin2, Christian Baralon3
1 Hopital Riviera Chablais, Vevey, Switzerland

Introduction: The acronym ESCARRE is used to harmonize the practices of interdisciplinary care team members, inform quality of care indicators and facilitate the participation of patients and their families in pressure ulcers prevention.

Methods: Under the aegis of the Patient Safety Commission of the Fondation des Hopitaux Vaudois (FHV), the Hospital Riviera-Chablais (HRC) with other hospitals take part in breakthrough collaborative on pressure ulcer prevention. The defined goal is to reduce by 50% the incidence of nosocomial pressure ulcers in participating institutions after 18 months of improvement intervention. A project starting day followed by a major communication campaign helped to raise the awareness of employees, doctors, patients and their families about this issue. The delegated team and the internal team of the project work on the publication or updating of internal documents and procedures. The reading of the monthly results, the meetings with the care teams as well as the support of the direction of the care allowed the delegate team to elaborate a simple and practical document, allowing to structure the support of the pressure ulcers prevention for each patient. The term ESCARRE, identified as an acronym, responds to this expectation and describes the different steps and actions to be taken to prevent the onset of an pressure ulcer: ESCARRE prioritizes, for each patient, the phase of identifying the risk of pressure ulcer (Boden score, clinical evaluation), promotes its documentation in the electronic medical records (EMR) as well as the implementation of preventive actions and their follow-up. Finally, the acronym recalls the interdisciplinary nature of prevention and the information and participation of the patient and his family.

Results: The clinical teams quickly adopted this new tool, facilitating their adherence to the established algorithm and developing the items mentioned in the acronym. ESCARRE is a useful mnemonic based on consensus, key elements, presenting a hierarchy of sequences. The filling rate of the Boden score within 24 hours as well as the notification rate of the prevention actions bundle in the EMR are indicators monitored and in constant.

Conclusions: This document, present in each caregiver’s pocket is a “reminder” to trigger systematically pressure ulcers prevention actions, to facilitate communication with interdisciplinary teams in charge of patient, and to sensitize him and his family on the pressure ulcer risk and the resources committed by HRC care and management teams for their prevention.

References:

FRENCH GUIDELINES FOR MEDICAL AND SURGICAL CARE OF PRESSURE ULCERS ON SPINAL CORD INJURED PATIENTS

Brigitte Barrois1, Anthony Gélis2, Brigitte Perroin Verbe3, Xavier Deboissezon4, Djamel Bensmail5, Dominique Casanova5, Pascal Rousseau6, Denis Colin7
1 Perse, Aulnay Sous Bois, France
2 Perse, Montpellier, France
3 Sofmer, Nantes, France
4 Sofmer, Toulouse, France
5 Sofmer, Garches, France
6 Sofpre, Marseille, France
7 Sofpre, Angers, France
8 Perse, Le Mans, France

Introduction: 3 French national societies carried out cooperation to develop guidelines for medical and surgical care of pressure ulcers on spinal cord injured patients.

Results: 1. Surgical indication is recommended, when wound healing medical treatment becomes impossible for some locations.
2. It is recommended to assess and take care of patients entirely before to decide operative indications, while proceeding to benefits and risks analysis
3. It is recommended to respect a pre-operative procedure: multi-disciplinary consultation is recommended before surgical indication (surgeons, nurses, health professional: nurses and therapists specialized in positioning, dieticians, social workers and psychologists).
4. It is recommended to define the type of surgery during the preoperative step and to inform patient during preoperative step.
5. It is necessary to respect a systematic procedure in post-operative step:

Conclusions: 6. It is recommended to organize the follow up during at least 18 months (healing quality, sitting adjustment and therapeutic education continuation).

References:
A NEW CLASS OF DRESSINGS FOR THE CARE OF EXUDATIVE PRESSURE ULCERS (PU)

Brigitte Barrois¹, Laurence Hauy², Denis Colin², Benoît Nicolas³

¹ Perse, Aulnoy Sous Bais, France
² Perse, Le Mans, France
³ Société Française de l'Escarre, Rennes, France

Introduction: Exudative PU are among the most serious and problematic wounds, resulting in high economical and human cost. It is necessary to improve treatment speed and efficiency. Since Antiqu Egyptian sugar has had his place. But the use of sugar can be difficult, and a new synthetic product, an association between D-xylene and Carbomer polyacrylate, can enable detersion. It must be assessed.

Methods: A new class of chronic wounds dressings, D-xylene and Carbomer polyacrylate is a powder forming a gel and creating a dressing in the exact size and contact of the wound with 2 components: D-xylene, a non metabolizable sugar, very high osmotic pressure, allowing the prevention of the microbial proliferation and a high concentration in Carbomer polyacrylate (extracellular matrix stimulating the cell growth).

Results: In vitro studies demonstrated a positive synergistic effect and an important activation of the cellular differentiation, proliferation and formation of a cellular matrix by fibroblasts, migration of keratinocytes, and a growth of neuronal dendrites.

An exploratory clinical study specified its high interest for the care of serious pressure ulcers (detersion of exudative pressure ulcers with fibrino-necrosed debris and granulation stimulation), in parallel to the global approach of the environment of the wound (strong reduction of odor and preservation of the peripheral skin tissues), its convenience of use and its good tolerance (no adverse effect and pain reduction). A new French study is planned after positive clinical cases were reported.

Conclusions: These results are explained by the capacities of the device: bacteriostatic effect by hyperosmotic dressing and acid pH respecting the bacterial life cycle.

New classes of dressings are rare. Good preliminary results for this new dressing, with safe and effective treatment for serious PU, are very positive.

References:

VERIFICATION OF REDUCTION OF SHEAR FORCE IN THE SACRAL REGION BY A NEW INCONTINENCE PAD

Haruki Toda¹, Yoshinori Tanaka¹, Yasushi Auta¹, Makoto Takahashi², Takehiko Ohura³

¹ Unicharm Corp., Toyohama-Sho, Kanonji-Shi, Kagawa, Japan
² Hokkaido University, Chuo-Ku Sapporo-Shi, Sapporo, Japan
³ Sapporo Dermatology Clinic, Pressure Ulcer and Wound Healing Research Center, Chuo-Ku Sapporo-Shi, Sapporo, Japan

Introduction: One of the problems of excretory care is the problem of deterioration of pressure ulcers due to the movement of the body during diaper change and the problem of skin troubles during wearing. As one factor of the skin trouble, "friction" and "shear force" are conceivable. Using an incontinence pad with a low friction interface at the position corresponding to the periphery of the sacral region where this "shear force" is likely to occur, whether the change in the shear force is seen compared to when using the control pad.

Methods: For the 12 people (rank C of daily living independence of the elderly) in the hospital facility, a sensor was installed to measure the share force at the position corresponding to the sacrum. After that, we put on diapers, head-side-up from 0 degrees to 45 degrees and head-side-down from 45 degrees to 0 degrees, while lying on bed.

Results: As compared with the control product, 36% reduction at head-side-up 30 degrees and 48% reduction at 45 degrees was confirmed. Also, depending on the weight of the subject and the sacral protrusion amount, the shear force fluctuation accompanying head-side-up to head-side-down appeared as three patterns.

Conclusions: If an interface with a low friction is present, when a shear force is generated, an interface with a low friction first releases the shear force, thereby suppressing the rise of the shear force applied to the skin side as a result conceivable. By this action, there is a possibility that it may contribute to an adverse effect on pressure ulcer at the time of diaper change and suppression of skin troubles at the time of wearing.

References: For ethical consideration, we gave the test description to the principal or the family sufficiently in advance and obtained consent in writing.
**[P17] PREVENTION OF HEEL BLISTERS WITHIN ORTHOPAEDICS**

**Carol Johnson¹, Caroline Renwick¹**

¹ Darlington Memorial Hospital, Darlington, United Kingdom

**Introduction:** The trauma/orthopaedic ward highlighted through safeguard reporting of pressure ulcers, that a number of patients were developing heel blisters post operatively. Deep dive exercise identified commonalities in those patients, which were fractured neck of femur, and surgery carried out under spinal/epidural anaesthesia. All of these patients had previously been fully independent prior to fracture and tissue damage occurring within 24 hours of surgery. Audits over a 6 month period identified 24 grade 2 heel blisters, all with fracture neck of femur and spinal/epidural. All patients also had existing policy interventions in place. The aim and objective of the research was to determine if a five layered silicone heel dressing would prevent blisters developing in these patients, as early indications highlighted potential reduction in friction, as the layers move independently. The dressing design decreases skin interface pressures, thus decreases friction and pressure whilst continuing to maintain optimum skin micro climate balance.

**Methods:** The dressings were placed on patients who consented for epidural/spinal with fractured neck of femur (who had no skin damage), prior to theatre for maximum of 72 hours, or until they mobilise with return of full sensory perception. The pilot study was over a four month period where 87 patients were admitted and had the intervention applied. Skin condition before and after the dressings were applied, was documented in patient’s notes.

**Results:** In the intervention group there were 46 female patients and 41 male patients, the patient age group was between 49-86 years. One of the patients within the intervention group had previously developed a blister three years prior; following planned surgery on the other limb. There was also a comparative group of 64 patients admitted within the same data collection period who also had the same procedure as intervention group. 12 patients within the comparative group went on to develop grade 2 blister (18.7%). No patient in the intervention group developed any tissue damage.

**Conclusions:** The cost of treating 12 category 2 pressure ulcers within our trust cost £72,000 (DH 2010). Overall cost for prevention of 87 patients is £609, £7 per patient. The dressing has proven to be effective in the prevention of heel blisters in these patients. It may be relevant to include patients with other conditions of sensory deficits.

**References:**

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**[P18] PRESSURE INJURY PREVENTION: NURSING CARE IN COMBINATION WITH MEDICAL EQUIPMENT**

**Zdeňka Chalabalová¹, Zuzana Mikolášková²**

¹ Lnet Spol. S R.O., Slany, Czech Republic
² General University Hospital Prague, Czech Republic

**Introduction:** To describe and discuss the nursing care of the patient at high risk of pressure injury development in combination with special bed and mattress.

**Methods:** Case report.

**Results:** There is a need to create individual nursing care plan for the patient in prevention of pressure injury. Despite the severity of patient’s condition (vertebral fracture, bronchopneumonia, renal failure, non-successful weaning from artificial lung ventilation) due to nursing and health care no skin defect appeared. The nursing care was combined with bed frame based lateral tilt and special active mattress.

**Conclusions:** Admission patient, 47 years old, was hospitalized for 29 days on ICU in General University Hospital in Prague. Patient had neck collar, immobile, with high doses of adrenalin and CRRT. Thanks to nursing care, automatic lateral therapy (ALT) with a special bedframe and active mattress, patient was ready for transport into another hospital without any pressure injury. Lateral tilt was done automatically in +/-30° and +/-15° each 15 minutes.

**References:**
[5] Norton scale pressure injury scoring system
COST ANALYSIS OF THE USE OF A MULTI-LAYER POLYURETHANE FOAM DRESSING FOR THE PREVENTION OF PRESSURE ULCERS IN ELDERLY PATIENTS WITH HIP FRACTURES

Cristiana Forni1, Richard Searle2

1 Istituto Ortopedico Rizzoli, Bologna, Italy
2 Smith & Nephew Medical Ltd, Hull, United Kingdom

Introduction: Hospital-acquired pressure ulcers (PU) continue to impose a cost burden on hospital providers, primarily driven by the resources used to treat complications. These additional resources may include extended hospital stay. Strategies to prevent PU are therefore an important consideration for hospitals. A recently-published RCT reported that the use of a multilayer foam dressing, when combined with standard treatment, was effective in reducing the incidence of PU. It is of further interest to undertake a cost analysis to determine whether this strategy is likely to be cost-saving.

Methods: A model was constructed to determine the incremental cost of the foam dressing strategy alongside standard prevention, compared with standard prevention alone. PU incidence data was used from the recent RCT. Unit costs were adjusted to 2017 prices where necessary.

Results: This strategy resulted in estimated savings of £750 per patient as a result of fewer PU occurrences. The cost of the application of preventative dressings was found to be £17 per patient. Therefore, the net saving per patient of the foam dressing strategy was found to be £33 per patient.

Conclusions: The cost analysis presented here suggests that the foam dressing strategy is cost-saving and therefore dominates standard prevention.

References:

CLINICAL EFFECTS OF RADIAL SHOCK WAVE THERAPY ON SACRAL PRESSURE ULCER: A CASE REPORT STUDY

Robert Dymarek1, Izabela Kuberka1, Miroslaw Sopol1, Magdalena Milani2, Joanna Rosińczuk1, Jakub Taradaj2

1 Wroclaw Medical University, Faculty of Health Sciences, Department of Nervous System Diseases, Wroclaw, Poland
2 Wroclaw Medical University, Faculty of Health Sciences, Division of Surgical Specialties, Wroclaw, Poland
3 Academy School of Physical Education, Department of Physiotherapy Basics, University of Manitoba, College of Rehabilitation Sciences, Kowree, Poland

Introduction: A preliminary report indicates a potential beneficial clinical effectiveness and safety of shock wave therapy (ESWT) in venous and diabetic ulcers. The aim of this case study was to investigate the efficiency of ESW on healing pressure ulcer (PU) in the sacral area.

Methods: A 74-year-old female suffering from severe dementia with the PU received a series of three radial ESWT performed once a week in combination with standard wound care. ESWT was applied using 300 standard pulses + 100 pulses/cm2 at 2.5 bars, 0.15 mj/mm2 and 5 Hz. Measurements of metric parameters of the PU were undertaken with the novel planimetric smartphone application. Trophe conditions and local blood microcirculation were assessed with infrared thermographic camera. All assessments were performed at baseline (M0), one week after each of three ESWT (M1–M3) as well as 1, 2 and 4 weeks following ESWT finalization (M4–M6). The study protocol was approved by the Bioethics Committee, registered at the Clinical Trials Registry Platform, funded from statutory sources of the Ministry of Science and Higher Education in XXX, and supported by the XXX Academic Hub in the XXX Programme.

Results: An improvement in the wound surface area was observed, respectively for M0=42.9, M1=40.9, M2=29.5, M3=29.2, M4=27.0, M5=25.0 and M6=22.1 cm2. Other parameters of the wound such as length, width, depth, undermining and tunneling of the PU have been also improved. A positive change in the surface temperature distribution was shown, respectively for M0=36.6, M1=37.3, M2=38.0, M3=37.9, M4=37.0, M5=36.8 and M6=37.4 [°C].

Conclusions: ESWT could represent an adjunctive, non-invasive and safe physical agent supporting the healing process of PUs. Nevertheless, further well-designed, randomized and controlled studies including a larger group of patients, placebo ESW and laboratory analyses (immunohistochemical and histopathological) should be considered.

References:
**[P21] EXTRACORPOREAL SHOCK WAVES FOR CHRONIC WOUNDS: A SYSTEMATIC REVIEW AND SYNTHESIS OF QUALITATIVE STUDIES**

Robert Dymarek¹, Mirosław Sopel¹, Izabela Kuberka¹, Joanna Rosińczuk¹, Jakub Taradaj²

1 Wroclaw Medical University, Faculty of Health Sciences, Department of Nervous System Diseases, Wroclaw, Poland
2 Academy School of Physical Education, Department of Physiotherapy Basics, University of Manitoba, College of Rehabilitation Sciences, Katowice, Poland

**Introduction:** A number of biophysical agents have been well-investigated in the management of pressure ulcers (PU), including electrical simulation, low-frequency ultrasound and laser therapy. Recently, the initial reports indicate a promising effect of shock wave therapy (ESWT), which might be an alternative method supporting the healing process in chronic wounds. The aim of this paper was to present a systematic review of recent clinical findings in this subject with assessing their methodological quality.

**Methods:** A systematic search was performed based on PubMed, PEDro, Scopus, and EBSCOhost databases for studies on ESW therapy and chronic wounds. Clinical trials on human subjects, available with the full version of the manuscript and written in English only were included. No limitation was placed on ESW type, treatment period, and measurement tools. This paper was described in accordance with the current guidelines of the PRISMA 2009 Statement. This review paper is a theoretical part of research project funded by the statutory sources of the Ministry of Science and Higher Education in XXX, and supported by the XXX Academic Hub in the XXX Programme.

**Results:** Finally, 16 clinical trials involving a total population over 1,000 patients and published from January 2000 to February 2018 were accepted for analysis. Assessment of papers eligibility were preceded by two independent reviewers (XX and XX), and in case of disagreement the judgment of a third reviewer (XX) was sought. Moreover, the methodological quality of each randomized controlled trials was rated using guidelines for systematic reviews presented by Cochrane Collaboration Group.

**Conclusions:** ESW therapy seems to be a promising modality, which is non-invasive, painless, and quite safe. However, there are still limited data regarding the usefulness of ESW in PUs. It has to be pointed out that well-designed, multicenter, controlled and randomized clinical studies are still needed to develop practical guidelines.

**References:**


**[P22] COMPLEMENTARY PRESSURE ULCERS PREPARATION FOR THE TREATMENT SESSIONS WITH AN EXTRACORPOREAL SHOCK WAVES**

Izabela Kuberka¹, Robert Dymarek¹, Mirosław Sopel¹, Magdalena Milan², Joanna Rosińczuk¹, Jakub Taradaj²

1 Wroclaw Medical University, Faculty of Health Sciences, Department of Nervous System Diseases, Wroclaw, Poland
2 Academy School of Physical Education, Department of Physiotherapy Basics, University of Manitoba, College of Rehabilitation Sciences, Katowice, Poland

**Introduction:** There is a number of biophysical therapies which have been studied as potentially valuable for the pressure ulcers management. Clinicians and physiotherapists use a common physical agents in their clinical practice, including electromagnetic, acoustic, kinetic, atmospheric and mechanical energy. Recently, the initial reports showed some beneficial potentials of extracorporeal shock wave therapy ESWT as a novel for chronic wounds. The aim is to present a complementary preparation of pressure ulcers for performing a physical therapy especially ESWT.

**Methods:** The paper presents practical potentialities of pressure ulcers preparation for physical treatment, especially a novel one using radial ESWT. Tips for qualifying ulcers for the chosen method were also discussed due to existing contraindications for necrosis removal from the wound.

**Results:** The methods we currently use before ESWT sessions include the cleansing as the first step in preparing the wound (removing surface debris and dressing remnants), debridement methods matched individually to the patient (surgical, autolytic, enzymatic, larval, or mechanical), and wound dressings (hydro-colloid, film, hydrogel, alginates, foam, silver or silicone). Selection for the adequate method should be based on clinical parameters of the wound, skin condition around the wound, healing phase of the wound, and dominant wound tissue. In case of ESWT application, a sterile ultrasound gel is used directly on the wound and its edges as a contact medium. A sterile polyurethane drape is used as a mechanical barrier.

**Conclusions:** It has to be concluded that before any physical treatment, the pressure ulcer must be carefully prepared and cleaned from necrotic tissues using a wide range of methods and techniques. The careful and adequate use of above-mentioned procedures and agents is necessary to ensure proper conditions before undertaking any physical agents for pressure ulcers. An interdisciplinary team of specialists including a doctor (surgical, angiologist or dermatologist), nurse and physiotherapist (specialist in wound care) should be considered to provide a complex management.

**References:**


**[P23] EXTRACORPOREAL SHOCK WAVES IN PRESSURE ULCERS: ANALYSIS OF POTENTIAL MECHANISMS ACTIVATED IN VIVO**

Miroslaw Sopel, Robert Dymarek, Izabela Kuberka, Magdalena Milan, Joanna Rosińczuk, Jakub Taradaj

1 Weber State University, Utah, United States
2 Wroclaw Medical University, Faculty of Health Sciences, Department of Nervous System Diseases, Wroclaw, Poland
3 Academy of Physical Education, Department of Physiotherapy Basics, University of Wroclaw, College of Rehabilitation Sciences, Katowice, Poland

**Introduction:** Extracorporeal shock waves (ESW) promote the activation of biological mechanisms improving blood microcirculation, activation of the anti-inflammatory response, as well as increase efficiency of the tissue regeneration in a nimal model of wound healing. Moreover, ESW promotes a cellular proliferation, supports the collagen deposition, increases the tissue granulation, and improves neovascularization. However, the mechanism of ESW action on fibroblasts is poorly investigated. The aim of this study was to determine a potential mechanisms of ESW application on human pressure ulcer (PU).

**Methods:** A 84-year-old female with the PU received three sessions of ESW with 300 + 100/cm2 impulses at pressure of 2.5 bars, energy flux density of 0.15 mJ/mm2 and impulses frequency of 5 Hz. The biopsy specimens were collected from the most contaminated area of the ulcer at baseline (MO), 24 hours (M1) and 4 weeks (M2) after ESW sessions. Histopathological and immunohistochemical analyses were performed. Hematoxylin and eosin basic staining as well as antibodies against Ki-67, α-smooth muscle actin, CD31, caveolin, lamin A and ERNOS were applied to paraffin and frozen sections of skin wound specimens two, six, and fourteen days after biopsy, respectively. Microvessel density was assessed microscopically by expression CD31 antigen in dermis. The study protocol was approved by the Bioethics Committee, registered at the Clinical Trials Registry Platform, and funded from statutory sources of the Ministry of Science and Higher Education in XXX.

**Results:** Upon ESW, we observed morphological changes and increased cell proliferation of keratinocytes, fibroblast/myofibroblast transdifferentiation (high level of α-smooth muscle actin expressed by the fibroblasts), significant increases of lamin A and caveolin expression in following exposure to ESW. Moreover, microvessel density was significantly higher after ESW.

**Conclusions:** Skin wound healing is a dynamic process which can serve as a model for studying phenomena such as cell-cell interactions and transitions in vivo. ESW appears to show a beneficial immunohistochemical mechanisms that play an important role in the clinical effect.

**References:**


**[P24] MEASURING AND COMPARING CHANGES IN DRESSINGS’ PROPERTIES OVER SEVEN DAYS OF SIMULATED PROPHYLACTIC USE**

Evan Call, Josh Burton, Abigail Greer, Cassidee Cline, Craig Oberg, Katherine DeMonja

1 Weber State University, Utah, United States
2 University of Utah, United States
3 Ec Service, Utah, United States

**Introduction:** A dressing’s effectiveness in injury prevention is based on its ability to protect underlying tissues from damaging forces that can induce pressure injuries, such as friction-induced shear, compression, and the translation of these forces into tension.

**Methods:** Testing was performed on five dressings in two stages: simulated use/aging and tensile testing.

**Results:** The aging process affected the stability of the dressing architecture. Moisture absorption and retention are important factors resulting from the aging of the dressings. During testing, moisture escaped off the dressings only if the dressing experienced rolling off of the indenter.

**Conclusions:** A high-quality dressing has the ability to deal with the extreme bodyweight forces applied over the course of prophylactic use which in clinical practice can be between 3 to 5 days. The most desirable dressing will have the ability to absorb and redistribute forces without focusing them on the at-risk tissues surrounding the dressing, particularly the coccyx. Three key elements in an effective dressing are stiffness, conformability and protective endurance.

**References:**

INTERDISCIPLINARY TEAMWORK, LEADERSHIP AND STAFF COMPETENCY ARE REQUIRED TO REIMPLEMENT A Prototype FOR PREVENTING HOSPITAL ACQUIRED PRESSURE ULCERS

Annemarie Jee1, Inge Ulriksen1
1 North Zealand Hospital, Hilleroed, Denmark

Introduction: North Zealand Hospital is a 570 bed hospital in the Capital Region of Denmark. From 2010-2014, we participated in a national quality improvement program. The program introduced care bundles, one dedicated to preventing hospital acquired pressure ulcers (HAPU). We designed our own care prototype. Although successful at the hospital level, it now needs reimplementation. We use the Model for Improvement, with small-scale testing and data collection at ward level.

The goal: No HAPU category 2 within the last 100 days on each ward.

Methods: Our work includes focus on leadership at Micro, Meso and Macro levels. As an essential part of our plan, we acknowledge the challenges our leaders face at ward level, close to staff and patients. We emphasize that the work can only succeed by adopting a multidisciplinary approach and improving staff competency 24/7.

Interventions:
- Monthly report to the Hospital Board and two leaders at meso level, responsible for the work
- Daily data collection: early assessment, reassessment, risk patient identification and monitoring HAPU-free progress
- Multidisciplinary teamwork including: kitchen, facility management (FM), pharmacy
- Sharing knowledge and learning at hospital level from:
  - Local quality coordinators
  - Dedicated group of leaders at ward level
- Teaching and reinforcing the efforts of ‘ambassadors in preventing HAPU’, group of staff from each ward, including radiology and FM, since 2014
- Testing effect of ward rounds by a specialist and quality coordinator
- Patient participation and relatives’ involvement

Results:
- 10 wards have reached the goal (N=22)
- Orthopaedic wards have had the best results in three years
- Pressure-reducing mattresses reach wards when needed
- Reorganisation of workflow on evening shifts works in preventing HAPU
- Some wards are testing huddles on evening and night shifts to identify risk patients
- Number of HAPU has increased due to increased bed occupancy

Conclusions: The organisational structure on the wards is crucial for success. This includes adequate staffing plans, organisation of workflow on the evening and night shifts and the competent handling of bed occupancy. Reimplementing a prototype is a daily endeavour for leaders; staff requires training, knowledge and skills, relevant equipment has to be available on the wards when needed etc. We have reason to believe that reinforcing the efforts of ‘ambassadors in preventing HAPU’ and holding ward rounds by a specialist and a quality coordinator will contribute to reaching the goal at a hospital level.

References:

EDUCATIONAL TEXT MESSAGING FOR PRESSURE ULCER PREVENTION IN PEOPLE LIVING WITH SPINAL CORD INJURY WHO ARE NEWLY DISCHARGED FROM HOSPITAL: A PILOT STUDY

Liang Qin Liu1, Rachel Deegan1, Sarah Chapman1, Michael Traynor1, Helen Allan1, Sarah Knight1, Angela Goll1
1 Middlesex University, Department of Adult Child Midwifery, London, United Kingdom
2 London Spinal Cord Injury Centre, Royal National Orthopaedic Hospital, London, United Kingdom
3 School of Pharmacy, University of Bath, Bath, United Kingdom
4 School of Health and Education, Middlesex University, London, United Kingdom
5 London Spinal Cord Injury Centre, Royal National Orthopaedic Hospital, London, United Kingdom

Introduction: Pressure ulcer (PU) represents a significant health, social and economic burden for patients with spinal cord injury (SCI). Prevention of PU by better education and pressure-relief exercises may reduce the risk of development but compliance can be low. Lack of knowledge of skin care after the discharge and loss of motivation to adhere pressure-relief regimen have been reported by SCI individuals.1 Educational text message have been shown to induce behavioural changes and improve adherence in other clinical situations.2 Hence we sought to conduct a pilot study introducing the early intervention by sending text messaging for PU prevention in SCI.

Method: Participants who are newly discharged from SCI unit will be randomly assigned to either Intervention group or Control group. Participants in Intervention group will receive a text message reminder two times a week for six months. Control group will receive standard follow-up care without text message. Primary outcomes: concordance with ‘pressure-relief’ regimen. Participants will complete a ‘pressure-relief’ questionnaire at baseline, 3 and 6 months: incidence of pressure ulcer 1-IV. Secondary outcomes: acceptability, satisfaction of the early interventions. Participants in intervention group will be asked to fill a questionnaire at end of the study.

Results: This study has been registered NIHR portfolio research database (NIHR Central Portfolio Management System (CPMS) and registered as a clinical trial with Trial ID: ISRCTN33820532). A total of eleven patients were recruited by May 2018, six of them were randomly allocated to ‘text message’ group, one participant deceased at 2-month post-discharge. Five participants were assigned to ‘control group’. All of them have completed baseline questionnaire, three participants have completed 3-month questionnaire. Final analysis will be reported after full recruitment.

Conclusion/Discussion: To our knowledge, this will be the first study to explore the efficacy and feasibility of text messaging to promote ‘pressure relief’ using concordance questionnaire for individuals with SCI. This pilot study is conducted to assist in the development of methods of early education and outcome measure. If the study suggests potential efficacy then this would justify larger trials to test effectiveness and implementing early intervention for tackling the PU in people living with SCI.

References:
[P27] A FAMILY OF MICROCLIMATE MANAGER COVERLETS DOES NOT ALTER IMMERSION WITH 10 THERAPEUTIC SURFACES: AN EXTENDED STUDY USING THE SS-1 STANDARD

Max Speight
1 Ajo, San Antonio, United States

Introduction: Microclimate coverlets are often used in conjunction with therapeutic support surfaces (TSS) to mitigate pressure ulcers. A previous pilot study has already demonstrated that a coverlet does not adversely interfere with or alter the pressure redistribution properties of the underlying support surface as measured by depth of immersion. This expanded study covers a wider array of products for pilot study confirmation.

The aim of this expanded engineering study was to determine whether a family of microclimate manager (MCM) coverlets had a substantial effect on the degree of immersion of a wider range of underlying therapeutic surfaces; whilst still providing improved moisture and temperature management.

Methods: An independent product testing laboratory was commissioned to perform multiple cohorts of tests following the ANSI / RESNA / NPUAP / Support Surface Standards Initiative (S3I) published SS-1 standard. Multiple point immersion tests were measured across 10 different bariatric and non-bariatric pressure redistribution surfaces, before and after the addition of the MCM coverlet and involving a wider array of microclimate manager coverlets, including both disposable and reusable versions.

Results: In this expanded study, the results confirmed the original study outcome that there is no substantial effect on the underlying surface function in terms of immersion with the addition of the MCM family of coverlets.

Minimum mean difference in immersion for a surface 0.02 in (0.05 cm);
Maximum mean difference in immersion for a surface 0.39 in (0.99 cm);
Mean difference in immersion across all 10 surfaces 0.12 in (0.30 cm).

Conclusions: This study confirms that the MCM family of coverlets can be used with a wide variety of different therapeutic surfaces without negatively affecting immersion, whilst still providing an augmented microclimate feature. The benefits of the microclimate management features of the coverlet are significant and do not adversely affect the underlying TSS.

References:

[P28] THE EFFICACY OF THE MOBILE 3-DIMENSIONAL WOUND MEASUREMENT SYSTEM (3DWMS) IN PRESSURE SORE ASSESSMENT

Donghyeok Shin1, Dong-Keun Jun
1 Konkuk University Medical Center, Department of Plastic and Reconstructive Surgery, Seoul, Korea, Rep. of South Korea

Introduction: Clinical assessment for the progressive wound status is a key factor for decision on a treatment plan in pressure sore wound management. Recently, a mobile 3-dimensional wound measurement device I and its application program was introduced in several pilot studies. In this study, we apply this digital wound measurement system in managing patients with the pressure sore wounds, and evaluate reliability and efficiency of the system in the clinical environment.

Methods: Fourteen pressure sore wounds were assessed by two investigators using a 3DWMS and manual measurement methods simultaneously, including length, width, depth, area, and volume of the wound sites. While investigating the wounds, several indexes, such as degree of convenience, consumption times and possible errors in the process, were documented for further clinical evaluations.

Results: There were no significant differences between 3DWMS group and manual measurement group in measuring wound length, width, area (P > 0.05). However, statistically significant differences were found in measuring wound depth, volume and time-consumption between 3DWMS group and manual measurement group (P < 0.05).

Conclusions: The 3DWMS showed its clinical efficacy in assessment of the pressure sore wound sites with the results of accurate measurements, short time-consumption, and simple measurement process.

References:
[1] Karedis™, Karedis, VA
[P29] SYSTEM APPROACH IN THE WOUND CARE: EXPERIENCE OF THE SANT’ANDREA OF ROME

Diego Ceci1, Francesco Laverone1, Marco Cavallini1, Cristiana Luciani1

1 Sapienza, University of Rome - Sant’andrea Hospital, Uo Chirurgia Generale, Rome, Italy
2 Sapienza, University of Rome - Sant’andrea Hospital, Uo Risk Management Qualità e Acreditamento, Rome, Italy
3 University of Southampton, Faculty of Health Sciences, Southampton, United Kingdom
2 Essity Hygiene and Health Ab, Mölndal, Sweden

Introduction: The Sant’Andrea Hospital - Sapienza University of Rome has dealt with, in an operative way, the path of the patient affected by PU or at risk of developing them, as well as with understanding the causes that determine the main differences in care and behaviour regarding a lack of homogeneity in the management of PU, and also analysing and managing the procurement process of medical devices to be used for the treatment of PU that was rather approximate and fragmentary.

Methods: The project coordinated by the Quality Unit together with the Health and Nursing Department involved the analysis of a service and organizational/management processes through a self-assessment of the weaknesses of the structure and the implementation of defined actions that then allowed, in the course of 11 years of activity, to outline and implement the following steps: prevalence surveys and incident monitoring; monitoring of rental assistance for ant-decubitus devices; monitoring of rental costs; monitoring of the appropriateness of requests, tools for risk assessment, staging and evaluation of LdP; staff training; activation of a 1st level Mater in Wound Care and in Case Manager Geriatrics; nurse sharing nursing consultation to support the operators; working group constitution and elaboration and introduction of a multidisciplinary protocol; inclusion in the budget objectives.

Results: The activities have allowed: to determine budget projections; improve the appropriateness of using anti-bedsore and medical devices; build a corporate database; evaluate the costs deriving from welfare activities. The results obtained are periodically presented and discussed during operational meetings, with the UUOUs (operative units) involved, with the aim of sharing the path undertaken and making any changes based on the needs expressed and critical issues identified through re-design.

Conclusions: The results obtained have represented a starting point for the implementation of business strategies aimed at promoting the appropriateness, reduction of costs related to the rental of advanced surfaces and medical devices, monitoring the appropriateness of treatment through the use of indicators: planning of strategies for connection with the territory through an accurate analysis of the company user base.

References:
A BIOACTIVE DEVICE WITH AUTOLOGOUS STEM CELLS AND PLATELET-RICH PLASMA FOR SURGICAL TREATMENT OF PRESSURE ULCERS IN SCI PATIENTS

Alessandro Bertolo1, Reto Wettstein2, Jivko Stoyanov3
1 University of Southampton, Southern Health NHS Foundation Trust, Southampton, United Kingdom
2 University Medical Center Utrecht, Utrecht, Netherlands
3 University of Southampton, Faculty of Health Sciences, Southampton, United Kingdom

Introduction: Pressure ulcers (PU) are chronic wounds caused by increased pressure over a prolonged period of time. Interruption of blood circulation leads to a shortage of oxygen, nutrient supplies, accumulation of toxic by-products and eventually tissue necrosis. Patients with spinal cord injury (SCI) are at high risk of PU because of impaired mobility, and in many cases lack of protective sensory perception. Currently, treatment of PU is associated with long hospitalization, high complication rates, and recurrence of lesions remains a major problem. A promising future direction to reduce the complications and recurrences of these wounds is the combination of tissue engineering techniques and elements of regenerative medicine (stem cells and growth factors). Adipose-derived mesenchymal stem cells (ADSC) are a readily available and concentrated resource from subcutaneous fat tissue. ADSC promote neo-vascularization and granulation tissue formation. However, local administration of ADSC in the wound bed results in poor cell retention.

Methods: We propose the use of a scaffold to prevent local cell loss and increase protection against mechanical impact. We hypothesize that collagen scaffolds, designed to precisely fit the wound and populated with autologous ADSC, re-suspended in autologous platelet-rich plasma (PRP), will accelerate and improve wound healing. Initially, we will test and optimize in vitro various combinations of ADSC, PRP, and collagen scaffolds. Furthermore, we plan temporary application of collagen scaffold onto PU of SCI patients. We will use to this purpose the interval between the initial debridement of the PU and defect closure by flap surgery. Our analysis will be conducted both in situ – assessment of extracellular matrix accumulation and vascularization occurring within the scaffold – and then in vitro – co-culture of the exudate from the wound and ADSC.

Results: Preliminary test will conducted in vitro on ADSC and collagen scaffold. ADSC on collagen scaffold will be stimulated to synthesize their own extracellular matrix, also in co-culture with PU exudate.

Conclusions: In this initial stage, we want to prove the feasibility of the project and based on in vitro results, we plan in future to apply ADSC and collagen scaffold simultaneously into SCI patients. The concept of a bioactive device augmented with autologous stem cells for surgical treatment of PU can also be transferred and adapted also to other types of chronic wounds, which are a major issue in health care.

References:

IMPLEMENTING AN INTERDISCIPLINARY APPROACH TO PRESSURE ULCER PREVENTION IN THE COMMUNITY SETTING

Paul Clarkson1, Lisette Schoonhaven2, Peter Worsley3, Dan Bader3
1 University of Southampton, Southern Health NHS Foundation Trust, Southampton, United Kingdom
2 University Medical Center Utrecht, Utrecht, Netherlands
3 University of Southampton, Faculty of Health Sciences, Southampton, United Kingdom

Introduction: A multidisciplinary approach to pressure ulcer (PU) prevention is considered best practice, yet there is little research to support these recommendations in practice. Previous work, presented at the 2017 EPUAP conference, highlighted variability in approaches to team-based community PU practice, ranging from working in professional silos, multidisciplinary practice and, to a lesser extent, interdisciplinary practice.

An interdisciplinary approach may be described as an integration of practice to meet increasingly complex needs of changing patient demographics (Satin 1994; D'Amour et al 2005; Nancarrow et al 2013). It is considered crucial to achieve improved patient outcomes and is the focus of the current study.

Methods: Data from questionnaires, focus groups and interviews were coded to determinants of behaviour change to inform the content and format of an interdisciplinary training programme. This programme was designed to encourage community-based interdisciplinary working and feasibility has been tested in a single community team. A pre-post-test design was adopted using quantitative questionnaires to explore knowledge, attitudes and inter-professional team collaboration tools. Semi-structured interviews were also undertaken with a variety of healthcare staff to gain more insight into the barriers and facilitators to use of the training programme.

Results: The training programme was divided into two sessions, conducted on two separate days. Fourteen healthcare staff from one community team took part in the first session, including matrons, nurses, physiotherapists, occupational therapists and healthcare/rehabilitation assistants. Pre-post test scores indicate static knowledge, a small decrease in attitudes, and a small increase in team collaboration, suggesting that these outcomes may lack sensitivity to show a meaningful difference in a larger study. Interview participants were positive about its content and format particularly the facilitated group discussions. Questions were raised over the feasibility of applying such a programme in practice, due to staffing logistics.

Conclusion: A team-based training programme accounting for individual and team-related barriers and facilitators to PU prevention showed promise for encouraging interdisciplinary community practice. Participants highlighted organisational barriers to future implementation of the programme. Future work should explore the programme with a larger sample and different outcome measures.

References:
Introduction: As an ever-growing problem in all healthcare settings, pressure ulcers (PUs) affect patients, decreasing quality of life and increasing both healthcare costs and mortality [1]. Using novel movement sensor technology, in addition to sub-epidermal moisture (SEM) measurement, this study aimed to determine the contribution of mobility, activity, nutritional status and incontinence on the development of PUs.

Methods: A quantitative, prospective, non-experimental design was applied to gather data from an elderly population cared for in a long-stay setting. Following ethical approval, 150 participants were followed-up for 20 days. The chosen risk factors were mobility, activity, nutritional status and incontinence. Weekly MUST, Braden scores and continence observation, daily visual skin assessment (VSA) and SEM measurement 2 were recorded. Patient movement in the bed was also recorded using a movement sensor. This sensor records all movements, thus it includes slight movements and well as gross postural changes.

Results: The mean scores for participants’ continence (weeks 1, 2, 3, 4 = 91.33%, N=137), activity/Braden (week 1: mean: 14.10, SD: 2.99; week 2: mean: 14.15, SD: 2.96; week 3: mean: 14.11, SD: 2.93; week 4: mean: 14.02, SD: 3.02) and nutritional status (week 1, 2, 3, 4 = 0.99 SD: 1.47 min 0 max 5) remained unchanged over the 20 days. By using the mobility sensor, participants’ mobility scores varied from 1.11 movements per hour to 641.30 movements per hour. PU incidence was 12.7% (N=19) and these participants spanned both extremes of the mobility scores (low mobility and extremely high mobility). SEM measures indicated evidence of early pressure ulcer development on average 7 days (min 3; max 15) before the visual detection of PU (table 1).

Conclusions: The preventative strategies required for these 2 cohorts of patients might be different as one group may benefit from micromovements and dressings to protect exposed areas from sheer/friction. However, the other group almost certainly require enhanced repositioning strategies to ensure more effective PU prevention (picture 1).

References:

Table 1 Overview of the 19 participants that developed pressure ulcer during the study.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Gender</th>
<th>Age</th>
<th>Duration of PU</th>
<th>Mobility</th>
<th>Activity</th>
<th>Nutritional status</th>
<th>Continence</th>
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</table>

Figure 1 Different preventive measures for each cohort of patient based on their mobility.

LOW MOVERS

HIGH MOVERS / AGITATED

Interactions: Pressure redistribution
surfaces
Enhanced repositioning

Intervention:
Micromovement control
Protective dressings

P33: Pressure Ulcer Risk Assessment: Risk Factors and Risk Screening in Older Persons - A Validation Study

Aglécia Budri, Zena Moore, Declan Patton, Tom O’Connor
1 Royal College of Surgeons in Ireland, School of Nursing and Midwifery, Science Without Borders (Brazil), Dublin, Ireland
2 Royal College of Surgeons in Ireland, School of Nursing and Midwifery, Dublin, Ireland

P34: Improvement of Visual Differentiation Diagnostic Ability for the Pressure Injury of Nurses for Early Detection of Pressure Injury

Minkyung Kim, Kyuwan Boek, Kyung Min Kwon
1 Samsung Medical Center, Seoul, Korea, Rep. of South
[P35] THE SEQUENTIAL STEPS OF CONSERVATIVE-RECONSTRUCTIVE TREATMENT OF DIABETIC FOOT PRESSURE ULCERS

Panfilo Antonio Di Gregorio1, Brunella Ventura1

1 ASL 1 Abruzzo, Vulnology-Regenerative Surgery and Surgery Diabetic Foot-PHlebolymphology Center, Ospedale San Giovanni Battista, Chieti, Italy

Introduction: The term “diabetic foot” refers to the polymorphic disease that can develop at the foot of the diabetic patient, determined by incorrect load discharge, peripheral neuropathy, peripheral arterial occlusive disease, local or systemic infection, eventually affecting the bone. Diabetic foot ulcers (DFUs) should be placed among the most serious complications of diabetes and often result in major amputations.

In the treatment of Ischemic Diabetic Foot afferent to our observation, the primary option was revascularization by angioplasty or bypass, together with antibiotic therapy, swab guided biopsy for bacteria research and analgesic therapy.

Patients who could not go through revascularization due to severe comorbidities or high impairment of general condition were referred to a minimally invasive surgical treatment in order to avoid major amputations and to a conservative-reconstructive therapy in concomitance with an adequate medical therapy.

Methods: Excluding patients with critical ischemia undergoing major amputation, from October 2017 we treated 50 patients: 25 men and 25 women aged between 65 and 85 years with skin lesions. Our protocol — that includes the sequential use of hydrotherapy, traditional NPWT, disposable/portable NPWT, HBO (hyperbaric oxygen therapy outpatient), platelet gel and/or dermal substitutes in association with an adequate load discharge solution — determined the remission of the lesions.

Results: The treatment protocol we adopted, using the methods described, led to a faster progression to healing, a shorter recovery time and reduced costs of treatment.

References:

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[P36] THE USE OF MODERN TECHNOLOGIES BASED ON TELEMEDICINE IN WOUND CARE: EXPERIENCE IN HIGH-TIRRENIAN REGION AND THE DISTRICT OF COSENZA (CALABRIA - ITALY) ASP COSENZA, CAPT PRAIA A MARE, ADVANCED OUTPATIENT WOUND CARE CLINIC

Francesco Giacinto1, Ciro Falasconi1, Elisabetta Giacinto1, Manuela Germano1, Domenica Cufioletti1

1 Azienda Sanitaria Provinciale Cosenza, Cosenza, Italy
2 Azienda Sanitaria Locale Napoli 1 Centro, Outpatient Clinic for Chronic Skin Wounds, Napoli, Italy

Introduction: Chronic Skin Wounds (CSW) are a chronic illness affecting a large part of people forced to bed or home for disabling diseases; cure and care of this illness represent an important commitment both for human and economic resources of the health system, so it could become a threat to the sustainability of the system itself.

Methods: A telemedicine project was launched to cure patients affected by CSW remotely using tablets and a program (application, APP) for the management of pictures of wounds and of clinical data. A comparison was made for costs (number of home medical visits, mileage reimbursements) of the treatment of patients with CSW in two semesters: the first (April 2016 - October 2016) in which patients were followed in the traditional way and the second (October 2016 - April 2017) in which the Telemedicine project was used.

Results: The authors present the results of an experimentation carried out using technologies and tools of Telemedicine to highlight problems and needs in home care of CSW.

Data show the sharp decrease in the direct specialist/patient home visits with the use of tablets for telemedicine compared to those of the traditional home care model: reduction of physical distances between the user and the specialist, with consequent lower risk for the same and decrease of the kilometers traveled for the patient’s home meeting (i.e. decrease of the kilometric reimbursement indemnity). Total health expenditure of the NHS for home care of CSW, comparing the two periods, is reduced by € 40448. This amount, reduced by the teleconference costs totaling € 20425, shows an actual saving amounting to € 20023, which, calculated monthly, is € 2860/month.

Conclusions: Data obtained show that the use of the IT and Telemedicine tools in CSW care allows to obtain savings both for economics and spent time, with an improvement in the results and perceived quality of care.

For these reasons, this modern therapeutic approach can represent a secure resource for the sustainability of the system of treatment of this chronic pathology, worthy of further study.

References:
**[P37] ANTISEPTICS AND CONTROL OF BACTERIAL LOAD IN VENOUS ULCER**

Giuseppe Nebbio1, Ciro Falasconi1, Viviana Nebbio2, Francesco Petrella3

1 Azienda Sanitaria Locale Napoli 1 Centro, Centro Riparazione Tessutale, Napoli, Italy
2 Università degli Studi di Napoli Federico II, Facoltà di Farmacia, Corso di Laurea in Chimica e Tecnologie Farmaceutiche, Napoli, Italy
3 Azienda Sanitaria Locale Napoli 3 Sud, Centro Riparazione Tessutale, Avellino, Italy

**Introduction:** The healing of chronic skin lesions (LCC) occurs through the stages of hemostasis, inflammation, proliferation and remodelling and can be negatively affected by an increase in the bacterial load present on the lesion.

**Methods:** Twelve patients with LCC, of a venous etiology who had a delayed recovery despite a correct local therapeutic approach (WBP) with local signs of probable increase in bacterial load were included in the study. The lesions were medicated every day according to the following therapeutic scheme:

- Deterioration of the lesion bottom with a solution of polyhexamethylene biguanide (PHMB) and betaine
- Application of gauze soaked with polyhexamethylene biguanide (PHMB) and betaine left in situ for 10 minutes
- Iodic cadexomer in granules placed on the bottom of the lesion
- Protection of peri-wound margin with 10% zinc oxide paste
- Sterile gauze
- Multi-layer compression bandage with short stretch bandages

For the evaluation of pain, the numerical rating scale (VAS), a one-dimensional scale was used.

**Results:** Of the 12 patients enrolled in the study in 9 of them there was a progressive improvement of the lesion with a recovery of the repair process, with the disappearance of local signs of inflammation and the attenuation / disappearance of the symptoms of pain. In 3 of the patients examined, due to a worsening of the lesion, it was necessary to administer antibiotics, initially with an empirical therapeutic scheme and subsequently on the basis of the antibiogram after culture.

**Conclusions:** The arrest of the tissue repair process in a wound, treated according to the principles of wound bed preparation, can be linked to an increase in the bacterial load. The critical increase of colonies at the bottom of the lesion causes the appearance of initial and local signs of inflammation that can be considered as an alarm bell for an evolving infection. The use of antimicrobials based on PHMB + betaine and iodine cadexomer allows, in many cases, to control and reduce the increase of germs by acting as a starter for the resumption of the tissue repair process.

**References:**


**Introduction:** The increase in life expectancy has led to a simultaneous increase in chronic diseases with an increase in the associated health demand, however, to a decrease in economic resources. To overcome this situation, it is necessary to involve the care giver and the family in the health care process.

**Methods:** Engagement is a process that promotes the centrality and participation of the person in their health path, enhancing the choices they know, the welfare priorities also in the context of family life. To achieve the engagement it is important to improve the modalities of communication between doctor and care giver. The doctor must collect the medical history, provide answers and establish a relationship with the patient or family members. In the doctor-patient relationship, open questions should be asked to allow complex answers and the patient should be free to include in the dialogue the aspects that he considers important. The "Eco" technique consists in the repetition by the medical staff, in question form, of a word spoken by the patient and is an indirect way to make the patient understand that his words are heard. While in gathering information the patient is the issuer and the doctor the recipient, in providing information the roles are reversed. The content of the information passing from the doctor to the patient is often technical, which in itself is difficult to understand for the patient.

**Results:** A high level of patient engagement allows to reduce health expenditure by up to 21% (1) and increases the safety and the quality of life of patients (2).

**Conclusions:** To improve the patient's engagement, it is necessary to improve the communication tools. It is important to follow some fundamental rules such as: to speak slowly, to limit but to repeat the information with each visit, to avoid the medical jargon, to use the images to explain important concepts, to use written materials easy to read, to make the visit interactive, to evaluate the understanding.

**References:**

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**Introduction:** Pressure injuries continue to be a serious public health problem, even with the vast solutions that exist today for their prevention and treatment. The support surfaces are increasingly important for the prevention of pressure lesions.

**Methods:** A quantitative, descriptive and correlational study was conducted with the purpose to know the differences of the Incidence Rate of Pressure Injury (LPP) in patients using the viscoelastic foam mattress and the standard alternating pressure overlay mattress.

Performed between July 2015 and September 2016 with patients admitted to a medical service of a hospital in Portugal. Defined inclusion and exclusion criteria. Taking into account ethical-legal aspects. Applied a questionnaire that integrates sociodemographic data, Braden scale and factors intrinsic to the development of pressure injuries.

**Results:** The viscoelastic foam mattress was applied to 23 patients, and the overlapping mattress alternated to 30, the total sample being 53 patients. All patients had a Braden scale of less than 16. With regard to nutritional status, 90.2% sample has albumin values below the reference values. Of the sample, 41.5% of patients are at risk of malnutrition and 17% are malnourished. From the total sample, 1.9% developed not brittle erythema, corresponding to the appearance of 1 pressure lesion, in a patient who was applied the mattress in viscoelastic foam at the 12th day of hospitalization. He was malnourished, dehydrated, with a Braden scale score 11 on the 1st day and 10 on the 5th day.

**Conclusions:** There was a low incidence of Pressure Injury due to a team-wide effort in providing nursing care. However, there is awareness that some factors are difficult to control, and the incidence of Pressure Injury remains real.

**References:**
**[P41] IMPORTANCE OF INITIAL TRAINING IN NURSING IN THE ACQUISITION OF KNOWLEDGE AND SKILLS TO CARE FOR THE PERSON WITH WOUNDS**

**Luís Paiva**, Rogério Rodrigues, Verónica Coutinho, Nazaré Cerejo, Natalya Kachur

1. Nursing School of Coimbra, Medical-Surgical Nursing, Coimbra, Portugal
2. Nursing School Of Coimbra, Community Nursing and Family, Coimbra, Portugal
3. Nursing School of Coimbra, Medical-Surgical Nursing, Hospital Universitário de Coimbra, Coimbra, Portugal
4. Sanofi, Casa de Saúde de Santa Filomena Sa, Coimbra, Portugal

**Introduction:** In the area of the wound care, nurses must have specific skills to provide situation-appropriate care. Correct wound assessment and decision-making are essential, and initial training should enable the acquisition of knowledge (with a view to a more accurate diagnosis) to provide more appropriate interventions, translating into gains for patients, health services and society in general.

Although this is a current issue among the scientific community, over the last few years, national and international studies have found gaps in academic curricula, showing that initial training is not providing students with the skills required at this level. These gaps need to be further addressed with lifelong training or other levels of education.

**Methods:** An exploratory-descriptive study was conducted with the purpose of understanding how students perceive the knowledge acquired in the area of wound care and the contents taught in the classroom and in their internships. A questionnaire built for this purpose was applied to all fourth-year students of the Bachelor's Degree in Nursing of the Nursing School of Coimbra in the academic year 2013/2014.

**Results:** There are obstacles in particular the low workload and how it is taught the material that hampers the transfer of knowledge from the classroom to the real work context. Learning occurs primarily in clinical education.

**Conclusions:** We concluded that training should be improved by increasing the workload and adjusting the syllabus.

**References:**


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**[P42] INFLUENCE OF NUTRITION IN THE IMPACT OF PRESSURE ULCERS IN HOSPITALIZED PATIENTS**

**Nazaré Cerejo** 1, Luís Paiva2

1. Nursing School of Coimbra, Medical-Surgical Nursing, Hospital Universitário de Coimbra, Coimbra, Portugal
2. Nursing School of Coimbra, Medical-Surgical Nursing, Coimbra, Portugal

**Introduction:** The prevalence of PU affects the quality of life of the patient due to pain, treatments and prolongation of hospitalization time. Although immobility is frequently indicated as the main predisposing factor for the development of these wounds, there is also a causal relationship between them and nutrition. Inadequate nutrition increases the vulnerability of tissues to external factors. Objectives: to analyze the influence of nutrition on the incidence of PUs; to identify the relationship of nutritional factors with the risk of developing PUs; identify foods that promote skin integrity.

**Methods:** Literature review through the Scielo and Google Academic databases, using the key words: pressure ulcer, nutritional status, functional capacity and hospitalization. The last 5 years were defined as the time horizon. The research was carried out in January 2017. Of the articles obtained in full text, the two that answered the objectives were selected.

**Results:** The incidence of PUs in severely malnourished patients was 10 times higher than in patients with adequate nutrition, both functional capacity and nutritional status were associated with PUs. Consumption of several micronutrients, cal / kg of body weight and grams of protein / kg of body weight, was inadequate for most of the users included in the studies analyzed. An inadequate nutritional status, both for excess and for deficit favors the development of PUs. In both studies, zinc, calcium, vitamins A, C and E were inadequately ingested. These nutrients are found in nuts, fruit, milk, white meat and fish.

**Conclusions:** The evaluation of the nutritional status of the patient in the host and during the hospitalization, as well as the nutritional care provided by the professionals during the hospitalization, are factors that influence the incidence of the PUs. Inadequate nutrition contributes to the appearance and evolution of these wounds in hospitalized patients, so it is fundamental to know their nutritional particularities to act efficiently in the prevention and treatment.

**References:**


**[P43] SUSTAINING AN INTER-PROFESSIONAL PREVENTION PRESSURE ULCER GUIDELINE: THE UNIQUE ROLE OF NURSES**

*Eva Favre¹, Anne Fishman¹, Patrick François¹*

¹ Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland

**Introduction:** The occurrence of pressure ulcers in intensive care units is higher than in other wards (1, 2). In our service, the annual prevalence rates have reached up to 63%, three times higher than in scientific reports. Diminishing this rate is imperative for our patients but represents quite a complex challenge. Pressure ulcers are considered as a nurse-sensitive indicator. Nevertheless, in intensive care units, patient acuity leads our team to focus on coordinated and collaborative ways of making teamwork efficient.

**Methods:** In 2013, guidelines to prevent pressure ulcers were implemented in the intensive care unit of our tertiary hospital. The following annual prevalence result was encouraging but the effect was not long-lasting. Sustainability was re-thought in response (3). The main work has consisted in enhancing a straight clinical patient follow-up by the nurse managers, the CNS and the champion nurses. Each of these supports the interprofessional team working at the patient’s bedside. Every week a peer review meeting is organized to report clinical cases.

**Results:** The annual prevalence of hospital-acquired pressure ulcers decreased from 63% to 27% in 2016 (3). We continue to measure pressure ulcers through a 1-month prevalence and a 6-month incidence. A quality board has been created to encourage delivering an aggressive prevention strategy.

**Conclusions:** Implementing guidelines implies comprehensive support of the management team to the bedside team. Positive outcomes cannot be maintained without the implication of each and every professional.

**References:**


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**[P44] SUCCESSFUL APPLICATION OF NPWT AND BIOACTIVE DRESSING COMPOSED OF HYALURONIC ACID AND COLLAGEN IN THE TREATMENT OF COMPLEX HEEL PRESSURE INJURY**

*Elena Tomo¹, Valentina Yanzii²*

¹ Independent Tissue Viability Consultant, Italy
² Bambino Gesù Children’s Hospital, Center of Excellence for Nursing Scholarship, Rome, Italy

**Introduction:** Negative Pressure Wound Therapy (NPWT) is a therapeutic technique which involves the application of subatmospheric pressure to promote healing in acute or chronic wounds. It has many advantages because it provides a temporary wound cover and a moist wound environment, accelerates patient mobility, improves pain management, increases dermal and wound perfusion, stimulates the formation of granulation tissue and enhances wound bed reepithelialization. NPWT has so far been delivered mainly via open-cell polyurethane foam, but increasing interest has been directed toward delivering NPWT via bioactive dressings. Bioactive dressings deliver substances active in wound healing either by delivery of bioactive compounds or by being constructed from materials having endogenous activity. Bioactive dressings composed of hyaluronic acid (HA) and collagen may be tested to enhance the activity of NPWT.

**Methods:** A clinical case study is reported and discussed. A 90-year-old male, sustained a stage 4 pressure injury on her left heel, with undermining and exposed bone devoid of periosteum. Her medical history included cognitive impairment, impaired mobility and chronic venous insufficiency. The patient and wound assessment (TOVEN Method) showed: Barthel Index 20/100, Braden Score 12/23, MNA 19/30, BMI 21.4, Hb 10 g/dL, Albumin 2.60 g/dL, PAINAD score 3/10. After the unsuccessful application of antimicrobial dressings and due to the need to protect the exposed bone devoid of periosteum, the NPTW was applied (maximum pressure ~80 mmHg/minimum pressure -20mmHg) with a bioactive dressing composed of HA and equine collagen.

**Results:** The combined use of NPWT and bioactive dressing (HA and collagen) promoted the wound healing process and enhanced the protection and regeneration of damaged periosteum in 45 days.

**Conclusions:** NPWT has increased in popularity over the past twenty years. While many research studies have shown evidence that it improves wound healing, research is ongoing to determine the most efficient wound dressings’ combination and the strength and length of therapy for specific wound types. To the best of authors’ knowledge, the application of NPWT and bioactive dressing composed of HA and collagen has not yet been reported. This combination may represent a valid option for the treatment of complex wound with exposed bone devoid of periosteum.

**References:**

Introduction:
Medical devices related pressure injuries (MDRPIs) are a minor but not negligible aspect of medical practice due to the increasing use of medical devices and their potential risks. Pressure injuries (PIs) are a significant problem in medical care, particularly in the intensive care unit (ICU) setting, affecting up to 18% of the population [1]. The identification and prevention of these injuries are crucial to maintain patient safety and reduce healthcare costs.

Methods:
We conducted a retrospective analysis of PI cases that occurred in our ICU from January 2017 to December 2019. We identified all patients who developed PIs during their hospital stay and assessed the incidence and characteristics of these injuries.

Results:
A total of 132 patients developed 187 PIs during their stay in the ICU. The most common sites were the heel (61%), followed by the sacrum (22%) and the trochanter (17%). The incidence of PI was higher in patients with chronic conditions such as diabetes (30%) and chronic kidney disease (20%). The use of medical devices, particularly those related to ventilator care, was associated with a higher risk of developing PIs.

Conclusion:
The incidence of PI is high in the ICU setting, particularly among patients with chronic conditions. The use of medical devices should be carefully monitored to prevent the development of PIs. Further research is needed to develop effective strategies for the prevention and management of these injuries.

References:
**[P47] DIABETIC FOOT OFF-LOADING A COMPLEX ASSESSMENT**

**Fabrizia Toscanella**

1  Luigi Di Liegro Hospital, Rome, Italy

**Introduction:** Offloading is the basic treatment of the neuropathic foot. This can be achieved both with specifically designed footwearing and personalized insoles of different materials and designs which have been the subject of various and sophisticated biomechanical research in recent years. There is still lack, however, of a strong rationale and of shared international guidelines. As the foot is the target of diabetic neuropathy-induced muscle imbalance and disorders of proprioception, we focused our attention on the dynamic relationships between the foot local changes caused by neuropathy and the whole organization of gait and posture. Possible neural-muscular-skeletal comorbidities, including the behavioral aspects, which inexorably affect posture and biomechancis, complicating the clinical conditions, have been taken into consideration.

**Methods:** We are currently studying for the purpose of offloading orthotic design 18 patients of both sexes in secondary prevention. In addition to the most sophisticated diagnostic tools, we reserved a primary attention to a systematic clinical examination of the postural layout and of the gait, performed by a neurophysiatric specialist who evaluated the patient in its entirety and complexity. Due to the high complexity of the interactions we needed a tool that could highlight and quantify these interactions. We then implemented, with the help of the physiatrist, a multidimensional assessment ad hoc form is formulated, including the whole spectrum of the problems ranging from the metabolic to the relational ones.

**Results:** We found that this approach was able to detect factors that are undervalued or not detected by a standard approach (for example concomitant disorders of the muscular-skeletal system), allowing to group patients into (dys)functional categories, and so providing more precise information for offloading. It also highlighted in particular the need to activate global neuromotor rehabilitation programs to restore the most suitable postural alignment and the best organization of gait, even with the help of the emotional support.

**Conclusions:** The Physiatrist or Neuro-physiatrist, together with the Psychologist, should then always be present within the team involved in the design of the offloading devices.

**References:**


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**[P48] ECMO IN PAEDIATRICS: PRESERVING SKIN INTEGRITY**

**Charlie Beetham**, Sergio Filippelli, Mario Zama, Guido Ciprandi, Antonio Amodeo

1  Bambino Gesù Children’s Hospital, Rome, Italy
2  Bambino Gesù Children’s Hospital, Division of Cardiothoracic Surgery, Rome, Italy
3  Bambino Gesù Children’s Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy

**Introduction:** Hospitalization costs for children supported with ECMO are strongly increased by severe associated wounds even due to forced immobility. These lead to a longer stay, an increased patient’s mortality, pain and distress as well as can be a source of parental anxiety.

Due to a fundamental role played by a pressure ulcer prevention, here is discussed a specific list of measures in preventing ECMO associated sores in pediatric patients, often multiple and occurring at various body sites.

**Methods:** Since January 2016, children on ECMO treatment were submitted to an accurate preventing protocol in order to avoid pressure injuries. No distinction is done between Veno-arterial and Veno-Venous types.

**FACTORS THAT CONTRIBUTED TO LOWER THE OCCURENCE OF PRESSURE SORES**

1. Sharing the child’s full assessment
2. Preventing severe hypotension in the operating theatre setting
3. Special and tailored Rotational Protocol
4. Increasing off-loading
5. Limiting the use of vasopressor drugs

**Results:** Totally 26 patients were included in the preventing protocol. After the first year of application, we recorded an important reduction of pressure sores from 65% to 18.7% (12 patients), this rate resulted improved after 18 months follow-up period to 15.5% (14 patients).

**Conclusions:** Preventing protocol aimed at preserving skin integrity in patients receiving ECMO treatment should consist in:

1. Observe children’s features every 24 hours
2. Maintain the rotational protocol during surgery
3. Discuss immediately after OR skin conditions, preventing measures for post op
4. Check of hemodynamic parameters every 2 hours
5. Mind of the turnover: tubes, off-loading, positioning every 6hs/ day
6. Discuss the best dressing to be applied on different skin body areas

**References:**


Mauro Pace1, Monica Rossi1, Marco Cecchi2, Claudia DeSantis1, Charlie Beetham1

1 Bambino Gesù Children’s Hospital, Rome, Italy

Introduction: Septic children require intensive care due to their critical conditions. Incidence, etiology and pathogens of sepsis in paediatrics are specific for different ages, comorbidity but common for all is the high risk of developing pressure sores. Paediatric pathologies leading to sepsis typical of this age are: birth acquired infection, NEC, pneumonia, congenital malformations, congenital immune deficiency, genetic diseases, infection diseases. Others are common to adults’ age: meningitis, onco haematological diseases, transplantation, major surgery, immunosuppressive therapies, CVC, burn injuries, major trauma. Skin integrity in these patients is undermined by poor peripheral perfusion, haemodynamic instability, thermoregulation impairment, kidneys failure, bacterial translocation. Frequently due to critical conditions, skin breakdown preventing measures are undervalued leading to pressure related wounds representing and increased risk of mortality and scarring sequelae of survivors. The aim of this study is exploring wounds typical of septic children, applicable preventing strategies consisting in a multidisciplinary approach.

Methods: Since January 2017, from 625 admissions in PICU, just the septic cases were enrolled in our multidisciplinary preventing protocol.

For each patient “from head to toe skin assessment” was performed together with photo pic at T0 (admission), then at T1 (24h) then daily. Critical risk factors as: surgical wounds, other infected wounds, saturation, perfusion, nutrition, haemodynamic instability, PEEP, blood pressure, corticosteroids, antibiotic or immunosuppressive therapies are underlined and multidisciplinary meetings planned. Off-loadings of critical body site prescribed and checked every 6 hours. Interventions and prescriptions are shared thanks to an intranet institutional counselling programme.

Results: In 2017, 118 patients (18.9 %) of 625 admitted to PICU areas were included in the study. Mortality was 23.8%. Pressure ulcers incidence was 15.7% but it was higher in patients not surviving to sepsis (26%). 87% of pressure injuries were staged grade 1, 13% grade 2. No unstageable sores occurred. Multidisciplinary collaborations brought to measures aimed at reducing risk factors in 93% of cases.

Conclusions: In a view of a continuous improvement of care assistance, multidisciplinary approach is mandatory to preserve skin integrity in complex septic paediatric patients.

References:


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**[P50] One Dressing to Manage Two out of Four in Time**

Roberto Cassino

1 Città Studi Clinical Institute, Diabetic Foot and Vascularity Center, Milan, Italy

Introduction: Modern wound care is essentially based on the principles of WBP and TIME [1]. It’s impossible to manage the whole healing process using only one dressing, but we try to manage more items with the same product to make easier the patient’s life and our job. Aim of the work is to demonstrate the effectiveness of a hydrofiber and polyurethane foam dressing [2] in the management of two items of TIME: exudate control (M) and epithelialization (E).

Methods: The study involved 30 patients with medium/heavy exuding sacral pressure ulcers (no necrotic, no infected). The treatment protocol consisted of applying the dressing on the lesions, after cleansing with chloroxidating solution (hypochlorite 0.05%), every 48-72 hours, according with the exudate amount. The effectiveness evaluation was based on the integrity of the wound edge, the absence of maceration, the good quality of the skin surrounding the wound and, obviously, the area reduction, after an observation period of 4 weeks.

Results: The results showed effectiveness in all treated patients, especially in terms of good quality of the perilesional skin, the wound edge was active and clean without maceration signs and the area reduction was more than satisfactory, according with the Sabolinski-Falanga healing rate [3].

Conclusions: The dressing target has been achieved in all cases we’ve treated and it demonstrated to be really effective in the management of the items we considered: M (osture) and E (dgel). The dressing also demonstrated to be a very good protection against the bacterial colonization; even if we treated only sacral bedsores, we had no infections. Another significant feature is the prolonged wearing time: the mean frequency of dressing change was 2.8 days.

References:


[P51] AN OFF-LABEL INDICATION OF A COLOSTRUM ENRICHED HYALURONATE CREAM

Roberto Cassino¹

¹ Citò Studi Clinici Institute, Diabet Foot and Vascular Center, Milan, Italy

Introduction: When IAD (Incontinence-Associated Dermatitis) is not well managed, in most cases there is the development of a superficial necrotic tissue [1]. With this work we want to demonstrate that a non-bloody procedure is possible to remove non-viable tissues using an off-label indication of a colostrum enriched cream.

Methods: The study, still ongoing, will involve 20 patients with superficial necrotic wounds due to the IAD necrotic evolution. All enrolled patients have a local treatment consisting in the application of a colostrum enriched hyaluronate cream covered by moist guazas. Dressing change every 48 hours. The target is to achieve the complete debridement within 8 weeks (end of observation period). Obviously, every patient has a good antidecubitus mattress and a personalized prevention program. Patients with a low nutritional status, cachexia and neoplasms have been and will be excluded.

Results: At the moment we have five patients in treatment and seven concluded the study; five of them achieved the complete debridement and one completely healed within the observation period. Only one patient didn’t achieve the target, but the wound improved.

Conclusions: Colostrum, a nutrient-rich fluid produced by female mammals immediately after giving birth, contains significant quantities of complement components that act as natural anti-microbial agents and have remarkable muscular-skeletal repair and growth capabilities. Colostrum growth factors promote wound healing with practical implications for trauma and surgical patients and have multiple regenerative effects that extend to all structural body cells [2]. Maybe the hygroscopic, regenerative and structural properties of hyaluronate contribute, with colostrum, to the removal of non-viable tissues with the contemporary wound healing. This off-label indication is really very important because allows the good management of IAD even if there’s already necrotic areas to treat.

References:

[109]

[P52] TECHNOLOGY DEBRIDEMENT: A NON EXUDING PROCEDURE IN SLUGGY DEEP BEDSORES

Roberto Cassino¹, Agnieszka Kapnika²

¹ Citò Studi Clinici Institute, Diabet Foot and Vascular Center, Milan, Italy
² Helopilis Nursing Home, Binazao (Milan), Italy

Introduction: In case of sluggy deep bedsores we usually use collagenase or hydrogels to achieve an effective debridement (proteolytic debridement using collagenase, autolytic debridement using hydrogels). The common feature of both treatments is the exudate increasing, due to the lytic processes. Very often we achieve the sluggy tissue removal with collateral damages: maceration of the wound edge and, sometimes, also of the perilesional skin. With this work we want to show that there’s a technological dressing that allows to debride sluggy tissues without exudate increasing, even controlling and reducing it.

Methods: We enrolled 12 patients with deep sluggy sacral and ischiatric pressure ulcers, with medium/heavy exudate. We treated them with an innovative technology2 desloughing fibers dressing that can absorb a wide quantity of sluggy exudate, removing non-viable tissues very quickly.3 With this rope shaped dressing we filled the wound; then we used polyurethane foam as secondary dressing. Dressing change according the exudate. We evaluated the dressing change frequency, the time to achieve the complete debridement and the wound edge and perilesional skin situation at the goal reaching.

Results: All patients had a satisfactory debridement within 5 weeks; 4 of them within 3 weeks. The mean healing time was 3.3 days. No perilesional skin damages, nor maceration of the wound edge. No adverse reactions/allergies. No signs of infection or critical colonization. Patients didn’t report any disturbance or any unpleasant feeling of malodor.

Conclusions: The innovative technology2 is the ultimate technique to debride sluggy wounds. These desloughing fibers allow to achieve a good and effective debridement, avoiding the collateral damages of proteolytic and/or autolytic debridement. So we can conclude that, in addition to the autolytic and proteolytic debridement, there is a “technolytic debridement” to remove the sluggy tissue without maceration problems.

References:
[2] TIC technology
[P53] RE-HOMING OF A WOUNDED ELDERLY PATIENT: CHECK LIST FOR A CAREGIVERS RELIEF

Marilena Palma1, Marilena Tender1, Giampiero Bramuro1, Giovanni Luigi Solito2, Gennaro Chiarolanza1, Serena Crucianelli3

1. Centro Neuros Orto, Rome, Italy
2. Marina (Rome), Italy
3. Bambino Gesù Children’s Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy

Introduction: Two millions people in Italy are estimated to be affected by pressure injuries. Moreover, 8% of hospitalized patients present at least one pressure injury at discharge. After re-homing, caregivers are responsible for the management of wounded, sometimes chronic ill relatives. Moving through these disorienting and confusing moments, guaranteeing the best re-homing until and after the activation of community based care nursing services and medical supplies, is frustrating and discouraging. Normally, the wound specialized nurse is the first figure contacted right before discharge. A check list of “things to do” and a summary clinical home chart, can help carers in planning home care. The aim of this study is to assess the impact and efficacy of introducing a check list for caregivers together with a home clinical chart to be consulted by specialists attending the patient. Results are evaluated in terms of carers’ feelings about re-homing before and after the use of the chart, other specialists involved in home care and patients’ outcomes.

Methods: Caregivers of re-homed patients treated since July 2016 by 4 wound care nurses and 3 wound care clinicians were provided with a check list of necessities for rehoming and a home clinical chart. Any comorbidity was accepted. Data obtained from carers’ interviews and from hospitalization documents are collected and used by the wound care nurses and physicians to compile both documents.

Results: In 18 months, 27 patients were re-homed and included in the study. Their relatives used the check list constantly for an average time of 58 days, then occasionally consulted for specific data (sizing of devices, date of changes, specialist’s phone number). Specialists referred to the home clinical chart at every visit, reporting their satisfaction in assessing easy and globally the patients. Patient readmission’s for emergency were 2 (kidneys failure, pneumonia), wounds healed within 4 months, no new pressure sores occurred.

Conclusions: Taking charge of wounded, chronically ill patients is optimized by the use of a check list and a home chart, resulting as feasible tools to guarantee a continuity hospital-community-based care assistance. Tools necessitate to be implemented and improved.

References:

[P54] INVITRO EVALUATION OF A SILICONE ADHESIVE FOAM DRESSING IN THE MANAGEMENT OF PRESSURE, FRICTION AND MICROCLIMATE

Daniel Parker

1. Syagenix, an Acelity Company, Skipton, United Kingdom

Introduction: Pressure ulcers are localised injuries to the skin and underlying tissues that typically occur over a bony prominence, such as heel or sacral regions, as a result of pressure and/or shear forces. Risk factors associated with the development of pressure ulcers include pressure, shear, friction, and microclimate. There is increasing consensus that the prophylactic use of dressings, alongside standard pressure ulcer prevention protocols, may aid in the prevention of pressure ulcers by mitigating these risk factors.

This study aims to assess the effect of a new silicone adhesive foam dressing2 on the risk factors associated with pressure ulcers; pressure, shear, friction, microclimate.

Methods: A standard in vitro method to determine the coefficient of friction was modified to measure the friction of a dressing’s movement against clothing or bed sheets. Another in vitro method was developed to map the pressure distribution across the dressing when a clinically relevant pressure was applied to the dressing. The ability of the dressing to control the microclimate was also assessed by measuring the moisture vapour transmission rate (MVT).

Results: The silicone adhesive foam dressing significantly reduced pressures applied in the in vitro model compared to when no dressing was in place, and was equal to other multilayer polyurethane foam dressings. It also measured a comparable coefficient of friction to comparator dressings. The MVT was also found to be comparable to other commercially available dressings.

Conclusions: These evaluations demonstrate the potential of the silicone adhesive foam dressing2 to help mitigate some of the risk factors associated with pressure injuries. However, the studies also show that there is no single silicon foam dressing which provides a significant difference in pressure or friction reduction when tested in vitro.

References:
**[P55] PEP PREVENTION EMERGENCY PROJECT**

**Jenny Delin**, Nina Lahti, Caroline Kevin

1. Karolinska University Hospital, Functionarea Emergency Department, Stockholm, Sweden
2. Karolinska University Hospital, Center For Innovation, Stockholm, Sweden

**Introduction:** Prevention Emergency Project-PEP: Ulcer prevention, of course we can start already at the Emergency Department, with easy assessment guidelines and user friendly tools.

We know that the largest patient group in the emergency departments (ED) is elderly patients, often with multiple diseases. These patients are at high risk to develop pressure ulcers, especially if they have prolonged ED visit time.

Studies show that a combination of early risk assessment together with the use of sacrum and heel dressing and other preventive interventions reduces the appearance of hospital acquired pressure ulcers (1).

The aim is to pilot test an intervention focusing on early detection of and preventive treatment for patients at risk for pressure ulcers.

**Methods:** Data collection took place 171113-180206 at the ED in university hospital in Stockholm, Sweden.

Patients with suspected hip fracture, patients over 75 years, and one of the following criteria, malnutrition, immobility and/or reduced general condition were eligible for participation. Inclusion was determined by the registered nurse in the ambulance or at ED triage.

Patients were included consecutively during the study period and following consent for participation randomized to control or intervention group. The intervention consisted of a prevention mat, heel and sacrum dressing and proper patient turning and position. The control group received standard care.

**Results:** 400 patients were included, 200 in a control group and 200 patients received prevention intervention. During the project, health care professionals have been trained in PUP and gained more insight into the importance of regular repositioning, using sacrum and heel dressings with preventive evidence. We see improved preventive care of the patient including repositioning.

**Conclusions:** A completely new model for EDs and acute inpatient care that enables early and simple supportive aids to prevent pressure injury/pressure ulcers associated with in-patient care has been established.

The project has contributed with important knowledge about feasibility on performing an intervention study in the ED. Lessons learned will be used in a future research project on prevention of pressure ulcers in the ED and in a new working model at the ED.

**References:**


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**[P56] MANAGEMENT OF PRESSURE ULCER WITH TOPICAL PHARMACEUTICAL COMPOSITION CONTAINING AS ACTIVE INGREDIENT A MIXTURE OF POLLEN EXTRACT AND UNSAPONIFIABLE FRACTION OF WHEAT GERM, SOYBEAN AND OLIVE OIL: DATA ON A PERSONAL SERIES ON THREE YEARS**

**Alessandro Ragno**, Daniele Marsili, Francesca De Filippis, Antonello Silvestri, Anna Crisanti, Emanuela Cavallaro, Cristina Latin, Angelo Emanuele Catucci

1. Regina Apostolorum Hospital, Unit of Internal Medicine, Albano Laziale (Rome), Italy
2. Regina Apostolorum Hospital, Unit of Pulmonology, Albano Laziale (Rome), Italy
3. Regina Apostolorum Hospital, Unit of Clinical Laboratory, Albano Laziale (Rome), Italy
4. Regina Apostolorum Hospital, Unit of Internal Medicine, Sapienza University of Rome, Department of Pediatrics, Rome, Italy

**Introduction:** Pressure Ulcers (PU) have high impact on social health (1). While current therapeutic agents are generally inadequate in efficacy and numbers of adverse effects, the natural remedies are well known for their abilities to promote wound healing without side effects (2). This study assesses the effectiveness of a topical composition containing a mixture of pollen extract and unsaponifiable fractions of vegetable oils on ulcers healing (3).

**Methods:** We treated PU with an original topical pharmaceutical composition containing as active ingredients, a mixture of pollen extract that comprises proteins, mucoid, pentosans, vitamins, oligoelements, water, C27, 29 sterols and vegetable oil unsaponifiables particularly of wheat germ, soybean and olive, in combination with other active principles having a function of complementary and supplementing function, such as zinc oxide, salicylates, collagen and heparinoids. Besides, the weight percentage of the mixture is not critical, it can range within wide limits in line with the chemical-physical characteristics of the formulation (3).

We included 7 males and 5 females from June 2014 to June 2017 (Age: 82.2 ± 8.7 years, mean ± SD) suffering from PU in different places. The PU and surrounding healthy skin were treated topically with the original composition twice daily. The pain was evaluated during formulation application by Visual Analog Scale (VAS) and time to complete closure was recorded. Adjuvant systemic therapy was administered when indicated.

**Results:** The pain VAS scores were 8.8 ± 1.1 before initiation of the local therapy and 1.9 ± 0.8 at the final visit. The time to complete healing of the PU was 50 ± 13.7 days. Antihypertensive therapy, antibiotics, diuretics, acetilsaliclyc acid, low molecular weight heparin, oral anticoagulant, and albumin were given during the study period.

**Conclusions:** In all cases was documented the rapid resolution of lesions with function recovery and normalization of general conditions of the patients. Treatment of PU with the topical pharmaceutical composition (3) was effective and quickly resolved the skin lesions. Controlled studies are needed to confirm our preliminary findings.

**References:**

**P57** THE CLINICAL PRACTICES IN TREATING HEEL PRESSURE INJURIES: A NATIONAL SURVEY

Matteo Martinato¹, Massimo Rivolo¹, Laura Stefanon¹, Claudio Quarto¹, Fabio Bellini¹, Enza Maniaci¹, Luisa Pinelli¹, Raimondo Arena¹, Luciano Allegritti¹, Annalisa Mascatelli¹, Valentina Vanzi¹, Nella Liparace¹, Valentina Guidi¹, Battistina Paggi¹, Anna Lago¹, Rossana Bonelli¹, Raffa Masiero¹, Rosa Rita Zorza¹

¹ Associazione Infermieristica Per Lo Studio Delle Lesioni Cutanee, Italy

**Introduction:** Heel pressure injuries (PIs) are the second most common site for pressure ulceration. Their prevalence varies widely depending on the characteristics of the examined population, ranging from 7.3% to 18.2% in the adult setting. Overall, heel PIs account for up to a third of all documented PIs.

The purpose of this survey is to collect and analyse data on the diagnostic/therapeutic pathways in this specific area to understand the state of the art of the clinicians involved in the assessment and treatment of heel pressure injuries with the intention of organising an International Consensus Conference on this specific topic.

**Methods:** The observational cross-sectional study has been delivered by a national online questionnaire. AISLeC, the Italian Nurses’ Association for Wound Care has promoted this survey using its institutional website, newsletters and inviting the main national stakeholders.

The clinical questions we investigated were: vascular assessment, local treatment, offloading devices, referral criteria and the usage of biological agents.

**Results:** The questionnaire has been filled in by 600 clinicians in a 4-week period, between February and March 2018. The clinical practices are extremely heterogeneous and the categories within the clinicians (doctors, nurses...) or the received training do not show different ways of treating the heel pressure injuries, apart from the wide use of medical devices for the vascular assessment by the wound care specialist nurses.

A huge discrepancy has been noticed between some clinical recommendations and the guidelines issued by EPUAP.

**Conclusions:** The results will be used to define the clinical questions to organise the AISLeC consensus conference promoting evidence-based recommendations for the assessment and management of heel pressure injuries.

**References:**


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**P58** PROSPECTIVE OBSERVATIONAL STUDY ON PRESSURE INJURY PREVENTION IN PATIENTS USING AN ALTERNATING-PRESSURE MATTRESS OVERLAY (APMO): THE MATCARP PROJECT

Sylvie Meaume¹, Marc Marty²

¹ Hôpital Rothschild, Paris, France
² Clinical Research Department, Nucleus, Paris, France

**Introduction:** Specialized pressure-relieving supports (i.e. beds, mattresses, cushions) aim to reduce or relieve the interface pressure between the skin and support surfaces in patient at risk of pressure injury (PI) formerly known as pressure ulcer.

**Methods:** This prospective observational study with a 35-day follow-up period was conducted in patients at high risk of PI (Braden score between 10 and 15) and free of PI at baseline. To participate, patients had to be bedridden from 15-20 hours per day and lying on an APMO 1. The care team monitored the patients regularly throughout the study. The primary end point was the percentage of patients in whom a PI (sacrum, ischium, back bone, heels) appeared. Secondary endpoints were the patients’ satisfaction with the comfort of the APMO, patient acceptance of the sound level of the APMO and the care team’s assessment of the use of the APMO and the moisture level. Eighty patients were enough to demonstrate, with a power of 80%, an upper limit of less than 20% of the bilateral 95% confidence interval (95% CI) of the percentage of patients with at least one PI during the study. In case a premature withdrawal of the study each patient was assessed kept in the analysis.

**Results:** 83 patients were included. Main cause of the reduced mobility was neurological disease (53.7%). 10 patients (12.0%) dropped out of the study: 1 patient for a serious adverse event (femoral neck fracture) considered as not related to the APMO, 4 patients for adverse events (2 of which were considered as related to APMO), and 5 for other reasons, including in one case discomfort with the APMO. The percentage of patients in whom a PI (sacrum, ischium, back bone, heels) is appeared over the 35-day period was 1.2% (1/83) (95% CI 0.03% to 6.53%). (1 sacral PI of stage 2 is appeared in a 78-year-old man suffering from level D12 paraplegia). Secondary endpoints were considered satisfactory for most patients or by the care team.

**Conclusions:** This non-comparative study was sized with a performance objective and conducted in patients at high risk of PI and free of PI at baseline. The study highlighted a very low incidence (1.2%) of PI when patients were lying on an APMO for between 15 and 20 hours per day.

**References:**

[1] IMI 00A EVO, manufactured by Pharmost Med Realisations SARL, 2 Rue Saint-Couban, 35540 Miniac-Morvan, France.
PRESSURE ULCERS AND THE ROLE OF THERAPY IN MANAGING PRESSURE

Heena Mahmood
Mid Yorkshire NHS Trust, Wakefield, United Kingdom

Introduction: Pressure ulcers are one of the largest yet burdens of the NHS with secondary complications being potentially life-threatening and even result in mortality. Pressure ulcers cost the NHS over £1 billion, increases the length of hospital stay and has a profound effect on social, emotional and physical life. Traditionally, pressure ulcers have been recognised as a nursing need; however this presentation outlines the role of therapists in management of pressure ulcers. Since presenting to inpatient therapists, there has been considerable response in empowerment of therapists to manage pressure ulcers through education and awareness for patients. Therapists also achieved greater understanding of appropriate equipment needs which can be identified by therapists. This presentation therefore outlines the role of therapists in understanding, assessing and managing pressure ulcers through assessment, education and awareness.

Methods: Educational awareness through presentation, followed by completion of a feedback form.

Results: Positive feedback from therapists who reported increased confidence in management of pressure ulcers, increased knowledge and awareness of pressure relieving equipment. Greater understanding of importance of educating patients on self-management of pressure ulcers.

Conclusions: This presentation was delivered to 15 physiotherapists and occupational therapists. Feedback from attendees included greater understanding and awareness of pressure ulcers and also greater confidence in contributing to management of pressure ulcers. Attendees felt this presentation should be delivered to all frontline staff, and feel more confident in providing service users with management and educational advice and awareness to manage their own pressure ulcers risk.

References:

OUTCOME SERIES OF PRESSURE ULCER RECONSTRUCTION AT A UK NATIONAL SPINAL INJURIES CENTRE

Paul Caine, Suki Gahunia, Ali Arnaout, Justin Conrad Rosen Wormald, Salma Elamin, Alexandra Murray
Ski Mandeville Hospital, Department of Burns & Plastic Surgery, Aylesbury, United Kingdom

Introduction: There are over 40,000 people with spinal cord injury in the United Kingdom, with an annual incidence of 16 new cases per million. Spinal cord injury patients are at high risk of pressure ulcers. The management of these complex wounds is challenging, costly and requires multi-disciplinary approach from the outset.

We present a single-centre experience of the management of pressure ulcers at a tertiary plastic surgery unit co-located with a National Spinal Injuries Centre.

Methods: A retrospective review of cases from January 2015 to January 2017. Data were extracted for patient demographics, co-morbidity, pressure ulcer characteristics, operative management and outcomes.

Results: Sixty-nine patients with 87 pressure ulcers were included. Twenty-five patients (36%) suffered cervical spine injury with the remainder sustaining thoracic (54%) and lumbar injuries (10%). Grade of pressure ulcer was documented for 71% of the cases with 60% being grade 3 or 4. Anatomical location of sore was documented in 84% of cases with 36% of the ulcers being ischial, 32% sacral, 23% trochanteric and 9% with an undefined anatomical site.

11% were managed conservatively, 17% underwent debridement and vacuum dressing and 31% were excised and closed directly. 42% were managed with 2-staged reconstruction with pedicled flaps.

The most commonly used flaps were the posterior thigh flap in 41% of cases and the Superior Gluteal Artery perforator flap (SGAP) in 37%. 11% underwent reconstruction with a Tensor Fascia Lata flap (TFL). Other flaps included a pedicled antero-lateral thigh (ALT) and inferior gluteal artery perforator flap (IGAP).

Complications were seen in 13% (11/87) of the ulcers and these included, infection (36%), wound dehiscence (18%), flap suture line dehiscence (36%) and venous congestion in 9% of cases. Only 8% (7/87) ulcers required a return to theatre. All flap suture line dehiscence was seen within 4 weeks of initial surgery; 50% (2/4) was seen in posterior thigh flap and 1/4 (25%) in the SGAP and 1/4 (25%) in the TFL flap.

Conclusions: The management of these complex wounds in spinal injury patients requires specialist input both pre- and post-operatively to optimise conditions for wound healing and tailor the reconstructive approach (when needed) to the needs of individual patients. Higher recurrence rates were seen in the cohort of patients who had delay to plastics input. This highlights the need for a truly multi-speciality and early approach, with patient and family involvement to tailor management plans appropriately.

References:
[1] VAC
**[P61] THE MEDICAL AND NURSING ADVICE IN WOUND CARE AS STRATEGY IN THE MANAGEMENT OF THE PREVENTIVE AND THERAPEUTIC PATHWAY OF THE PATIENT WITH PRESSURE ULCERS**

Francesco Uccelli, Salvatore Panduri, Marilena Pradal, Monica Scateni, Marco Romanelli

1 Azienda Ospedaliero-Universitaria Pisana, Direzione Infermieristica, Pisa, Italy
2 Azienda Ospedaliero-Universitaria Pisana, Department of Dermatology University of Pisa, Pisa, Italy
3 Azienda Ospedaliero-Universitaria Pisana, Direzione Infermieristica, Pisa, Italy

**Introduction:** In medical facilities, the opinion of specialist doctors (dermatologist, plastic or vascular surgeon, diabetologist) is often requested to identify the best way to prevent and treat pressure ulcers; sometimes, however, in the face of careful and scrupulous consultation, the correct adoption and constant compliance with the indications provided are not always followed by the staff of the ward.

The objective to be achieved is to build a path of surveillance and monitoring of the lesion up to the discharge or recovery of the patient that goes beyond the first medical-nursing consultation and that allows to provide the correct indications to the care team to highlight any training gap within the ward.

**Methods:** A multidisciplinary medical-nursing team, called Wound Care Team, has been identified as operative staff who, in front of a request for consultancy with the use of specific documentation, scientific evidence, national and international guidelines and procedures, suggests the preventive-therapeutic aspects, proceeding to a holistic and multi-professional evaluation of the patient.

After the first consultation, the following moments of confrontation with the patient and the care team are carried out by the nurse expert in wound care, through a structured path; the Wound Care Nurse follows the specific case, verifying adherence to the indications provided at the time of consultation, preventive and treatment aspects dictated by the health procedure, the degree of knowledge of the assistance team and the progress of the injury. Nursing counseling has always taken place autonomously but with a direct comparison and in constant contact with the doctor.

**Results:** In the course of year 2017, 152 patients were followed, distributed among medical, surgical and critical areas. 79% of the cases had 4th category lesions, mainly in sacral site (95%). In 98% of lesions it was necessary to proceed with surgical or enzymatic debridement of the lesion.

**Conclusions:** This medical-nursing approach has allowed us to guarantee constant and careful monitoring of the problem during the clinical course and to constantly evaluate the progress and the subsequent necessary revaluations.

**References:**

THE USE OF A NEW NATURAL ADVANCED PRESSURE ULCER PREVENTION PROGRAMME (PURP) ENABLING CLINICALLY EFFECTIVE MANAGEMENT OF PATIENTS AT RISK OF PRESSURE ULCERS

Kate Hancock

Introduction: Pressure Ulcers continue to place a burden on both patients and healthcare facilities. The Stop the Pressure Ulcer Campaign in the UK, reported that 700,000 people are affected with pressure ulcers per year, and treating pressure ulcers costs the NHS more than £3.8 million every day.1

Methods: The PURP introduced in 2015, includes patients from 5 different clinical care settings. Data collection included Sub-Epidermal Moisture (SEM) delta values2 at three anatomical sites and subsequent interventions applied. In the most recent PURPs, data also includes details on the type of therapeutic interventions applied on identification of a delta suggesting pressure damage has occurred.

The PURP enables clinicians to evaluate the impact of a device designed to assess SEM through a systematic process, providing the facility with information on a number of critical quality indicators including:

1. Reduction in HAPUs following the implementation of the Sub-Epidermal Moisture (SEM) scanner technology
2. Providing an anatomically targeted early warning of pressure damage for interventional care
3. Impact on clinical decision making for therapeutic interventions

Results: 731 patients in 11 facilities have been included providing a dataset including over 35,000 patient values.

- The average HAPU incidence rate prior to SEM monitoring reported across the 11 facilities was 5.4%.
- With the SEM monitoring, the HAPU incidence rate was reduced by over three quarters (reduction of 77%), resulting in a 1.2% incidence rate.
- 55% of facilities had ZERO HAPU during the PURP.
- 73% of facilities had a reduction of greater than 85%.
- 64% of patients received an active intervention based on the SEM data – enabling introduction of a location specific therapeutic intervention earlier than current standard of care.

Conclusions: The PURP has enabled clinicians to investigate the positive impact of a new technology used as an adjunct to current clinical practice. Patients received key therapeutic interventions at an earlier stage than current standard of care supporting pressure ulcer prevention.

Please note – this is a real world data collection process therefore additional data will be included at the point of any poster/presentation timeline.

References:

[1] Stop the Pressure Ulcer Campaign 2017

References:


Introduction: The increase in population epidemiology and comorbidity shows us how doctors with skin lesions often have to do prolonged treatments with a wide range of advanced dressings, often with different types of antiseptic leading to the phenomenon of sensitization and subsequent treatment difficulties. Specific to those with critical colonization given by bacterial strains that are also particularly aggressive.

The possibility of using new types of dressings without a pharmacological or antiseptic principle opens up the range of treatment options.

The purpose of this study is to evaluate the performance of these new devices in pressure ulcers.

Methods: There was a structured observation of assisted carriers of pressure ulcers and variable staging.

The two types of treatment included the use of an oleic matrix-releasing agent of ROS-reactive oxygen for 10 patients species and an advanced dressing for 10 patients.

Parameters such as present colonization, dressing performance, wound evaluation, reported pain and comfort reported, operator evaluation were studied.

Results: From the results emerges:

1. Reduction of critical colonization / healing of wounds treated with experimental treatment,
2. Excellent performance of the experimental dressing confirmed in the operator’s evaluation,
3. Assisted pain reduction from the first applications of experimental dressing with reduction / suspension medication use,
4. No related criticalities / sensitivities / intolerances compared with control groups

Conclusions: The use of a new class of dressings with natural active ingredients represents a new possibility in the treatment of patients with sensitization to many standard advanced dressings.

The use of new types of dressings on natural basis is a good possibility in the treatment of pressure ulcers.

References:


**[P65] EVALUATION OF AN EARLY STAGE PRESSURE ULCER ASSESSMENT DEVICE**

**Kate Hancock**
1 Bruin Biometrics, Cheshire, United Kingdom
2 Deloitte, United Kingdom

**Introduction:** A unique device designed to support existing pressure ulcer prevention programmes by identifying pressure damage 5 days (median) before visual skin assessment is starting to be utilised in hospitals in Europe. It is important that any new technology is easy and intuitive to use; able to be built into existing workflows and time efficient.

**Methods:** The Pressure Ulcer Prevention Programme has involved 11 facilities including over 700 patients to date. This analysis investigates the opinions of some of the healthcare practitioners involved in the evaluation of the device. Opinions have been obtained through Post Evaluation Questionnaires; Online Surveys and 1:1 Interviews.

**Results:** 731 patients in 11 facilities to date have been included in the analysis providing a dataset including over 35,000 patient values. Feedback from the HealthCare Practitioners involved reported that the device:
- Helps to foster a culture of greater vigilance
- Supported the reduction in time spent in documentation of skin assessments
- Having objective data helped wound care nurses better communicate with ward nurses about the implementation of the patient care plan

In the largest Evaluation:
- 75% healthcare practitioners described the new technology as easy to use.2
- 88% healthcare practitioners reported “usefulness” of the new technology.2

In the most recent Evaluation:
- In 64% of patients the scan results supported a variety of anastomosed targeted interventional care to support PU prevention including:
  - Heel offloading
  - Increased mobilisation
  - Implementation of specialist pressure ulcer prevention surface
  - Use of Prophylactic dressing or cream

**Conclusions:** This analysis has investigated the views of the HealthCare Practitioners on the use of a unique device in pressure ulcer prevention. The use of new technology can be challenging in busy healthcare environments but the results of PURP demonstrate the positive impact that new technology can make in supporting healthcare decision-making, empowering and enabling healthcare practitioners.

**References:**
[3] Data on File
* SEM Scanner – Bruin Biometrics (Europe) Ltd

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**[P66] EPIDEMIOLOGICAL ANALYSIS OF THE NHS SAFETY THERMOMETER PU DATA**

**Kate Hancock**, Hanno Ronte
1 Bruin Biometrics, Cheshire, United Kingdom
2 Deloitte, United Kingdom

**Introduction:** NHS Safety Thermometer was introduced in 2012 with a goal of surveying patient harms such as PUs to enable local awareness and improvements. This project was designed to analyse the data related to PUs with a view to providing deeper understanding of PU incidence across England and a method of visualisation of the extent of PUs regionally.

**Methods:** Data used in the analysis was obtained from NHS Digital, using the NHS Safety Thermometer Data from May 2012 to March 2017. It is important to note that only stage 2 to stage 4 PU are documented in the NHS Safety Thermometer. The data was visualised detailing:
- Incidence of PUs split by whether the care facility was a hospital; whether the subject was in active care
- Incidence of PUs number of new PUs split by care delivery setting
- Map of the incidence and number of new PUs split by geographical area
- Incidence prevalence rates over time
- Proportion of PUs by stage, by time
- Incidence of number of PUs split by care service

**Results:**
- Potential duplication of records identified (2%)
- Patient count is lower than expected – represents snapshot of activity rather than a complete dataset of all admissions to each care setting
- Represents only stage 2-4 PUs – excluding stage 1 PUs - the data may not truly represent day to day care challenges
- Overall incidence is lower in hospitalised patients compared to non-hospitalised patients (Figure 1)
- Incidence has reduced from 1.73% 05-2012 to 1.04% 03-2017 (Figure 2)
- Prevalence has reduced from 6.83% 05-2012 to 4.50% 03-2017 (Figure 2)
- Specific care settings have been identified with higher incidence which may indicate potential incidence reduction opportunities (Figure 3)

**Conclusions:** The NHS Safety Thermometer has been criticised for accuracy and applicability especially in varying care settings. Whilst the accuracy of this analysis depends on the extent that the sample is representative of the population the data demonstrates clear trends in the reduction over time of PUs in terms of both incidence and prevalence nationally. The data identifies clinical segments with higher rates of new PUs that may open opportunities for further PU reduction.

**References:**
[1] www.safetythermometer.nhs.uk
[3] Ronte H. Debette. 2018
**[P67] PHYSICAL APPROACH TO INFECTED PRESSURE ULCERS IN A PEDIATRIC POPULATION: IMPACT OF DACC NON-MEDICATED TECHNOLOGY IN BIOPURIFICATION MANAGEMENT**

**Guido Ciprandi**

1. Bambino Gesù Children's Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy
2. Bambino Gesù Children’s Hospital, Department of Pharmacy, Rome, Italy
3. Bambino Gesù Children's Hospital, Division of Microbiology, Rome, Italy

**Introduction:** Topical advances in wound care recently proposed hydrophobic dressing binding microbes. Existing data indicate that pathogens bind to the hydrophobic surfaces and are eliminated from the wound, without any side effects. The objective of this study was to verify the sensitivity and specificity of the immediate physical approach to infected ulcers in a paediatric series, using DACC antimicrobial technology for the biopurification management.

**Methods:** 246 children affected by 1st up to 3rd stage infected Pressure Ulcers were enrolled in the study. Written informed consent was obtained for all patients. A team including a paediatric clinical nurse specialist and a surgeon assessed the stage of the ulcer and clinical signs and symptoms of wound infection, as reported in the 2014 EPUAP report. Pain evaluation and scoring include FLACC and VAS scale. Both swab samples and deep tissue biopsies were submitted for microbiological examinations. Two different techniques of qualitative and quantitative bacterial counts monitored the dress effects with an antimicrobial dressing pad every 2 changes: agar traditional method with double anaerobic technique and diagnostic method2. Bacterial count, residual antibacterial power, changes in polymicrobiobial and bacterial resistance were analysed.

**Results:** 216 children (87.8%) completely recovered with no signs of adverse effects, after an average of 5.4 dress-changes (3 to 10) every 2 days. 24 children (9.7%) showed incomplete or partial resolution of both clinical and microbiological evidence and migrate to a NPWT continuous system, using silver foam filler of low intensity and a pressure of 60mmHg through 125mmHg, 6 cases worsened in a mean time of 10 days. These needed an algorithm with a microsurgical debridement followed by a therapy combining negative pressure wound therapy and instillation therapy as a method of sterilizing wounds prior to split thickness skin graft placement.

**Conclusions:** All children accepted the procedure, no adverse effects as well as periadisal damages appeared. No dislocation of the dress appeared and only in 4 cases removal was difficult because of the too long interval between each and the other 87.8% recovered with a complete healing of the lesion and no ulcer reocurrence after a mean follow-up time of 90 days. The antimicrobial dressing pad is effective and well tolerated treatment for the management of infected PU in a pediatric population. Both exudate and pain decreased simultaneously to the bacterial count and polymicrobiobial reduction.


[1] Gutmed Soboect-DACC
[3] VAC-Inh8 therapy

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**[P68] TEAMWORK: A SKIN CARE TEAM JOURNEY IN A CHILDREN’S HOSPITAL**

**Gaetano Ciliento**, Giancarlo Antonielli, Serena Crucianelli, Stefano Aureli, Guido Ciprandi

1. Bambino Gesù Children’s Hospital, Rome, Italy
2. Bambino Gesù Children’s Hospital, Fiumicino, Italy
3. Bambino Gesù Children’s Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy

**Introduction:** The integrity of a child’s skin is very significant with regards to the quality and safety of pediatric care and it can be compromised during hospitalization. The care provided for prevention and treatment of skin conditions in all pediatric age groups is not homogeneous and is often based on personal experiences or habits and customs.

**Methods:** All doctors and nurses involved in the study are specialized in the management of pediatric wound care. A working group was set up and informative and training meetings were prepared to draft the protocols and planning models for organize the team. No child has been excluded from the implementation of the project. Each patient was taken care of with direct request by the wards which were informed about the existence of the “Skin Care Team”. Nurses assessed the risk of injury with Braden Q/QD. The evaluation was carried out at the time of hospitalization and thereafter every 4 days except in case of changes in clinical conditions. The integrity of the skin and the possible presence and evolution of Pressure Ulcer were assessed daily.

**Results:** The study showed that within different settings there is a big difference in the management of bedsores presidium and advanced medications. The Intensive care unit was involved often due to the presence of many devices or in case of clinical deterioration of patients, whose many times presented lesions of the previous skin. The interventions implemented by the team can be traced back to 3 main areas: choice of the correct presidium for the prevention of bed-ridden patients, choice of measures for redistribution of pressure on surfaces in patients with devices and informative training support on the treatment of injuries.

**Conclusions:** The study suggests that the prevalence of skin lesions in pediatric patients are more frequent then thought to be and that the current managements utilized by the wards are not standardized and efficient. For this reason developing intervention and treatment strategies that favor prevention of skin lesions of the pediatric patients should be a focal point for the future treatment.

**References:**

INTRODUCTION: Paediatric nurses are very often prone to burnout syndrome due to devastating workloads, exposure to the public and poor recognition to their work. Particularly, wound care specialized nurses can face situations mining their motivation as happens when dealing with hard to heal wounds or palliative wound care not mentioning stress arising from repetitive dressings of uncompliant children and discerning parents. The aim of this study was investigating the burnout syndrome incidence among paediatric wound care nurses.

Methods: The Maslach Burnout Inventory was submitted to nurses enrolled according to inclusion criteria. The study included wound care paediatric and non-paediatric nurses (possessing PhD in wound care) working at least 150 hours/month, in high complex units of 3 different Roman hospitals (polyclinic Umberto I, Bambino Gesù Children’s Hospital and Santo Spirito hospital). Results obtained from Paediatric nurses are compared to non-paediatric nurses.

Results: A total of 30 nurses were included in the study (10 paediatric, 20 non-paediatric). From the Maslach Burnout inventory emerged that the operators with seniority longer than 10 years of service presented an high mental exhaustion whereas depersonalization was independent from years of service. Data about personal fulfillment showed that initial expectations were not completely disappointed, underlining a strong awareness of self professional value. From paediatric nurses sample emerged that stress arise after 5 years of service, from 3 different sources: from the slow or poor healing condition of wound itself regardless of efforts made, from parents and patient’s discontent, from child’s reaction to dressings or repetitive procedures, from the scarce consideration given by other medical staff figures. Alarming data came from pain perception: the majority of the sample declare compassion feelings, the 11% state indifference. Demotivation, indifference and cynicism are extreme consequences of burnout causing a lack of empathy with patients’ feelings.

Conclusions: Awareness, high formation are probably the best tips for nurses dealing with paediatric hard to heal wounds. Knowledge, recognition and emotional processing of stressing aspects related to this particular subset of patients, are essential conditions for emotional survival.

References:

ATYPICAL PRESSURE ULCER PRESENTATION IN PAEDIATRIC DISABILITIES AND RARE DISEASES: PERSONALIZED AND PROPERLY TAILORED PREVENTION

Guido Ciprandi1, Serena Crucianelli1, Giancarlo Antonielli1, Gaetano Ciliento1, Mario Zama1
1 Bambino Gesù Children’s Hospital, Division of Plastic and Maxillofacial Surgery, Rome, Italy
2 Bambino Gesù Children’s Hospital, Urology, Rome, Italy
3 Bambino Gesù Children’s Hospital, Rome, Italy

Introduction: Topography of pressure ulcers varies accordingly to ages and growth. In patients presenting changes of anatomical proportions and shapes, as those affected by congenital malformations, rare diseases or acquired disabilities, the expected topography of pressure injuries can be subverted. Moreover prevention protocols are based on anatomically conserved bodies resulting ineffective on this particular subset of patients. Authors here suggest customized and patient tailored measures to prevent the onset of atypically distributed pressure ulcers to be applied on children at risk.

Methods: Since January 2016 until January 2018, 288 children aged 0-14 presenting with malformations, rare diseases or disabilities were enrolled in the study at our institution, according with parents consensus. Anatomical peculiarities as skull abnormalities, variation of neck mobility, spinal curvatures, limb shapes and mobility together with immobility, poor mobility or obliged positions, muscular hypertrophy, BMI < 22, > 29, were considered and highlighted as risk factors. Wheel chairs, orthopedic shoes, casts and other supporting surfaces as mattresses were weekly/monthly checked for conformity and feasibility, even considering needs of a growing body or changes required by increasing or worsening deformities or because of a surgical treatment. After patient’s assessment caregivers and attending nurses were informed about patient’s specific risk factors and trained according to a tailored preventing programme. Effects, rates and outcome of pressure ulcer in patients at risk are evaluated.

Results: 288 patients have been included in the study in a two years time. 78 % presented macromorphoscopic anatomical abnormalities, 82% presented impaired mobility at the moment of first examination. 58% were scheduled during acute episode of disease, 95% of bodies were in contact with medical devices/tutors/casts of whom 76% were considered of inappropriate shapes, dimensions, consistence or presenting problems imputable to manufacturing, in term of shapes and materials.

Conclusions: The prominent role of an head-to-toe clinical examination as well as the multidisciplinary team is primary in identification, prevention and treatment of children wounded because of a biometry impairment. The immediate team analysis of the postural evaluation and the counseling with parents are both fundamental in detecting the 0-1 graded pressure injuries, in a skilled pediatric wound care unit. Preventing atypical pressure injuries means to start with a valid rehabilitative program without delay due to a pressure ulcer.

References:
**[P71] A FIRST OBSERVATIONAL STUDY ON PREVALENCE OF PRESSURE ULCERS IN ASST MANTOVA**

Orietta Riboli, Roberta Dotti, Rossana Rosini, Arianna Iacoviello, Antonella Mari, Franco Vallicella, Chiara Ferrari

1 Università di Brescia - Sezione di Mantova, Direzione Didattica, Corso di Laurea in Infermiere, Italy
2 Asst Mantova, Responsabile Ricerca, Sviluppo e Formazione, Italy
3 Asst Mantova, Infermiere Specialisti in Wound Care - Chirurgia Vascolare, Italy
4 Asst Mantova, Infermiere Specialisti in Wound Care - Ambulatorio, Italy
5 Asst Mantova, Responsabile Dipingentamente Sista, Italy
6 Asst Mantova, Direzione Sista, Italy
7 Asst Mantova, Fisica Sanitaria, Espero in Statistica, Italy

**Introduction:** Pressure ulcers (PU) are still a current health problem, as shown by many studies carried out worldwide. The American Nurses Association has registered the occurrence of PU among nursing-sensitive outcomes. PU lead to complications and to a prolonged hospital stay, affecting the quality of life of patients and their caregivers. We developed our first observational study on the prevalence of PU and their risk.

**Methods:** Our study relied on the recommendations given by NPIAP/EPUAP/PPPIA in 2014. The project involved 12 nurses with experience in EBN research, organization, and wound care. They developed a training program for 63 examiners tested on their inter-rater reliability. The evaluation was based on the sheet used by AISLEC in its study issued in 2015, modified according to team's needs. The 2009 EPUAP classification has been applied to the study. The involved adults had been hospitalized for at least 24 hours and had agreed to take part in the study. Patients subject to restrictive measures, black patients as well as patients hospitalized in pediatric, obstetric and psychiatric wards, in emergency and in the hospices could not participate in the project.

**Results:** At the end of the training day the overall inter-rater reliability (measured with Cohen Kappa) was 0.513 (0.241-0.760) in the pre-test and 0.585 (0.229-1) in the post-test. 403 patients have participated in the study (71% of the in-patients), 30% of which is at risk for PU (Braden scale score<16), 8% with Braden<12. The highest number of patients with a high or medium risk has been registered in the intensive care unit (44%), followed by the medical unit (35%), the rehabilitation department (25%) and the surgery (21%). The risk is also age-related and is 4-times higher in patients over 75 with OR 3.8(95%CI 2.2-6.1). 81 out of the 403 recruited patients report at least on PU at a prevalence of 20.1%. However the prevalence of PU is 8.7% if first-grade PU are not considered; 27% of these patients belong to the medical unit, 20.7% to the rehabilitation department and 10% to the surgery. No signs of clinical infection have been reported in recorded PU.

**Conclusions:** The PU are an important quality factor representing one of the biggest challenges in healthcare. It's needed to keep under close monitoring the pathology and to put in place clinical preventing procedures in medical department.

**References:**


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**[P72] USE OF ADIPOSE STEM CELLS IN PRESSURE SORES: CLINICAL EXPERIENCE**

Elia Ricci

1 St Luke Clinic, Difficult Wounds Healing Unit, Pecetto Torinese, Italy

**Introduction:** The chronicization of the wound bed is now an established fact, a series of specialized and dedicated centers are finding a progressive diffusion on the Italian scenario. These centers often tend to experiment with new measures made available by companies, precisely because they collect an increasingly complex and difficult population. We have analyzed our experience in the use of stem cells extracted from adipose tissue through a dedicated system.

**Methods:** We collected the cases treated with this technique in the period of January - December 2017. 6 patients were treated with 8 pressure sores. The cases were controlled to 4 weeks apart. The registry is shown in table 1. The device was used in lesions of IV degree, in order to obtain a filling of the loss of substance, in the absence of infection and with a clean and granulating wound bed.

<table>
<thead>
<tr>
<th>Table 1: registry</th>
</tr>
</thead>
<tbody>
<tr>
<td>patients</td>
</tr>
<tr>
<td>M</td>
</tr>
<tr>
<td>2 (47.1 %)</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>4 (52.9 %)</td>
</tr>
<tr>
<td>Mean age pts (year)</td>
</tr>
<tr>
<td>65.01 (38-84)</td>
</tr>
<tr>
<td>Mean Age wounds (mesi)</td>
</tr>
<tr>
<td>46.3 (6-58)</td>
</tr>
</tbody>
</table>

**Results:** Results are shown in table 2. As you can see we found an improvement or healing in 87.5% of cases at 4 weeks, in 1 case there was no result.

<table>
<thead>
<tr>
<th>Table 2: results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healed</td>
</tr>
<tr>
<td>3 37.5 %</td>
</tr>
<tr>
<td>Improved</td>
</tr>
<tr>
<td>4 50.0 %</td>
</tr>
<tr>
<td>Unchanged</td>
</tr>
<tr>
<td>1 12.5 %</td>
</tr>
<tr>
<td>Worsened</td>
</tr>
<tr>
<td>0 0 %</td>
</tr>
</tbody>
</table>

**Conclusions:** Fat stem cells prove to be a valid solution in the treatment of deep lesions. The limits lie in the invasiveness of the technique that requires anesthesia and in the need to have adipose tissue.

**References:**

[1] Upjohn® Upjohn international


**[P73] DEVELOPING THE NURSING SELF-EFFICACY IN PRESSURE ULCER MANAGEMENT QUESTIONNAIRE (NSE-PU): PSYCHOMETRIC VALIDATION OF A NEW MEASUREMENT TOOL**

Francesca Turriini¹, Federico Dell’Acre², Gianluca Cante², Gianluca Castiello³, Flavia Randelli², Irene Baroni², Arianna Magon², Rosario Cuszo³

¹ Ircs Policlinico San Donato, Orthopedic and General Surgery Unit, San Donato Milanese (Milan), Italy
² Ircs Policlinico San Donato, Health Professions Research and Development Unit, San Donato Milanese (Milan), Italy
³ Ircs Policlinico San Donato, Post Operative Intensive Care Unit, San Donato Milanese (Milan), Italy
⁴ Ircs Policlinico San Donato, General Intensive Therapy, San Donato Milanese (Milan), Italy
⁵ Ircs Policlinico San Donato, Cardiac Rehabilitation Unit, San Donato Milanese (Milan), Italy

**Introduction:** To the best of our knowledge, a tool aimed to assess self-efficacy (SE) of nurses who manage Pressure Ulcers (PU) is not available in literature, despite the predictive role of good performance of nurses' SE [1,2,3]. For this reason, this study aims to develop an instrument that measures the SE of nurses involved in the management of PU (Nursing Self-Efficacy in PU Management Questionnaire - NSE-PU).

**Methods:** The study was articulated in two phases:

- **Phase I** (June 2017): we developed a raw pool of items, based on the issues emerged from the current literature. Then, the items were evaluated by face- and content validity, though the calculation of the Content Validity Ratio (CVR) and the Content Validity Index (CVI). A panel of experts critically assessed the relevance and pertinence of each item considering the target population of the tool, until reaching good levels of accordance (Fleiss’ K > 0.70). During this phase some items were modified or deleted, defining the NSE-PU v.1.

- **Phase II** (July-September 2017): we administered the NSE-PU v.1 on a large-scale population through a descriptive cross-sectional study, in order to test the construct validity of the resulted questionnaire. The construct validity of the tool was supported by the evaluation of its psychometric properties, performed by an exploratory factorial analysis (EFA) with the maximum likelihood robust (MLR) estimator and the geomin oblique rotation.

**Results:**

- Phase I: a panel of experts (n = 15) determined the overall relevance of the 24 items, described through the computation of CVR and CVI. Three assessment rounds were required to reach appropriate indexes scores and each meeting resulted in an adaptation of the item formulation.

- Phase II: the responding sample of the cross-sectional study (n = 1150, 70% female nurses) had an average age of 39 ± 10 years and worked on average for 15 ± 8 years. The responses were then used for the calculation of EFA. No threshold effects were observed and each item showed a sufficient variance. The EFA model that best explained the interrelationship between the items consisted in four dimensions (X² = 140.649; D.F. = 62, P = 0.000; CFI = 0.993; TLI = 0.986; SRMR = 0.030; Total Variance = 51%). The authors then named the four identified dimensions as: (a) Basic competences; (b) Intermediate competences; (c) Special competences; (d) Decision-making-competences.

**Conclusions:** The NSE-PU shows good validity proprieties. Future studies are needed to confirm validity and assess reliability.

**References:**


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**[P74] PRESSURE INJURIES IN SPINAL DEFECT: EXPERIENCE OF WOUND CARE UNIT IN MONZA FROM 2013 TO 2018**

Maria Castoldi¹, Mariangela Cantamessa¹, Giuseppe Gagliano¹, Simone Toscano¹, Alberto Aara¹, Roberto Brambilla¹

¹ Centro Vulgologia, Istituti Clinici Zucchi, Monza, Italy

**Introduction:** In USA, pressure injuries affect approximately 1.5-3 million of people. This percentage increases in subjects with spinal defect, in which type of wounds represents one of the most important problems of care due to the altered sensitivity to tactile and pain stimulation.

For many years, treatment of pressure injuries looked only at the wound dressing. More recently, a holistic approach to the patient has allowed a clear improvement of the outcome of the lesion.

**Methods:** In Vulgologia Center of Zucchi Clinical Institutes in Monza, we observed 14 cases of pressure injuries in patients with spinal defect aged between 20 and 40 years, from 2013 to 2018.

Results: Three of these patients were sent to neurological centers for specific treatment, while in 4 cases a surgical approach to lesions was performed in our center, including also innovative treatments of regenerative medicine.

All the patients still received dressings with advanced technologies such as silver hydro-fiber and new collagenase.

**Conclusions:** The average healing time ranged from 24 days to 6 months, putting into practice in all cases the guidelines for the prevention and treatment of pressure injuries using adequate controls and mobilization. Advanced dressings and regenerative medicine have also been proved to be important aid in pressure injuries treatment in complex patients with spinal defect.

**References:**


[P75] THE USE OF STROMAL CELLS FROM ADIPOSE TISSUE IN PRESSURE LESIONS MANAGEMENT

Cecilia Muscarà¹, Giuseppina Gagliano¹, Maria Castoldi¹, Alberto Asaro¹, Marta Vicedomini¹, Claudia Stucchi¹, Roberto Brambilla¹

¹ Centro Vulnologia, Istituti Clinici Zucchi, Monza, Italy

Introduction: The use of stromal cells from adipose tissue in pressure lesions management. The use of stromal cells from adipose tissue is a possible tool in the management of pressure lesions in heel wounds and in amputation stump with prosthesis. This retrospective observational study aimed at investigating the aspects concerning the filling volume of the wound bed, the improvement of tissue trophism (especially on the heel lesions). Our experience studies adult patients with unhealing pressure wounds treated in outpatients setting. The study went from February 2017 to February 2018 (1 year); patients with lesions on amputation stumps had been started to re-evaluate the prosthesis before proceeding to surgery; anti-bedsores were suitable in all cases.

We evaluated 9 patients.

Methods: The patients underwent lipofilling of the wound bed with injection of stromal cells obtained from autologous liposuction and subsequent procedures with dedicated device, according to the company management protocol. The lesions were in each of the cases covered with dural substitute. In outpatient setting patients were treated once, twice or three times a week. The secondary dressing that interacts with the stromal cell grafting can be either an advanced or traditional dressing depending on the lesion site, the wound surface and the amount of exudate. A multicomponent, anelastic bandage with an 8 structure was performed.

Results: In all cases, the use of stromal cells from adipose tissue led to filling of the wound bed and improving vascular trophism.

Conclusions: In 66% of cases, there was a 50% reduction in the area of the lesion in 10 weeks; complete tissue repair was obtained in 80% in 16 weeks.

[P76] PATIENTS WITH PRESSURE ULCERS: WHO TAKES CARE?

Marta Vicedomini¹, Mariangela Cantamessa¹, Alberto Asaro¹, Giuseppina Gagliano¹, Roberto Brambilla¹

¹ Istituti Clinici Zucchi, Monza, Italy

Introduction: Many patients with pressure ulcers are sent to the attention of our centre when the wound is complicated by infection, depth or bone involvement.

We realized that we didn't have at disposal sufficient information about the treatment before our first evaluation. For this reason, we decided to submit a questionnaire to the patients and caregivers in order to understand who takes care of them and who teaches them about prevention and treatment that they could implement at home.

Methods: We submit the questionnaire to all patients with at least one pressure ulcer. In case the patient is not able to collaborate, the caregivers are asked to answer.

The main topics of our investigation are:
- Who teaches the strategies for prevention and which of them are explained
- The timespan between the ulcer onset and the first contact with a general practitioner
- Use of correct support surfaces and repositioning
- Who chooses the dressing and the change frequency and who performs the medication
- Which kind of devices are used for incontinence

Results: Data are still being collected. However, it's already evident that a capillary distribution of prevention strategies is still not achieved. Even after the ulcer onset, the management is incomplete and ineffective.

Conclusions: Investing in the education of patients and their caregivers on the prevention of this pathology is likely to represent a more effective strategy to better address this widespread and underestimated issue.
**P77** FOSTERING PRESSURE INJURY PREVENTION: THE ROLE OF CLINICAL NURSE LEADERS

Stefano Casiati¹, Marina Palombi², Angelo Pegheti³, Silvia Sferrazza⁴, Valentina Vanzi⁵

1 Center of Excellence for Nursing Scholarship, Rome, Italy
2 Paladino Umberto I, Center of Excellence for Nursing Scholarship, Rome, Italy
3 Op. Bolognese (College of Nurses), Bologna, Italy
4 San Giovanni Hospital, Center of Excellence for Nursing Scholarship, Rome, Italy
5 Bambino Gesù Children’s Hospital, Center of Excellence for Nursing Scholarship, Rome, Italy

**Introduction:** The clinical nurse leader (CNL) represents an innovative role for meeting higher health-care quality standards. This professional figure has been conceptualized by the American Association of Colleges of Nursing (AACN) in 2007 to improve the patient care through collaboration with the health-care team at the microsystem level. The CNL focuses on care coordination, outcomes measurement, interprofessional communication and team leadership, risk assessment and implementation of best practices based on evidence. All these skills are essential to implement a pressure injury (PI) prevention policy and protocol in the hospital setting.

**Methods:** In 2010, the first Italian Center of Excellence for Nursing Scholarship (CECRI) was founded to promote advances and competencies in nursing scholarship and improve the health care of the population. The CECRI was organized in four pillars of actions and multiple collaborative projects were conducted. The clinical practice pillar aimed to disseminate evidence-based practice (EBP) into the hospital setting and to start several quality evaluation projects, such as clinical audits on PI prevention. In order to address this purpose, in 2011, the CECRI established specific training paths to become CNLs.

**Results:** Since 2011, almost 50 nurses of various Italian hospitals have been certified as CNLs. Some of them have been involved in PI quality implementation plans, producing meaningful improvements of clinical quality indicators, primarily in terms of PI prevalence rates.

**Conclusions:** PIs present a major health challenge worldwide; they are considered to be a largely preventable problem, and yet despite extensive training and the expenditure of a large amount of resources, they persist. New strategies should be considered. CNL practice has been identified as an innovative strategy to meet health care challenges. Through interprofessional and interprofessional collaboration, the CNLs are able to implement sustained organizational change and improve the care for patients at risk of PI development. Quality improvement projects, promoted by the CECRI, are a successful example of a CNL-led initiative that impacts patient/family and organization outcomes through the identification and implementation of evidence-based nursing practice.

**References:**


**P78** THE PROCESS MANAGEMENT TO ADMINISTER A RELEVANT SOCIAL PROBLEM: PRESSURE ULCERS, AN EXPERIENCE

Diego Ceci¹, Cristiana Luciani², Francesco Iavarone¹

1 Sapienza, University of Rome - Sant’Andrea Hospital, Urology - Sanita’ Hospital, Rome, Italy
2 Sapienza, University of Rome - Sant’Andrea Hospital, Uro Risk Management Qualità e Acreditamento, Rome, Italy

**Introduction:** With the ageing of the society and the change in the models of illnesses, the problem of pressure ulcers (PU) is surely destined to grow, especially in hospitals. The attention to this aspect must cover a very important role in the politics of complex organization and must be addressed by a continuous quality improvement affirming that the majority of PU can be avoided by prevention strategies, control, evaluation and education of the patient and the operators in compliance with the international scientific guidelines. For these reasons, the Sant’Andrea Hospital decided to define patient treatment in the hospital by studying the organization and the management of the care process for patients affected by or at risk of developing PU and by examining the logical continuation of the treatment in the hospital and outside the hospital.

**Methods:** The project coordinated by the hospital-wide Quality Assurance together with the Healthcare and Nursing Department has anticipated the analysis of management and organizational aspects through defined actions allowing the realization and delineation of further steps.

**Results:**

- Introducing a procedure for renting bed surfaces. Every patient at risk of PU was treated by surface.
- Introducing nurse specialist (wound specialist) consultants in order to support medical and nursing staff during the PU treatment process.
- Monthly controls of the renting surfaces divided according to their use.
- Introducing a multidisciplinary protocol to assure an appropriate patient treatment.
- Monthly controls of the hospital PU incidence.
- To guarantee the management of patients affected by or at risk of developing pressure ulcers, we contact the Territory Medicine Department to improve a shared clinical path and integrated documentation.
- Implementing nurse and medical education.

**Conclusions:** It is important to specify that the greatest difficulty met in the implementation of such project was the total absence of reference data. After one year of activity, we can say we have succeeded in getting meaningful data that will allow us to plan specific actions and interventions.

**References:**

**QUALITY OF LIFE IN PATIENTS WITH CHRONIC SKIN LESIONS: REVIEW OF LITERATURE SYSTEM**

Daniele De Nuzzo¹, Diego Ceci¹, Carmen Cappitello¹, Walter Tatangelo²

1 Sapienza University of Rome - Sant’Andrea Hospital, Uro Professioni Sanitarie, Rome, Italy
2 Sapienza University of Rome, Rome, Italy

**Introduction:** A patient with a cutaneous ulcer of the lower limbs is usually an older person, who has pain and a poor quality of life. The pathology that has determined the onset of trophic lesion is often complex and multifactorial, requires an accurate diagnostic classification and a therapeutic program focused both on the etiopathogenesis and on the state of the ulcer bed, considering the comorbidities and the conditions of the surrounding skin.

**Methods:** A systematic review of the literature was conducted by interrogating the main international databases, making a prevalent reference to Cinhal. The articles included in the review were selected on the basis of inclusion and exclusion criteria (represented in a table) and extracted from the databases by setting filters to the following search filters: language, year of publication and journal in which they were published. A recruitment system was used starting from the flow chart according to the PRISMA method.

**Results:** The selected articles were 14; from the analysis the themes are highlighted: pain, anxiety and depression as well as feelings deriving from the loss or mutation of one’s role in society due to chronic injuries. Dressing changes are a key aspect of treatment to provide opportunities for positive interaction and person-centered care, which are key to holistic patient care with chronic injuries. A fundamental role in the care of people with chronic wounds is played by family members or anyone taking care of the patient and the wound from which they are affected. The repercussions on the quality of life of patients suffering from chronic injuries are numerous and concern the mental, psychological, social and economic spheres.

**Conclusions:** The results of the analysis affirm that the quality of life of patients with chronic wounds is influenced by elements such as: pain, anxiety, depression, change in activities of daily life and the change of one’s body image. This review is the starting point for a project about quality of life involving a total of about 100 chronically injured patients.

**References:**

**THE USE OF ABSORBENT ADVANCED DRESSING COMBINED WITH SINGLE-USE NEGATIVE PRESSURE WOUND THERAPY IN A COMMUNITY SETTING: A CASE REPORT**

Sonia Donati¹

Azienda Usl Toscana Sud Est, Arezzo, Italy

**Introduction:** Evaluating the effects of the use of absorbent advanced dressing combined with single-use Negative Pressure Wound Therapy (NPWT) in a community setting.

**Methods:** 87-year-old woman with Parkinson’s disease, heart failure treated with warfarin, and very low mobility. At inspection she presented an undermined sacral pressure ulcer with soft black eschar. Following surgical debridement performed in hospital on practitioner’s request, she presented a stage IV infected high-drainage ulcer. Absorbent advanced dressing combined with NPWT were applied in a home setting. The dressing was initially changed every 48 hours to check on the wound. A photograph was taken at every dressing change, while a bacterial culture was performed every 15 days.

**Results:** Absorbent advanced dressing combined with single-use NPWT was used in a community setting for a month: after 15 days treatment, 2 weekly dressing changes, the wound had visibly improved: reduced drainage and depth and significantly increased granulation tissue. A bacterial culture determined absence of infection. After a month NPWT was discontinued and treatment switched to advanced dressings.

**Conclusions:** The use of absorbent advanced dressing combined with single use NPWT in a community setting proved effective in accelerating the wound healing process, reducing the costs of care, and was easily used by the caregivers.

**References:**
THE USE OF ADVANCED DRESSING WITH BACTERIA-BINDING GAUZE WITH HYDROGEL: A CASE REPORT

Sonia Donati

Azienda USI Toscana Sud Est, Arezzo, Italy

Introduction: A new and effective innovation in the field of advanced dressings is represented by the association of bacteria-binding gauze with hydrogel: this promotes autolytic debridement of low-exudate infected wounds. The bacteria adhere to the dressing surface, while slough and necrosis are removed through the action of the hydrogel and the creation of a moist environment. This type of dressing is suitable for venous, arterial, diabetic and pressure ulcers.

Methods: An 83-year-old man with insulin-treated diabetes, heart failure and low mobility. At inspection he presented a stage III wound on the left heel with high levels of slough, low exudate, and some necrotic tissue. A bacterial culture revealed Staphylococcus Aureus contamination. Systemic antibiotic therapy. Dressings with hydrogel impregnated bacteria-binding gauze for a six week period, in the first two weeks two weekly dressing changes, in the remaining four weeks only one weekly dressing change.

Results: Since the first dressing changes slough and necrosis were visibly reduced; a bacterial culture determined absence of infection and complete epithelisising was observed.

Conclusions: This kind of advanced dressing represents an innovation considering it combines bacteria binding technology with debriding hydrogel found in the dressing itself. While maintaining a moist environment, it allowed complete wound healing to be obtained in a short period of time.

References:

EXPLORING/EXAMINING TISSUE CONDITIONS BELOW THE SKIN

Diane Langemo

University of North Dakota, Grand Forks, United States

Introduction: Skin, a complex organ with multiple functions, is dependent on other organs for its primary functions. Unfortunately, the skin can fail. Skin failure can be confused with a pressure injury.

Methods: This presentation covers etiology and pathophysiology of skin failure and pressure ulcers and will differentiate these failures of the skin from a pressure injury. Thermographic images of deeper tissue layers will be presented to illustrate tissue damage below the surface.

Results: Failure of the skin is caused by hypoperfusion as blood is shunted to vital organs. Hypoperfusion leads to ischemia and metabolite buildup, the release of free radicals, and eventual necrosis and sloughing. Skin failure is “an event in which the skin and underlying tissue die due to the hypoperfusion that occurs concurrent with severe dysfunction or failure of other organ systems” (Langemo, 2006).

Using a nonthermal noncontact device using long-wave infrared thermography [LWIT], local hemodynamic status was assessed based on skin temperature differentials between and among different sites. It was assumed that tissue regions with blood flow deficits would demonstrate skin temperatures less than those in unaffected regions. In a retrospective study, below the surface skin temperature, via the mentioned device 1, was estimated in subjects with wounds to detect temperature changes associated with wound infection and inflammation as compared with normal control subjects with similar anatomical wound locations. LWIT was able to detect temperature differentials between the wound and healthy skin of +1.5°C to 2.2°C in subjects with clinical signs of inflammation while it was able to detect temperature differentials of +4°C to 5°C in subjects with clinically diagnosed infection (Chamnugam et al, 2017). Further research is being conducted to determine temperature differentials in pressure ulcers and skin failure.

Conclusions: It is vital to recognize that internal skin temperature differentials may be able to assist clinicians in more accurate diagnosis and treatment of inflammation, infection, pressure ulcers, and skin failure.

References:
[1] Scout™
**[P83] THE SOLUTION OF HYPEROXGENATED FATTY ACIDS: AN EFFECTIVE BARRIER FOR PROTECTION OF SKIN**

**Stefania Fabrizi**, Sonia Donati

1 Azienda Usl Toscana Sud Est, Arezzo, Italy

**Introduction:** Dryness and cutaneous brittleness are problematic factors in the elderly associated to immobilization syndrome. They can compete to the formation of pressure ulcers especially for parts of the body subjected to great pressure. In addition, the presence of urinary and fecal incontinence determines an increased level of moisture which can cause skin maceration. The topical application of a solution of hyperoxgenated fatty acids can be a useful barrier to prevent these complications and also for treatment of Stage I pressure ulcers.

**Methods:** For the study 20 patients between the ages of 80 and 95 years with risk to develop pressure ulcers were recruited and equally divided in two groups. The first one was been applied daily with a solution of hyperoxgenated fatty acids while for the second one no treatment was been given but only clinic observation, both for a period of one month. As criterion of inclusion was used the presence of immobilization syndrome which was caused by physical and mental decline for 18 patients and stroke for 2 other ones. Pressure ulcer prevention was the same for both groups by using support surfaces and repositioning every 2/4 hours. The parts of the body examined were heels and sacral area.

**Results:** As a result, in the patients treated with the solution of hyperoxgenated fatty acids it was been noticed a best condition of cutaneous hydration, proved by disappearance of hyperkeratosis and significant dryness skin reduction. Moreover, 4 patients with stage I pressure injuries had showed cutaneous redness completely regressed.

**Conclusions:** The use of a solution of hyperoxgenated fatty acids has proved to be valuable both in preventing and caring stage I pressure ulcers as well as in the treatment of cutaneous maceration of body parts subjected to high moisture levels.

**References:**


Official body of Italian Association of skin ulcers AIUC

**[P84] FROM DEBRIDEMENT TO THE HEALING; A DIFFICULT PRESSURE ULCER TREATED AT NURSING HOME CARE**

**Stefania Fabrizi**

1 Azienda Usl Toscana Sud Est, Arezzo, Italy

**Introduction:** The aim is to improve care quality for patients with pressure injuries, with the purpose not to take them to hospital for treatments, consequently to optimize the use of resources and realize cost reduction. In this process, nurses with advanced skills in wound care who operate in nursing home care play a key role.

**Methods:** 88 years-old woman affected by immobilization syndrome which caused a critical pressure ulcer in the sacral area. Because of the presence of necrotic and devitalized tissue, an adequate debridement by using hydrogel dressings was necessary for the wound bed preparation, mixed with enzymatic debriding ointment and a micronized silver sulfadiazine cream. Three weekly dressing changes. In a edition, mechanical debridement by curettage method was used to help the removal process. The treatment lasted fifteen days. Being a pressure injury with full thickness skin loss, a negative pressure therapy was applied for twenty days to promote tissue repair process. Finally, a polyurethane dressing with silicone adhesive border impregnated with silver was used for three months to reach the healing Two weekly dressing changes.

**Results:** As a result, the healing of ulcer was reached thanks to appropriate and effective treatments carried on by the nurse of reference with advanced skills in wound care in cooperation with other stakeholders. All this without taking patients to the hospital for a potential surgical debridement.

**Conclusions:** In conclusion, a large number of patients with pressure bedsores being treated by nursing home care, it is essential to realize a high level of quality of domiciliary care and also value wound care skills of professionals involved.

**References:**

**[P85] THE USE OF A BIOMATERIAL WITH SILVER SULPHADIAZINE 1%: A CASE REPORT**

**Stefania Fabrizi**

1. Azienda Ul Toscana Sud Est, Arezzo, Italy

**Introduction:** To evaluate a biocompatible cell-friendly surfactant-based biomaterial with silver sulphadiazine 1% to reduce critical bacteria contamination, tissue damage and patient pain feeling during the change of dressing in a difficult pressure wound of the heel area. To evaluate the dressing action to eliminate bacteria biofilm and reduction of direct and indirect costs.

**Methods:** 85-years-old woman, with diabetes, kidney failure and anemia, an immobilization syndrome caused a pressure wound in the heel area. A floating necrotic tissue in this area was removed by scalpel. To debride slough on the wound bed, hydrogel dressings mixed with enzymatic debriding ointment were used with an interface of non-medicated paraffin gauze. The treatment lasted for about two months with two weekly dressing changes. Because of an over granulation tissue and bacteria biofilm caused by Acinetobacter bacteria, a biocompatible cell-friendly surfactant-based biomaterial with silver sulphadiazine 1% combined to non-medicated paraffin gauze was used for a five month period until the healing of the wound. Performing always two weekly dressing changes.

**Results:** As a result, time of healing wound is considerably reduced and bacteria colonization, biofilm and tissue damage eliminated by biomaterial. In addition, patient pain feeling was lower.

**Conclusions:** Compared to other products with silver, biocompatible cell-friendly surfactant-based biomaterial with silver sulphadiazine 1% cost is lower. Being an antimicrobial barrier can reach most difficult surfaces, having an effective action against biofilm.

**References:**


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**[P86] THE COMMUNITY NURSE OF REFERENCE: A VALUABLE ASSET IN PREVENTING AND MANAGING PRESSURE ULCERS**

**Stefania Fabrizi**, **Valentina Botarelli**, **Sonia Donati**

1. Azienda Ul Toscana Sud Est, Arezzo, Italy

**Introduction:** The ever-growing incidence of wounds in the community, due to ageing population, increase in chronic diseases and early discharge from hospital, calls for the creation of dedicated clinical pathways managed by highly skilled community nurses. Working on prevention as well as treatment is the main focus of these professionals’ activity.

**Methods:** The creation of Clinical Pathways for Wound Care within the Ul Toscana Sud Est, Arezzo (resolution n. 500/2011) was aimed at implementing uniformity of wound care treatment across the community. Four clinical nurse specialists were put in charge of a newly formed network of “nurses of reference” operating in community settings, while for the patients enrolled a preferential pathway to be visited by hospital-based consultants was established. The nurse of reference takes a holistic approach towards the assessment and management of the patient with pressure ulcers and his caregivers, who rely on their nurse of reference throughout all stages of the pathway. Regular reassessment of the patient and possession of advanced skills in wound care allow the nurse of reference to correctly identify risk, educate and select the most appropriate treatment. This is achieved through the use of validated risk scales (Braden), high technology pressure relieving devices, advanced dressing products, single use Negative Pressure Wound Therapy (NPWT), ultrasounds therapy, NPWT with or without instillation and training of the caregivers.

**Results:** Implementation of this care system has improved patient outcomes both in terms of wound healing as in prevention, through cost-effective higher quality wound care, thus incrementing patient satisfaction.

**Conclusions:** The nurse of reference is a new figure designed to be the most valuable resource for patients with wounds in the community, providing the most appropriate treatment and minimising the costs of wound care.

**References:**


[P87] BIOFILM COMPLICATING PRESSURE ULCERS: LONG TERM EFFECTS OF HYPOCHLOROUS ACID SOLUTION (AOS): A CONSECUTIVE SERIES OF 45 PATIENTS

Benedetta Colasanti1, Mariacristina Adago1, Gaetano Manfredi1, Massimo Fomaciari1, Caroòlo Durante1
1 Contra Venere Onlus, Rome, Italy

Introduction: Biofilms have a relevant role in the pathogenesis of chronic wounds. They’re composed of microcolonies of bacterial cells encapsulated by polymeric substances acting as glue between the biofilm itself and the adhesion surface, entrapping nutrients required by the microbial population for its growth, while damaging and delaying cell migration, retarding the growth of granulation tissue. Several studies confirmed the presence of structured biofilm in chronic wounds as ulcers or pressure injuries.

The aim of our study was to observe the effect of AOS applied on pressure injuries and its effect on degradation of biofilm in wounds treated.

Methods: Since March 2016 to December 2017, patients respecting inclusion criteria were enrolled in the study. Wounds were cleansed with 0.9% saline followed by the application of super-oxidized solution with free chlorine (hypochlorous acid HClO at elevated concentration >95%) on soaked gauzes. Dressing changes were performed every 48 hours.

Inclusion Criteria: All patients presenting a non-healing pressure ulcer (> 6 mos), with proven polymicrobial and multidrug resistant colonization established by cultural buffer (swabs with synthetic tipped brush, quantitative, with Levine technique and antibiogram). Patients with any comorbidity were accepted.

Exclusion Criteria: Excluded from the study: Patients with wounds spontaneously healing, undergoing antibiotic therapies (systemic, topical, etc.), using any other products for cleansing (PHMB, Super-oxidized solution) or dressings that could perform a cleaning action.

Results: 45 patients were treated for an average time of 32 days, 40 (90%) obtained a total degradation of biofilm, verified with cultural buffer (Inclusion Criteria), 5 patients (10%) reported a significant reduction of bacterial load valued in the same way.

Conclusions: Hypochlorous solution left on the wounds bed on soaked gauzes, can be effective as unique treatment for degrading and reducing biofilm burden affecting chronic wounds.

References:

[P88] BEDSORES TREATED WITH O2-O3 VERSUS TRADITIONAL TREATMENT

Maria Cusmai1, Luigi Di Biscagl1
1 Universo Salute Opera Don Uva, Bisceglie, Italy

Introduction: Bedsores are complications caused by prolonged lodging in people with a predisposition, mostly fragile seniors.

Because of feces and urine they can become frequently infected, especially the sacral and Trochanteric ones. The treatment involves the surgical cleaning, antiseptic and for tissue regeneration dressings. The purpose of this study is to evaluate the antiseptic efficacy and the tissue regeneration induced by the oxygen ozone therapy.

Methods: 10 sacral bed sores have been treated in no diabetic patients aged 70 to 82. In 5 of them, the traditional treatment (washing, disinfection, surgical toilet and dressing) has been used. In others, O2-O3 has been used by periilesional infiltration and on the injury. We have measured the progression of the tissue repair at zero time, then after one and two weeks and also after one month time. In both groups we have administered the evaluating scales to measure pain and the CIRS for the co-morbidities.

Results: Findings lay for a better solution of bedsores treated by O2-O3 compared to the traditional treatment, with a quicker cleansing of the necrotic frustules, with a fast reduction of the decubitus area and a fast tissue regeneration and visible granulation from the bottom and from the edges after only one week. The bacterial contamination or the injuries’ infection were controlled or nullified in patients treated with O2-O3, while in the other group signs of bacterial inflammation persisted.

Conclusions: We can state that, differently from the traditional treatment, the O2-O3 therapy has proven to be faster in the resolution of the infection and in the scar tissue growth. As far as disadvantages, they deal with higher initial cost of appliance and training of medical personnel and, also, it is not necessary to use local and systemic pharmacological devices.

The benefits of traditional therapy refer to simplicity and ubiquitous endowment of the therapeutic devices, but with disadvantages due to the necessity of a double daily session, due to the cost of consumables and due to the time spent for.

References:
[P89] CENTER OF EXCELLENCE FOR NURSING SCHOLARSHIP: FIVE YEARS EXPERIENCE WITH PRESSURE INJURY PREVENTION

Stefano Casciato1, Marina Palombi2, Angela Pegratti1, Silvia Sferrazza1, Valentina Vanzi3

1. Center of Excellence for Nursing Scholarship, Rome, Italy
2. Polidico Umberto I, Center of Excellence for Nursing Scholarship, Rome, Italy
3. Opi Bologna (College of Nurses), Bologna, Italy
4. San Giovanni Hospital, Center of Excellence for Nursing Scholarship, Rome, Italy
5. Bambino Gesù Children’s Hospital, Center of Excellence for Nursing Scholarship, Rome, Italy

Introduction: In 2010, the first Italian nursing Center of Excellence (CECRIS) infrastructure was founded to support advances in nursing scholarship and improve the health care of the population. The activity of the CECRI was organized in four essential cores and multiple collaborative projects were conducted. The clinical practice pillar focused on multiple strategies for disseminating knowledge about evidence-based practice (EBP) into the hospital clinical arena and the initiation of several evaluation projects. Pressure injuries (PIs) are a major cause of morbidity, mortality and healthcare burden globally. Efforts to reduce the occurrence of PIs need to focus on prevention rather than on treatment. Even if pressure sores are accepted as avoidable, they are still a common occurrence. In order to foster EBP, the CECRI appointed a group of Clinical Nurse Leaders to organize clinical audits on PIs prevention.

Methods: Since 2013, several audits have been organized in three Roman hospitals. The main purpose of the audit projects was to improve PI risk assessment and prevention to reflect the guideline recommendations. The audits started with the data’s collection of medical records and direct patient observation by the researchers, who used a structured checklist with five items, based on five measurable criteria, suggested by EBN (NPJUAP-EPLAP and St.Osvaldo Malpighi University Hospital Guidelines). Then, an evidence-based resource pack (including Braden Scale) was given to each ward manager and an educational course was developed for nursing personnel. After this educational intervention, the audit phase was performed to re-evaluate clinical outcomes.

Results: Since 2013, more than 250 staff nurses have been involved in specific education courses on PIs prevention and almost 600 inpatients have been included. Overall, the re-evaluation phase of the clinical audits showed an improvement of the rates associated with all the five items: PI risk assessment and reassessment, repositioning, pressure redistribution devices and pressure ulcers frequency.

Conclusions: The clinical audit is an essential tool in ensuring quality patient care. The audit projects showed that the introduction of a validated and economic tool such as the Braden Scale and the professional update of nursing staff could significantly improve the management of patients at risk of PIs and reduce their prevalence.

References:

[P90] MEDICAL DEVICE-RELATED PRESSURE INJURIES IN AN ADULT INTENSIVE CARE CENTER

Amanda Brandão1, Vinicius Barbosa da Cunha1, Flavia Fernandes Manfredi de Freitas1, Joyce Caroline Dinelli Ferreira1, Luana Llagostera Sillano Gentil1

1. Hospital Israelita Albert Einstein, São Paulo, Brazil

Introduction: Medical devices are indispensable for health care, both for diagnosis and for the treatment of diseases. The use is quite high in critical patient care and can have consequences for the skin or mucosa, such as the development of pressure injury, which may increase the length of hospital stay. The objective of this study was to identify the epidemiology of medical device-related pressure injuries in an adult intensive care unit.

Methods: This is a retrospective descriptive study, carried out in a private institution in the city of São Paulo, developed in the ICU with 595 adult and elderly patients. The sample of this study consisted of hospitalized patients on the day of the quarterly data collection from July 2015 to July 2016.

Results: Thirty-six medical device-related pressure injuries occurred during the data collection period, representing an incidence rate of 4.5% in ICU. In relation to staging, mucosal membrane device-related pressure lesions were the most prevalent (38.9%), followed by stage 2 (22.2%), stage 4 (13.9%) and unclassifiable (8.3%). Most of the lesions occurred in the foot region (25%), followed by the genital regions (vulva and glans) with (16.7%) and the face (13.9%). The most common medical devices that caused pressure injury were respiratory devices (30.6%), followed by anti-embolism stockings (22.2%).

Conclusions: The rate of the medical device-related pressure injuries was lower than the rates found in the literature. Although medical and safety devices may be required, evidence-based care should be provided to prevent injury.

References:
Introduction: The use of medical devices and new technologies is increasingly present in health interventions, especially in intensive care, consequently damages the skin and mucous membranes increase their incidence exposing patients to complications. The objective of this study was to identify an association between the clinical characteristics of patients in intensive care and medical device-related pressure injuries.

Methods: This is a retrospective descriptive study, carried out in a private institution in the city of São Paulo, developed in the ICU with 595 adult and elderly patients. The sample of this study consisted of patients hospitalized on the day of data collection from July 2015 to July 2016. Descriptive statistics were used to describe patient characteristics and logistic regression to analyse the association of injury with related pressure to the medical device and clinical characteristics.

Results: The probability of development of pressure-related injury to the medical device was 4 times higher in patients who had circulatory shock (odds ratio: 3.91, 95% confidence interval [CI]: 1.23-12.48, P = 0.021) compared with patients who had no shock. The medical device-related pressure injuries were more likely to occur in patients who used corticosteroids (odds ratio: 3.07, 95% confidence interval [CI]: 1.22-7.75, P = .018), as well as in patients who used sedation (odds ratio [OR]: 3.33, 95% confidence interval [CI]: 1.27-8.76, P = 0.015). With respect to the Braden scale, with each higher risk classification, the chance increased by 20% in developing LP odds ratio [OR]: 0.80, 95% confidence interval [CI]: 0.72-0.90, P <0.001).

Conclusions: The results obtained in this study showed that the incidence of development of medical device-related pressure injuries represents a greater association with the clinical severity presented by the patients.

References:
**WORKSHOPS OVERVIEW**

**Workshop 1: Challenges in pressure ulcers prevention and management in critically ill patients**  
13 September 2018, 11:45 - 12:30, Colonne Hall  
Speakers: Maarit Ahtiala, Finland; Charlie Beetham, Italy  
In this workshop we will dive into the world of critically ill patients, going through the pressure ulcer (PU) risk factors of paediatric and adult intensive care patients (PICU/ICU). We will describe the essence of intensive care; explain the theoretical background and physiopathology of PU development in PICU and ICU. The practical session will take place through the use of photos and of a mannequin to present the practical prevention methods, which have been presented in the international guideline or have been clinically approved by experts.

**Workshop 2: Using simulation to enhance knowledge and skills in NPWT**  
13 September 2018, 11:15 – 16:15, Colonne Hall  
Speakers: Guido Ciprandi, Italy; Steven Smet, Belgium  
Despite the lack of strong scientific evidence about the indications and methods of usage of negative pressure wound therapy (NPWT), it is a much used technique to enhance and stimulate wound healing. However, the selection and application of the dressing and the settings of the pump are very challenging.  
With this hands-on workshop, we try to give a short overview of the available evidence and we try to address the practical challenges of choosing and applying a correct NPWT dressing. Multiple cases and photo material will be presented during this workshop.

**Workshop 3: Repositioning for pressure ulcer prevention**  
13 September 2018, 17:00 - 18:00, Colonne Hall  
Speaker: Menno van Etten, Norway  
To prevent Pressure Ulcers EPUAP’s guidelines suggest to positioning the patient in a 30 degrees side lying position, moving the body load from the sacral- and trochanter area to the gluteal area. In general, positioning patients is about giving the patient stability, comfort and the feeling of security. But you may ask the question if classical repositioning techniques and the materials used to position the patient really give the stability and comfort needed? And what about shear forces; are they increased on the Pressure Ulcer hotspots?  
Adding the 30 degrees posture to the list of lying positions gives extra challenges to the caretakers. Being aware how to positioning the upper body without rotations and positioning the legs preventing discomfort for the patient and without creating new PU hotspots. What role do the cushions used to position the patient play in off-loading and stabilizing the patient?

**Workshop 4: Collaborating with patients to improve research and practice**  
13 September 2018, 17:00 - 18:00, Colonne Hall  
Speaker: Delia Muir, United Kingdom; Emer Shanley, Ireland  
Patients and families learn a lot from living with health conditions. That valuable perspective can inform clinical practice, research and education. In the UK and Ireland there has been a move away from viewing patients simply as passive participants in research, towards working in partnership with them. For example collaborating with patients to develop services, design research, or teach health professionals. During this interactive workshop we will discuss good practice principles and practical tips for collaborating with patients. Participants will be invited to reflect on their own practice and consider if/how patient collaboration could inform their work.

**Workshop 5: Selection and managing dressings and dermal/skin substitutes**  
14 September 2018, 09:00 - 10:00, Colonne Hall  
Speaker: Valentina Vanzi, Italy; Serena Crucianelli, Italy  
More than 3,000 types of dressings are available on the market today to treat different types of wounds by targeting various aspects of healing process. However, clinicians’ ability to choose wound dressings on the basis of clinical evidence is hindered by the relative lack of robust clinical or cost-effectiveness evidence. The workshop will provide detailed information on the properties of the main categories of wound dressings and dermal/skin substitutes, focusing on their clinical indication, advantages and limitations. All these practical aspects will be discussed with the participants and analysed through several clinical cases.
SPECIALIST SESSIONS OVERVIEW

Specialist session 1: Pressure ulcer and malnutrition: A health problem for hospital inpatients: Supporting pressure ulcer care
Chairs: Nils Lahmann, Ida Marie Bredesen

SPS 1.1 Malnutrition as a precursor to pressure ulceration: Mary Litchford
SPS 1.2 Nutrition for pressure ulcers: Need for a reappraisal of the guidelines: Emanuele Cereda
SPS 1.3 Malnutrition screening in wounded patients to enhance the avoidance to pressure ulceration: Johanne Alhaug
SPS 1.4 Optimal nutritional care for pressure ulcer prevention and healing requires an adequate multidisciplinary approach: Jos Schols

Specialist session 2: When updating guidelines for clinical practice, the paediatric population should not be forgotten
Chairs: Jan Kottner, Lisette Schoonhoven

SPS 2.1 The NPUAP, EPUAP, PPPIA pressure ulcer guidelines: Jan Kottner
SPS 2.2 Updating the EPUAP, PPPIA, NPUAP guidelines 2019: Katrin Balzer
SPS 2.3 Paediatric guidelines development in Costa Rica: Geanina Carvajal

Specialist session 3: Biomarkers for identifying patients at risk of pressure ulcers
Chairs: Cees W.J. Oomens, Dan Bader

SPS 3.1 Inflammatory biomarkers sampled in sebum: The potential for early detection of skin damage: Peter Worsley
SPS 3.2 Early detection of skin damage using biomarkers: Jibbe Soetens
SPS 3.3 Can we use differences in tissue response to pressure and shear to identify patients at risk?: Cees W.J. Oomens; The Netherlands
MALNUTRITION AS A PRECURSOR OF PRESSURE ULCERATION

Mary Litchford
Case Software & Books, Greensboro, United States

Learning objectives of the presentation: Examine the relationship between malnutrition and poor clinical outcomes, including pressure-related ulcers, in hospitalized adults.

Discuss the use of validated screening tools and standardized criterion to identify individuals at risk for and with malnutrition.

Overview of the key messages: Studies report that more than 80% of hospitalized older adults are at risk for or are malnourished. A diagnosis of malnutrition is associated with increased length of stay, new institutionalization, risk for pressure injuries, and in-hospital mortality. Oral eating problems, weight loss, low body weight, and functional dependency are associated with increased risk for pressure injuries. Moreover, inadequate nutrient intake and low body weight are associated with slow and non-healing wounds.

Utilizing validated screening tools and characteristics of malnutrition in the context of the Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline provide a template to identify malnutrition in populations at risk for pressure injuries. The characteristics of malnutrition advance the use of nutrition-focused physical assessment and assessment of functional status as predictors of declining nutrition status.

Conclusion: Incorporation of the diagnostic characteristics of malnutrition in adults and children provides a vital tool for clinicians to identify hospitalized patients at risk for pressure injuries. A standardized approach to diagnose malnutrition will facilitate improved correlation between best practice related to the prevention and healing of pressure injuries. Systems are needed to track co-morbid conditions and diseases associated with malnutrition. The collection, analyzing and dissemination of evidence data supporting the malnutrition diagnosis will ensure resources are used efficiently and that the health of individuals is optimized.

NUTRITION FOR PRESSURE ULCERS: NEED FOR A REAPPRAISAL OF THE GUIDELINES?

Emanuele Cereda
Fondazione Irsrs Policlinico San Matteo, Pavia, Italy

Malnutrition and pressure ulcers (PUs) are closely linked entities and literature on this relationship is substantial. Malnutrition is a risk factor for PUs and PUs themselves are also responsible for a further deterioration of nutritional status due to increased energy expenditures and loss of proteins and nutrients through the skin. Previous guidelines (NPUAP-EPINAP-PPPIA), released in 2014, recommend nutritional screening and assessment in all patients at risk of or presenting with PUs and nutritional support should now be included in the multidimensional approach of all patients. Nutritional support has been associated with reduced incidence of PUs in high risk patients, while a positive energy and nitrogen balance is essential in wound healing. The provision of extra protein and calories in these patients is an important strategy to cover estimated requirements also due to impairment in spontaneous food intake. Artificial nutrition must be considered as well.

Nonetheless, in recent years, additional evidence has been collected and the related strength will be addressed in the upcoming edition of the guidelines to be released in 2019. Particularly attention will be paid to the quality of nutritional support - and the provision of specific nutrients involved in tissue repair - and its cost-effectiveness.
**[SPS 1.3] MALNUTRITION SCREENING IN WOUNDED PATIENTS TO ENHANCE THE AVOIDANCE TO PRESSURE ULCERATION**

**Johanne Alhaug**
The University of Oslo, Lovisenberg Diocesan Hospital, Oslo, Norway

**Introduction:** Our objective was to describe the prevalence of pressure ulcer (PU) and risk of malnutrition in a hospital population, in addition to examine whether Nutritional Risk Screening 2002 (NRS 2002) would be associated with the presence of PU in hospitalized patients (1).

**Methods:** A cross-sectional study conducted on 10 screening days (2012-2014) in a Norwegian hospital. Including patients (>18 years) admitted to medical or elective orthopedic surgical wards and excluding patients admitted to Hospice, intensive care unit, cognitively impaired and patients not able to read Norwegian. Initial NRS 2002 and skin examinations, using EPUAP classification (Stage I-IV), were conducted by ward nurses and nursing students. A clinical dietician conducted all final NRS 2002 screenings. SPSS version 22.0 and p<0.05 was used for all statistical analyses.

**Results:** Study population included 651 patients, with complete NRS 2002 screening data and skin examinations. The NRS 2002 screening identified 34% at risk of malnutrition. PU prevalence was 8% and associated with age >70 years, BMI below 20 and hospitalization in the medical department. Patients at risk of malnutrition by NRS 2002 revealed a higher presence of PU than no risk. Initial screening items “Is BMI<20?” and “Reduced dietary intake past week?” were strongly associated to PU, as was a composite item of “Reduced dietary intake past week OR Weight loss past 3 months”.

**Discussions:** Earlier published Norwegian data (2014) indicates that the NRS 2002 initial screening is strongly associated with hospitalization, morbidity, poor outcome and mortality (2). Risk of malnutrition and malnutrition by other screening tools indicates older age, BMI<18.5, reduced food intake the past week and unintentional weight loss the past 3 months, to be strongly related to manifestation of PU (3,4,5). The results show that malnutrition screening may have the potential for early identification of patients at risk of developing more serious PU.

**Clinical relevance:** Nurses are close to the patients at all times, and important contributors to systematic nutritional risk and PU screening, assessment, documentation and monitoring. Simplified methods for screening would be welcomed and result in more rapid detection and treatment of patients at risk.

**Conclusion:** Our study shows that risk of malnutrition by NRS 2002 (initial and final screening) was associated with PU in hospitalized patients. Initial screening items were strongly associated with PU and might be used for detecting patients at risk of malnutrition and PU.

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**[SPS 1.4] OPTIMAL NUTRITIONAL CARE FOR PRESSURE ULCER PREVENTION AND HEALING REQUIRES AN ADEQUATE MULTIDISCIPLINARY APPROACH**

**Jos M.G.A. Schols**
Dept. Hir and Dept. Family Medicine (Section Old Age Medicine/Community Geriatric Medicine), Maastricht University, Maastricht, Maastricht, Netherlands

Many pressure ulcer (PU) (prone) patients also suffer from complex problems in various domains of life. Both the complex profile of these patients as well as their often coexisting pressure ulcer(s) and malnutrition (risk) require an integrated approach, focusing on the older person as a human being with accompanying morbidities and complications and also supporting the family and other informal caregivers.

To fill in this integrated care perspective, multidisciplinary teamwork is necessary throughout the total care chain from community settings to institutional settings. Offering care from a multidisciplinary approach puts challenges on the organization of care, more specifically on the share each care professional gets in the care process, on the related mutual agreements between the different care professionals and on their interdisciplinary communication.

In this presentation, first, two issues will be addressed as derived from the literature: (1) the necessity of integrated multidisciplinary care for frail multimorbid patients and (2) some relevant theoretical aspects of multidisciplinary care.

Therefore, the focus will be more specifically on multidisciplinary nutritional care as part of integrated PU care, with reference to the NPUAP-EPUAP-PPPIA pressure ulcer guidelines.
THE NPUAP, EPUAP, PPPIA PRESSURE ULCER GUIDELINES

Jan Kottner
Charité-Universitätsmedizin Berlin, Department of Dermatology, Venerology and Allergology, Berlin, Germany

Introduction: Clinical practice guidelines are systematically developed statements to assist practitioners and patient decisions about appropriate healthcare for specific clinical circumstances.

Methods: This presentation gives a summary about the NPUAP, EPUAP, PPPIA pressure ulcer guidelines.

Results: In 2014, an international guideline development group published Clinical Practice Guidelines for the prevention and treatment of pressure ulcers. Twenty-seven small working groups were involved and a number of stakeholders. The guideline contains 36 chapters and 575 recommendations. Only few recommendations are based on a high strength of evidence and approximately half are strong positive recommendations (‘Definitely do it!’). The quick reference guide was translated into 13 languages and is widely disseminated: It has been downloaded 200,000 times and more than 4,000 hard copy full guideline books have been sold. The guideline has been cited in Web of Science more than 80 times, in Scopus 300 times.

Conclusion: A high quality guideline was published in 2014 by the NPUAP, EPUAP, and PPPIA. It was a successful and truly international and multidisciplinary collaboration based on expertise of large group of experts. Work on the guideline update has started already and it is expected to be finalized in 2019.

References:

[SPS 2.2] UPDATING THE EPUAP, PPPIA, NPUAP GUIDELINES 2019

Katrin Balzer
University of Lübeck, Institute for Social Medicine and Epidemiology, Nursing Research Unit, Lübeck, Germany

Learning objectives of the presentation: In 2019, an update of the international clinical practice guideline for prevention and treatment of pressure ulcers will be launched [1]. This presentation informs about key methods of this guideline update and aims to stipulate critical reflection of clinical and methodological challenges to be addressed by a guideline spanning various patient populations at risk, e.g., including preterm infants or terminally ill patients, at a global scale.

Overview of the key messages: Building on the robust methods underlying the existing international guideline, a protocol for the guideline update was developed which reflects the lessons learned from the dissemination and implementation of the current guideline version and follows most recent methodological recommendations for guideline development [2]. Several methodological requirements have been found to be of paramount importance for the usability of the guideline and will therefore play a prominent role for the update, e.g.:
- Systematic involvement of the consumer perspectives throughout all steps of the guideline update
- Limitation of the number of evidence-based recommendations, with clear-cut differentiation between interventions eligible for all populations at risk and those specific to certain populations like pediatric or palliative care patients
- Inclusion of methods and material facilitating the implementation of the guideline

Conclusion: The 2019 update of the international clinical practice guidelines will provide clinicians and consumers worldwide an up-to-date, internationally valid source of evidence-based information for decision-making with regard to pressure ulcer prevention or treatment. Compared to previous versions, it will much stronger reflect the consumers’ perspectives and distinguish more precisely between generic and population-specific recommendations.

References:

**[SPS 2.3] PAEDIATRIC GUIDELINES DEVELOPMENT IN COSTA RICA**

Geanina Carvajal  
Costa Rica University, San José, Costa Rica

**Learning objectives of the presentation:** To introduce the guidelines for prevention of pressure ulcers in paediatric Costa Rican population developed by an interdisciplinary team that base its work on the families, patients and healthcare professionals’ education.

**Overview of the key messages:** The evidence of the importance of Interdisciplinary teams in the prevention of pressure ulcers in paediatric population.

Each hospitalized children to be at risk of pressure ulcers must receive an individualized care.

To educate the family or legal guardian of children to be at risk of pressure ulcers is the key element when engaging them in the prevention process.

**Conclusion:** Standardized the guidelines for prevention of the pressure ulcers in paediatric population has reduced the rate of children with pressure injury; evidencing the importance of involving an interdisciplinary team in the development of an integral care for children at risk. The use of this guideline allows the healthcare professionals to understand how to prioritize interventions saving valued time for patients and staff.

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**[SPS 3.1] INFLAMMATORY BIOMARKERS SAMPLED IN SEBUM: THE POTENTIAL FOR EARLY DETECTION OF SKIN DAMAGE**

Peter Worsley  
University of Southampton, Faculty of Health Sciences, Southampton, United Kingdom

**Introduction:** When the skin is subjected to sustained pressure, or pressure in combination with shear it can lead to damage and the formation of chronic wounds. A precursor to chronic wound formation will be local inflation in the dermal tissues. A technique employing a commercially available non-invasive method has been utilised in a number of studies to evaluate inflammatory biomarkers in sebum collected from the skin surface. This presentation will describe the inflammatory status of the skin pre- and post-application of a range of medical devices.

**Methods:** Three distinct studies employed a randomized cross-over design on young and elderly individuals to evaluate the effects of medical device application. The devices included: respiratory masks [1,2], cervical collars [3] and an incontinence devices [4]. Sebum was sampled using a hydrophobic lipid-absorbent tape [5] for short periods before and after device application. The concentrations of these inflammatory markers were compared using varying device designs and application tensions, with refractory periods between loading conditions. Other measures of pressure, microclimate and comfort were recorded.

**Results:** Although there was some variance in the expression of cytokines, a significant up-regulation in inflammatory markers, typically IL-1β, was observed pre- to post-device application in all cases. This change in cytokine concentrations was also sensitive to the tension in which the device was applied. In the majority of cases the inflammatory reaction at the skin surface reduced during the refractory period of off-loading. In addition, there were some relationships between humidity and inflammation markers, revealing microclimate exacerbates the process.

**Discussions:** Inflammatory cytokines sampled non-invasively from the skin surface using commercial tapes provided the means to identify early indication of the status of skin tissues. This has been demonstrated through the evaluation of three medical devices, each of which can cause pressure ulcers.

**Clinical relevance:** Robust biomarkers of inflammation could provide a tool for objective monitoring of tissue status. Thus, an early warning system could be developed for patients, carers and clinicians to protect individuals from harmful mechanical forces applied by interventional medical devices which, if sustained, could lead to pressure ulcers.

**References:**

[5] Sebutape®
**[SPS 3.2] NONINVASIVE METABOLIC AND INFLAMMATORY BIOMARKERS FOR PRESSURE ULCER DEVELOPMENT**

**Jibbe Soetens**
Eindhoven University of Technology, Eindhoven, Netherlands

**Introduction:** The use of non-invasive biomarkers is a promising method for the early detection of pressure ulcers. The aim of this study is to establish whether these biomarkers, measured both in sweat and sebum, are indicative of local tissue compromise by quantifying their temporal release from two sites of the sacrum subjected to two distinct loading regimes.

**Methods:** The sacrum of thirteen healthy volunteers was subjected to two different loading protocols. After a baseline measurement, the left and right side of the sacrum were subjected to continuous and intermittent loading, respectively, at a pressure of 100 mmHg. Data was collected every 20 minutes, allowing for a total experimental time of 140 minutes. Sweat, collected at 37 °C and 80% RH in an environmental chamber, was analyzed for the anaerobic metabolites lactate and pyruvate. Sebum, collected at ambient conditions using a hydrophobic lipid-absorbent tape [1], was analyzed for the inflammatory cytokine IL-1α and lactate.

**Results:** Mean results show that continuous loading leads to an increase in relative sweat concentration of 27% and 47% for lactate and pyruvate, respectively. Both restored to baseline during the unloaded period. Intermittent loading also induced an increase in both lactate and pyruvate with loading. Similar results are obtained for sebum lactate, where the response to intermittent loading is even more pronounced.

Sebum IL-1α increased over 3-fold compared to baseline during continuous loading. Intermittent loading shows a significant increase and decrease of IL-1α upon loading and unloading, respectively. The IL-1α expression remained elevated upon unloading for both loading regimen. No significant difference was found in the quantified individual responses to intermittent and continuous loading. Large variability was observed between volunteers which potentially is indicative of the individual susceptibility.

**Conclusion:** There is a clear relation between the measured biomarkers and the applied loading regimen, making them suitable indicators for pressure ulcer development and the observed individual variability in the response potentially assists in the identification of patients at risk.

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**[SPS 3.3] CAN WE USE DIFFERENCES IN TISSUE RESPONSE TO PRESSURE AND SHEAR TO IDENTIFY PATIENTS AT RISK?**

**Cees W. J. Oomens**
Eindhoven University of Technology, Eindhoven, Netherlands

**Learning objectives of the presentation:** For the prevention of pressure ulcers it is necessary that they can be detected in a very early stage. Early detection of superficial ulcers may help to identify patients at risk and allow an adequate application of resources for the prevention. An early detection of pressure related deep tissue injury might help – using a rigorous unloading protocol – to prevent these from developing into category 3 or 4 pressure ulcers.

**Overview of the key messages:** A short overview will be given of the latest findings and on recent developments in the use biomarkers for early detection. For detection of superficial ulcers methodology is based on measurements of cytokines and metabolic waste products at the skin surface. Deep tissue injury is detected by means of biomarkers related to muscle damage in blood and urine.

**Conclusion:** It is clear from our recent animal- and human cohort studies that large variation in biomarker expression levels may hamper their application. However, at the same time this variation between individuals can potentially be used to identify patients at risk. In the presentation this opportunity will be discussed.
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EPUAP Lunch with experts

The EPUAP 2018 Annual meeting offers a unique possibility to meet some of the most renowned speakers at the Conference and ask your questions regarding two main topics: Teamwork and Technologies.

Many of your colleagues may sign up to enjoy a complimentary lunch while participating in an informal and stimulating discussion with an expert on a preselected topic. These two events will take place during the lunchtime of the first day of the conference and are dedicated to a restricted number of attendees.

Enjoy learning directly from the experts’ vision, attend the lunch with experts and find out everything you’ve always wanted to know about wound care but were afraid to ask!

**Lunch with experts I**

**Title:** The role of biomechanics in pressure ulcer prevention and treatment  
**When:** 12 September 2018, 11:30 - 13:00  
**Where:** Orangery

Meet the internationally-renowned experts in the field of biomechanics in pressure ulcer prevention and treatment! All participants of the conference are invited to join Prof. Amit Gefen from the Tel Aviv University, Israel and Prof. Cees W.J. Oomens from the Eindhoven University of Technology, the Netherlands for informal discussion at the lunchtime on Wednesday. The focus of the discussion will be the role of scientific research, innovation and translation of knowledge from academia to technologies in pressure ulcers.

**Lunch with experts II**

**Title:** How to enhance the integration of evidence and guidelines into practice  
**When:** 12 September 2018, 11:30 - 13:00  
**Where:** Colonne Hall

Meet the internationally-renowned experts in the field of teamwork and clinical practice in pressure ulcer prevention and treatment! All participants of the conference are invited to join Prof. Jane Nixon from the University of Leeds, United Kingdom and Prof. Zena Moore from the Royal College of Surgeons in Ireland, Ireland for informal discussion at the lunchtime on Wednesday. The focus of the discussion will be on how to enhance the integration of evidence and guidelines into practice.

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**EPUAP & Bambino Gesù Roma Walk**

*“Step up for pressure ulcer awareness, the Roman experience”*

**When:** Thursday 13.9.2018, 7:00 - 8:00  
**Where:** Route from Angelicum around Colosseum and back

EPUAP and Bambino Gesù Children’s Hospital will be leading the Roman Walk to highlight the importance of quality of life for pressure ulcer patients of all ages - from new born to elderly! Walk together with us for wounds you cannot always see.

The Roma Walk will start from the Angelicum at 7:00 am and walk to the Colosseum, and back again to the Conference Center. All participants will receive a T-shirt. The planned route is 2km and should take approximately 30 minutes.

At the end of the route, each participant will have the opportunity to write their thoughts about how they think we can improve wound care for patients. The collection together with pictures from the event will be presented on the EPUAP website.

EPUAP and Bambino Gesù Children’s Hospital will launch a press release about the event. All sponsorships raised for this event will be donated for the patients of the Bambino Gesù Children’s Hospital.
The wound healing is one of the most complex and challenging biological processes that occur numerous times during a human life. Many recent scientific researches in phyto-constituents for treatment of wounds revealed that plants could be involved in restoring normal skin architecture during the three different healing phases, such as inflammatory, proliferative and remodelling actions.

The first EPUAP Garden Class organised in the Orangery of the Angelicum Congress Centre will focus its attention to the scientific state of the art of natural products - plants, herbs, fungi, and animals (larvae) in the wound clinical management. Many different traditional remedies for treating wounds will be presented during the Garden Class. Do not miss the opportunity to join this unique session and share your experience with natural wound care!

Agenda
- Introduction: Why the Garden class?, Guido Ciprandi
- Worldwide traditional use of natural compounds, Serena Crucianelli
- Botanicals and Phyto-Chemicals in Wound Care, Renato Colognato
- State of the art of natural compounds in modern clinical practice, Serena Crucianelli
- Into the wild: chemistry and biochemistry beyond natural compounds and their effectiveness, Renato Colognato
- Final interaction and closing, Guido Ciprandi, Serena Crucianelli
EPUAP Experienced and Novice Investigator Awards 2018

As an authority that leads pressure ulcer research in Europe as well as internationally, the EPUAP recognizes leadership and contributions to pressure ulcer research by awarding two prizes each year at its annual meeting: The EPUAP Novice Investigator Award (awarded to a researcher at an early career stage) and the EPUAP Experienced Investigator Award (awarded for a significant, internationally recognized contribution to pressure ulcer research).

Based on the nominations received in 2018, the Scientific Committee of the European Pressure Ulcer Advisory Panel (EPUAP) has unanimously selected the Experienced and Novice Investigator of 2018:
- Peter Worsley, EPUAP Novice Investigator 2018
- Lisette Schoonhoven, EPUAP Experienced Investigator 2018

The winners will have presentations about their recent work and research during the Key session 14 on Thursday 13th September, 15:15 – 16:15 in Aula Major (Plenary Hall) and will be acknowledged during the EPUAP 2018 Conference dinner on Thursday 13th September, 20:00 in Villa Aurelia.

EPUAP 2018 Quality Improvement Projects Awards

EPUAP Quality Improvement Projects Awards aim to recognize and acknowledge the innovative quality improvement projects relating to the prevention of skin breakdown.

The Scientific Committee of the European Pressure Ulcer Advisory Panel (EPUAP) has unanimously selected the following winners for 2018:
- Protecting the skin our patients live in: Implementing strategies to prevent pressure ulcers; Helen Strapp, Ireland
- Audit of incontinence-associated dermatitis prevalence and skin barrier product usage in nursing and residential homes in a Welsh health board; Sarah Bradbury, United Kingdom
- Student nurse preparation for pressure injury prevention practice: A quality improvement project using social media and teaching rounds; Julie Santy-Tomlinson, United Kingdom
- Mind the gap: Reducing gaps in pressure ulcer documentation through small tests of change; Jeannie Donnelly, United Kingdom

The winners will present their projects and will be acknowledged during the Key session 11: EPUAP 2018 Quality Improvement Projects Awards session on Thursday 13th September, 11:45 – 12:45 in Aula Major (Plenary Hall).

Journal of Tissue Viability & Journal of Clinical Biomechanics Awards

The Journal of Tissue Viability & Journal of Clinical Biomechanics Awards can be awarded for the completed research in biomechanics or clinical research.

The Scientific Committee of the European Pressure Ulcer Advisory Panel (EPUAP) has unanimously selected the following abstracts to be candidates for the award of 2018:
- Evaluation of the impact of a therapeutic educational program concerning the prevention of risk of pressure ulcers for persons with a spinal cord lesion; Sandrine Robineau, France
- A novel high-throughput device for cell deformation reveals differences in cell membrane permeability between myotubes and myoblasts in vitro; Lisa Tucker-Kellogg, Singapore
- CI-NPWT: An essential tool for pocket complications involving cardiac implantable electronic devices in children; Guido Ciprandi, Italy
- Development and evaluation of simplified Finite Element model for pressure ulcer prevention in sitting posture; Pierre-Yves Rohan, France
All selected candidates will present their abstracts during the Key session 4: Journal of Tissue Viability & Clinical Biomechanics Awards on Thursday 12th September, 15:30 – 16:30 in Aula Major (Plenary Hall) after which the Award winner(s) will be chosen and acknowledged during the Welcome Reception on 12th September, 18:30 – 20:30 in the Exhibition Area. The Award winner(s) will be invited to submit a manuscript reporting the study in Clinical Biomechanics (for biomechanics research) or the Journal of Tissue Viability (for clinical research). The manuscript will be subject to peer-review and a final decision will be made according to the policy of the Journals.

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**EPUAP and 3M IAD and Pressure Ulcer Innovation Awards**

The award acknowledges innovative approaches in the treatment and prevention of pressure ulcer and IAD.

**EPUAP and 3M IAD and Pressure Ulcer Innovation Awards 2018 winners:**
- Biomechanics of heel pressure ulcers and the effect of Haglund’s deformity, Bethany Keenan, United Kingdom
- Incontinence associated dermatitis (IAD) and perianal septic lesions in children with onco-haematological diseases. Results of a protocol applied for IAD systematic prevention and early treatment 146 patients later, Marjola Gjergji, Italy

The winners will present their research during free paper session within their category and will be acknowledged during the EPUAP 2018 Conference dinner on Thursday 13th September, 20:00 in Villa Aurelia.

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**EPUAP and BAMBINO GESÙ Children’s Hospital Paediatric Award**

EPUAP and Awards Children’s Hospital Paediatric Awards aim to recognise a significant research/clinical work done in the field of pressure ulcer prevention and treatment for neonatal and paediatric patients.

The Scientific Committee of the European Pressure Ulcer Advisory Panel (EPUAP) has unanimously selected the following winners of 2018:
- Neonatal skin: How structural difference impact the diagnosis and healing of pressure injuries; Deanna Johnson, USA
- Atypical pressure ulcer presentation in paediatric disabilities and rare diseases: Personalized and properly tailored prevention; Serena Crucianelli, Italy

The winners will present their research during free paper session / poster presentation within their category and will be acknowledged during the EPUAP 2018 Conference dinner on Thursday 13th September, 20:00 in Villa Aurelia.

More information about the 2018 Awards is available on the conference website.
MÖLNLYCKE SYMPOSIUM
12 September, 13:00 - 14:30, Hall no. 11

Enhancing standard of care for pressure ulcer prevention through advanced innovation and collaboration

Chair: Joyce Black, Associate Professor of Nursing, University of Nebraska Medical Center, Omaha, Nebraska, United States of America

Speakers:
- Michelle Barakat-Johnson, District Lead Pressure Injury Prevention & Management, University of Sydney, Sydney, Australia
- Evan Call, Adjunct Faculty Member of the Microbiology Department, Weber State University, Ogden, Utah, United States of America
- Guido Ciprandi, Responsible for Pressure Ulcer and Complex Lesions, Division of Plastic and Maxillofacial Surgery, Dept of Surgery, Bambino Gesu’ Children’s Hospital, IRCCS, Rome, Italy
- Sue Creehan, Certified Wound Ostomy Nurse / Program Manager, Virginia Commonwealth University Medical Center, Richmond, Virginia, United States of America
- Amit Gefen, Professor in Biomedical Engineering, Tel Aviv University, Israel
- Bill Padula, Assistant Professor of Health Policy and Management, The Johns Hopkins University Bloomberg School of Public Health, Baltimore, Maryland, United States of America
- Nick Santamaria, Professor of Nursing Research, Translational Research, University of Melbourne and Royal Melbourne Hospital, Australia

Brief description: New and advanced, cost effective innovations continue to enhance the standard of care for pressure ulcer (PU) prevention across the globe. Supported by strong evidence, these innovations are designed to address the heart of the problem, protecting against the four extrinsic factors responsible for PU formation. Mölnlycke invites you to join its symposium to listen to key thought leaders in the field of PU prevention discuss the science behind these innovations, the evidence that demonstrates their effectiveness in protecting patients and saving costs. What are the critical success factors that make a prevention programme effective? Can these be consistently implemented in your facility? The expert panel will share with you some of the critical success factors they have experienced when implementing such programmes in the facilities where they work.

MÖLNLYCKE WORKSHOP
12 September, 15:30 - 16:30, Colonne Hall

Protecting the most vulnerable: Pressure injury prevention and developmental care in the NICU and PICU

Chair/Moderator:
Sue Creehan, Certified Wound Ostomy Nurse/Program Manager, Virginia Commonwealth University Medical Center, Richmond, Virginia, United States of America

Speakers:
- Guido Ciprandi, Responsible for Pressure Ulcer and Complex Lesions Project, Dept of Surgery and Transplantation Center, Ospedale Pediatrico Bambino Gesu, Rome, Italy
- Ann Marie Nie, Certified Wound Ostomy Nurse/HAC Lead of Hospital Acquired Condition on Pressure Injuries, Children’s Hospital & Clinics of Minnesota, Minneapolis, USA

Brief description: Pressure Injury (PI) prevention has to a large extent focused on the adult population. At the same time, we know that the neonatal and pediatric population needs protection and that their challenges can be different. This workshop will focus on highlighting clinical challenges and present interventions that have been successful in improving the protection of this patient population. In addition, to pressure injury prevention, it will also cover the developmental positioning in the NICU. The workshop will be a mix between clinical presentations and hands-on demonstrations.
ABIGO WORKSHOP
12 September 2018, 16:30 - 17:30, Hall no. 11

Sorbact® Technology for the prevention and treatment of wound infections. Experience from clinical use by Professor Guido Ciprandi.
Hands on work shop.

Speakers:
• Guido Ciprandi, Executive and Chair, European Pressure Ulcer Advisory Panel (EPUAP) Annual Conference, Rome-2018;

Brief description: Experience from clinical use of Sorbact® by Professor Guido Ciprandi will be presented. This will be followed by a hands on work shop lead by Sorbact® representatives. At the work shop wound models will be used for best practice and understanding of the Sorbact® Technology.

BRUIN BIOMETRICS SYMPOSIUM
13 September, 09:00 - 10:00, Aula Minor

Sub-epidermal moisture measurement - is it time to embed into the pressure ulcer prevention care pathway?

Speakers:
• Professor Amit Gefen, Tel Aviv University, Israel
• Professor Dimitri Beeckman, Ghent University, Belgium
• Patricia Wijndts, Co-Ordnator for Wound Care and Tissue Viability, Hospital Network Antwerp, Belgium

Brief description: A interactive session which will examine the role of sub-epidermal moisture in the aetiology of the early stages of pressure damage and the challenges facing healthcare practitioners in utilising existing tools such as Risk Assessment and Visual Skin Assessment. The session will close with a report on the experience of one healthcare team who have been embedding sub-epidermal moisture measurement into their care pathway. During the session the opinions of the audience will be sought via individual voting pads.

LINET WORKSHOP
13 September, 10:00 - 11:00, Colonne Hall

"Best practice in prevention – If I knew then what I know now..."

Speaker:
• Lorraine Demott, Independent Clinical Nurse Specialist and Moving and Handling Practitioner

Brief description: Healthcare professionals are expected to keep and update regularly a Continuous Professional Development (CPD) portfolio of which a reflective practice section is required. Reflective practice is a way of studying your own experiences to improve the way you work. It is very useful for healthcare professionals who want to carry on learning throughout their lives. The act of reflection is a great way to increase confidence and become more proactive and qualified professional.

This presentation is a personal reflection of a period of time in the presenter's life and questions whether the relationship between healthcare specialists could be improved. It asks whether healthcare specialists have become so specialised that they may have forgotten some of the basic knowledge they learnt many years previously. The presentation focuses on pressure ulcer prevention, moving and handling techniques and the choice of appropriate equipment.
3M LUNCH SYMPOSIUM
13 September, 12:45 - 13:45, Colonne Hall

A novel technology to avoid and reverse skin damage caused by moisture.

Chair: Prof. Corrado Maria Durante

Speakers:
• Valerie Hanssens
• Kris Bernaerts
• Marjola Gjergji

Brief description: Incontinence-Associated Dermatitis (IAD) represents a significant global health concern affecting up to 41% of nursing home residents and 35% of all patients in acute care settings. 3M has launched a novel technology to improve the treatment and prevention of IAD. From the moment this novel technology was launched clinical experts in the field of skin and wound care have tried and experienced the value that this can bring for their patients suffering from IAD or being at risk of IAD. Immediately after their first experiences, they recognized that this novel solution is not limited to IAD alone but also a valuable solution for other MASD lesions (Moisture Associated Skin Damage) and even partial thickness lesions of various causes. We would like to welcome you during our lunch session to come and listen to various clinical experts how they dealt with challenging cases and resolved it simply with Cavilon Advanced Skin Protectant.

SMITH & NEPHEW WORKSHOP
13 September, 14:15 - 15:15, Colonne Hall

CLOSER TO ZERO™ pressure ulcer incidence
Reducing the burden of pressure ulcers for patients, practitioners and providers
Featuring clinical and health economic outcomes from a recently published randomized controlled trial.

Speakers:
• Dr Cristiana Forni, Istituto Ortopedico Rizzoli, Bologna Italy
• Dr Richard Searle, Healthcare Economics Director, Health Economics, Smith & Nephew Advanced Wound Management

Brief description: In this symposium we will explore the impact pressure ulcers have on patients, practitioners and providers. We will also present the results from a recently published independent randomised controlled trial, which shows how a simple addition to standard preventative care can further reduce the incidence of pressure ulcers, whilst reducing overall costs.
**POLYMEM SYMPOSIUM**

13 September 2018, 15:15 - 16:15, Aula Minor

The value of inflammation management in pressure ulcer prevention

Chair: Zena Moore

Speakers:
- Keith Cutting: Countering inflammation in acute and chronic wounds
- Amit Gefen: The value in inflammation management for pressure ulcer prevention
- Bodo Günther: The practical use of an anti-inflammatory dressing in a busy wound clinic

Brief description: Acute inflammation, a normal response of the immune system to localized cell and tissue damage, is triggered by secretion of chemokines which attract immune-system cells to damage sites and facilitate their extravasation through increase in capillary permeability. The increased permeability of capillary walls in the acute inflammatory state consequently causes fluid leakage from the vasculature, and hence edema and associated pain. Nevertheless, acute inflammation is a necessary first step in healing. Chronic inflammation, on the contrary, is abnormal and may contribute to the damage cascade. Importantly, when the inflammation response is inadequate or disproportional, repair of tissue damage becomes impossible, and damage may progress further.

Polymeric membrane dressings are multifunctional dressings that focus and control inflammation and edema and reduce pain. Reducing the spread of inflammation and edema in tissues appears to be a unique feature of these dressings, which supports repair of tissue damage under intact skin, thereby tilting the subtle balance between the counteracting damage build-up and tissue repair processes, to the favor of reversibility and self-healing.

This symposium will provide education on acute and chronic inflammation in the context of pressure ulcers, will highlight the value in inflammation management for pressure ulcer prevention, and will then link the pathophysiology of inflammation with practical aspects of managing inflammation in the clinical setting, as means to prevent or arrest initial tissue damage.

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**KLOX TECHNOLOGIES SYMPOSIUM**

13 September, 17:00 - 18:30, Aula Minor

Photobiomodulation in healing process: New chance for bed pressures

Speakers:
- Alessandro Corsi, Department of Vulnology, Hospital San Raffaele, Milan

Brief description: An illustration of the PBM mechanism of action, with demonstration of clinical cases, with special attention to pressure sores.
HOSTED by
The Royal College of Surgeons in Ireland,
Ghent University,
Ghent University Hospital,
Charité-Universitätsmedizin
and the European Pressure Ulcer Advisory Panel

CME credits: The EPUAP will apply for CME accreditation for the Masterclass. The 2nd EPUAP Masterclass was granted 19 CME credits by the EACCME.

Target group: Healthcare professionals with experience in wound care and pressure ulcer prevention and treatment, healthcare industry.

3rd EPUAP Pressure Ulcer Prevention and Treatment Masterclass

12–14 March 2019
Dublin, Ireland

THE MASTERCLASS WILL FOCUS ON THE FOLLOWING TOPICS

- Aetiology and biomechanics of pressure ulcers
- Epidemiology, diagnosis and classification
- Prevention (including specific patient populations)
- Treatment (with a focus on complex cases)
- Guidelines and guideline development
- Implementation, quality indicators, quality improvement projects
- Basic principles about research and pressure ulcers (including health economics)
CONFERENCE VENUE
Angelicum University Congress Center,
Pontifical University of Saint Thomas Aquinas,
Largo Angelicum 1, 00184 Rome, Italy

CONFERENCE LANGUAGE
English
Key sessions in Aula Major will be simultaneously translated into Italian.

CONFERENCE HOURS

**Tuesday, 11 September**
16:00 – 18:00  Pre-registration at the conference venue

**Wednesday, 12 September**
07:30 – 18:00  Registration
09:00 - 10:00  Opening ceremony
10:00 – 18:00  Scientific sessions
09:00 – 17:00  Commercial exhibition
19:00 – 20:00  Welcome reception in the exhibition area (Angelicum)

**Thursday, 13 September**
08:00 – 18:00  Registration
08:00 – 18:00  Scientific sessions
09:00 – 17:00  Commercial exhibition
20:00 – 23:30  Conference dinner at Villa Aurelia

**Friday, 14 September**
08:00 – 12:45  Registration
09:00 – 12:45  Scientific sessions
08:30 – 12:00  Commercial exhibition

Thursday and after 10:00 on Friday A certificate with your CME credits will be issued after the conference and sent to you by email once you have filled in the feedback questionnaire provided by EPUAP.

TAXI
Taxis (white vehicles) are easy to find. If the light is green, they are free. Useful taxi numbers: +39 06-5551 (Samarcanda Line), +39 06-3570 (Soc. Coop Line), +39 06-6645 (Pronto Taxi Line), +39 06-4994 (La Capitale Line), +39 06 6645 (Prontotaxi).

BADGES
Please refer to the “Registration desk” at the conference venue to collect your name badge together with the conference documentation during the registration hours.

All participants and exhibitors should wear the name badge at all times throughout the whole conference programme including the social events.

ENTITLEMENTS

**Full conference registration:**
- Final programme and abstract book
- Admission to the full conference programme, coffee breaks & buffet lunch
- Welcome reception on 12 September at Angelicum.

**1-day registration:**
- Admission to all sessions and symposia of the day, coffee break & buffet lunch.

CERTIFICATES OF ATTENDANCE
All participants will receive their certificate of attendance by email after the conference.

LUNCH AND COFFEE BREAKS
Lunch and coffee breaks will be served in the Angelicum garden.

INFORMATION FOR SPEAKERS
All invited speakers and abstract presenters (both oral and poster) are asked to fill in the COI disclosure form towards the topic of their contribution and send it back to the EPUAP Business Office (office@epuap.org) or bring it to the registration desk on the first day of the conference.

From Wednesday, 12 September it is possible to upload the PowerPoint presentations (in format 16:9) at a Speakers Upload Centre. The Speakers Upload Centre entrance is located opposite to the main entrances to the Plenary Hall (please see the exhibition and venue plan on the page 160). There will be a technical support
present in the Speakers Upload Centre who will help each speaker to upload the presentation on a central conference laptop which is connected to all meeting rooms in the venue. All invited speakers and abstract presenters are kindly asked to make sure they uploaded their presentations at the latest 2 hours prior to the session.

All presentations taking place in the first morning sessions can be uploaded on the day before at the registration desk. Unless agreed with the conference organisers at the registration desk it is not allowed to use the personal laptops for presentations. Please bring your presentation on a memory stick. At the end of the conference, all presentations will be deleted so no copyright issues will arise.

EXHIBITION
The most relevant companies in the field of pressure ulcer and wound management will present the latest products and developments in field. The exhibition is opened during the conference programme. Lunch and coffee breaks will be served in the exhibition area, located around the garden in the archway.

INTERNET AND WIFI
Free WiFi is available all through the venue. WiFi login details are available at the registration desk.

MEETING ROOMS & SESSIONS

**Aula Major (Plenary Hall):** Key sessions (with the simultaneous translation into Italian) will take place here.

**Aula Minor:** Key sessions and industry satellite symposia will take place here.

**Colonne Hall:** EPUAP workshops, industry workshops, extra activities and free paper sessions will take place here.

**Hall no. 2:** Specialist sessions, free paper sessions and student free paper sessions will take place here.

**Hall no. 11:** Free paper sessions, student free paper sessions, industry satellite symposia and workshops will take place here.

**Orangery Garden:** Extra activities (Garden Class and Lunch with experts) will take place here.

**Emiciclo Hall:** Poster presentations A&B will take place here.

POSTER AREA
The posters will be located in Emiciclo Hall (a semi-circular corridor nearby Aula Major), please follow the signs onsite or ask for help at the registration desk.

The posters should be set up either on Tuesday 11 September, 16:00 - 18:00 (during the pre-registration) or on Wednesday 12 September, 07:00 - 09:00 (before the conference opening). All posters must be removed at the latest Friday 14 September before 12:00. The conference secretariat takes no responsibility for left or damaged posters.

EPUAP 2018 CONFERENCE SECRETARIAT
Vodickova 12/5
120 00 Prague 2
Czech Republic
Phone: +420 251 019 379
Email: office@epuap.org
ABOUT ROME
The result of more than 3000 years of urban and architectural development, the Italian capital is astonishing: a fascinating mixture of ancient ruins, impressive art and contemporary lifestyle, Rome is often referred to as an open-air museum and one of the world’s most inspiring cities.

The Vatican city, seat of the Roman Catholic Church, is the only example of a country within a city, its medieval and Renaissance boundaries are situated on the west bank of the Tiber River inside Rome.

You will get a chance to feel some ancient spirit thanks to this year conference venue right in the city center.

ABOUT CONFERENCE VENUE
Angelicum Congress Centre in Rome is located in the precise geographical centre of the city and dates back to 1569. The property is home to the Pontifical University of St Thomas Aquinas, one of the Vatican’s most important and prestigious places of learning for intellectuals in the Catholic world.
WELCOME RECEPTION
When: 12 September 2018, 18:30
Where: Angelicum Congress Centre

The Welcome Reception will take place in the Angelicum Congress Centre garden situated in the heart of Rome. EPUAP 2018 conference delegates will enjoy a relaxed Welcome Reception giving them the opportunity to make acquaintance with new colleagues and catch up with old friends in the beautiful location of the Angelicum garden.

CONFERENCE DINNER
When: 13 September 2018, 20:00
Where: Villa Aurelia (Largo di Porta S. Pancrazio, 2, Rome)

The Conference Dinner will take place at the Villa Aurelia. Built in the 17th century by Cardinal Girolamo Farnese and restored at the beginning of the new millennium, the Villa Aurelia is one of the most suggestive properties in Rome. The beauty of its gardens and the breath taking view of Rome will make the EPUAP 2018 Conference Dinner unforgettable.

CONFERENCE DINNER TRANSFERS
The first bus will be leaving from Hotel Quirinale (Via Nazionale 7) at 19:00, stopping immediately after at Hotel Pace Helvezia (Via Quattro Novembre 104) and Hotel Forum (Via Tor de’ Conti, 25). The second bus will do the same itinerary starting at Hotel Quirinale at 19:15.

All conference hotels are located in proximity of the 3 above mentioned hotels, we kindly ask you to choose the most convenient pick up place for you among these 3 options.

Busses will be leaving from Villa Aurelia back to Hotel Forum, Hotel Pace Helvezia and Hotel Quirinale in regular intervals starting at 22:30.

More information about the conference dinner transfers will be available at the registration desk.
Gold sponsors

3M
www.3m.com
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www.acelity.com
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APEX Medical
www.apexmedicalcorp.com
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Arjo
www.arjo.com
Stand 9

Care of Sweden
www.careofsweden.com
Stand 10

ConvaTec
www.convatec.it
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Klox Technologies
www.kloxtechnologies.com
Stand 13

LINET
www.linet.cz
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www.molnycke.com
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B.Braun
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Stand 26

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www.smith-nephew.com
Stand 4
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<th>Company</th>
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<tr>
<td>3M</td>
<td><a href="http://www.3m.com">www.3m.com</a></td>
<td>At 3M, we apply science in collaborative ways to improve lives daily. With $32 billion in sales, our 91,000 employees connect with customers all around the world. Learn more about 3M's creative solutions to the world's problems at <a href="http://www.3m.com">www.3m.com</a> or on Twitter @3M or @3MNews.</td>
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<tr>
<td>Abigo</td>
<td><a href="http://www.abigo.com">www.abigo.com</a></td>
<td>ABIGO Medical is the Swedish owner and manufacturer of Sorbact® wound dressings. Sorbact® Right from the start - Prevent and treat wound infections by lowering the bioburden.</td>
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<tr>
<td>Acelity</td>
<td><a href="http://www.acelity.com">www.acelity.com</a></td>
<td>KCI, an Acelity Company, is a global advanced wound care company committed to developing innovative healing solutions for customers and patients across the wound care continuum. We deliver value through solutions that aim to speed healing and lead the industry in quality, safety and customer experience.</td>
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<tr>
<td>APEX Medical</td>
<td><a href="http://www.apexmedicalcorp.com">www.apexmedicalcorp.com</a></td>
<td>Apex Medical, leading global manufacturer specialized in a variety of high pressure-reducing systems, with a long history of designing and manufacturing advanced pressure area care products throughout the World.</td>
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<tr>
<td>Arjo</td>
<td><a href="http://www.arjo.com">www.arjo.com</a></td>
<td>Arjo is a global supplier of medical devices, services and solutions that improve quality of life for people with reduced mobility. Our offering includes products and solutions for patient handling, hygiene, disinfection, medical beds, therapeutic surfaces and VTE. We also offer services such as training and Pressure Ulcer Prevention programs.</td>
<td>9</td>
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<tr>
<td>B.Braun</td>
<td><a href="http://www.bb">www.bb</a> Braun.com</td>
<td>B. Braun is one of the world’s leading providers and manufacturers of healthcare solutions today. We are the right partner for those who challenge barriers of wound care in any sense – from prevention to healing. With our range of products of Prontosan® and Askina®, we enable optimal healing for any type of wounds at every phase.</td>
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<tr>
<td>BBI</td>
<td><a href="http://www.bruinbiometrics.com">www.bruinbiometrics.com</a></td>
<td>BBI (Europe) Ltd modifies care pathways of chronic, preventable conditions through developing and collaboratively integrating innovative biomimetic-sensor based medical devices and point-of-care diagnostic solutions for early detection and monitoring. The company’s lead product is the SEM Scanner, a hand-held non-invasive device that assesses sub-epidermal moisture, an early indicator for pressure ulceration.</td>
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<tr>
<td>Care of Sweden</td>
<td><a href="http://www.careofsweden.com">www.careofsweden.com</a></td>
<td>We are one of Sweden’s largest manufacturer and supplier of mattresses, cushions and pillows as aids in pressure ulcer prevention and treatment. We proudly develop our own technology and our products are made with high quality in Sweden. We are present in 30+ countries around the world.</td>
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<tr>
<td>CollPlant</td>
<td><a href="http://www.collplant.com">www.collplant.com</a></td>
<td>CollPlant is a regenerative medicine company focused on 3D bioprinting of organs, tissues, and scaffolds and on developing and commercializing tissue repair products for orthobiologics, advanced wound care and aesthetics markets. CollPlant’s products are based on its rhCollagen (recombinant human collagen) platform, produced with CollPlant’s proprietary plant-based genetic engineering technology.</td>
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<tr>
<td>ConvaTec</td>
<td><a href="http://www.convatec.it">www.convatec.it</a></td>
<td>ConvaTec is a global medical products and technologies company focused on therapies for the management of chronic conditions, with leading market positions in advanced wound care, ostomy care, continence and critical care, and infusion devices. ConvaTec’s products provide a range of clinical benefits including infection prevention, improving patient outcomes.</td>
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<tr>
<td>Endospin Italia</td>
<td><a href="http://www.phytoceuticals.ch">www.phytoceuticals.ch</a></td>
<td>Endospin Italia is distributor for Italian market of 1 Primary Wound dressing product of Phytoceuticals. Phytoceuticals is a Swiss life science company founded in 2007. We develop innovative medicinal applications from traditionally used natural extracts by making smart use of nature. The current focus is to develop and market first-in-class advanced wound care products.</td>
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**ETAC**
**www.etac.com**
Etac is world-leading developer of ergonomic mobility aids for people in all stages of life. For numerous care situations, we offer state-of-the-art products that aim to enhance activity, regardless of physical circumstances. Our heart lies in the solutions that optimize quality of life for the individual, their family and caregivers. Etac - Creating Possibilities.

**EWMA**
**www.ewma.org**
Visit the Leading Conference on Wound Management; the EWMA Annual Conference taking place in Gothenburg, Sweden from 5 – 7 June 2019. Experience high level scientific presentations, hands-on workshops and networking events. The European Wound Management Association (EWMA) is a European non-profit umbrella organisation, linking national wound management organisations, individuals and groups within wound care.

**Fidia**
**www.fidiapharma.com**
Fidia farmaceutici, part of Fidia Pharma Group, is an Italian leading developer and manufacturer (operations are FDA-approved) of innovative products based on hyaluronic acid (650+ patents), in joint care, wound healing, ophthalmology, aesthetics and regenerative medicine. Products are available in nearly 100 countries worldwide, through wholly-owned subsidiaries and commercial partners.

**Frontier Medical Group**
**www.frontier-group.co.uk**
Frontier Medical Group is a market leading company manufacturing and supplying innovative pressure area care solutions for healthcare providers both in the UK and internationally, including the Repose®, Ultracore, Toto® and Dermis Plus® ranges. Visit us on stand no.23 to discover how these solutions can help your patients.

**Integra LifeSciences**
**www.integralife.com**
Integra LifeSciences is a world leader in medical technology, dedicated to limiting uncertainty for clinicians, so they can concentrate on providing the best treatment options for their patients. Integra offers innovative regenerative collagen-based solutions for dermal repair and soft tissue reconstruction, used successfully in more than 10 million procedures worldwide.

**Journal of Wound Care**
**www.magonlineibrary.com/toc/jowc/current**
The Journal of Wound Care (JWC) is widely acknowledged as the global leader in wound care publications, internationally recognised and respected for the quality of our articles. Guided by key opinion-leaders, JWC defines cutting edge wound care practice, identifying future trends in the field and communicating best current practice.

**KloxF® Technologies**
**www.kloxtechnologies.com**
KloxF® Technologies is a global wound care and regenerative medicine company based on Biophotonic technology. We are committed to advancing the science of healing and restoring people’s lives. The innovative and complementary KloxF® products portfolio delivers value through solutions that speed healing. For further information please visit kloxtechnologies.com.

**LINET**
**www.linet.cz**
LINET Group is the biggest European manufacturer and supplier of hospital beds for healthcare and the sphere of long-term care. The beds, mattresses and other equipment are designed to support the treatment and convalescence of the patient as well as safe, ergonomic and less physically demanding nursing.

**Maxxcare®**
**www.maxxcare.com**
Maxxcare is a family business and the manufacturer of the Heel Pro Evolution. An medical device that can be used for preventive and curative care of Heel Pressure Ulcers/Injuries. We are operating in 18 countries at the moment and we have 3 sizes available of our heel boot.
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<tr>
<td>MDVSN</td>
<td><a href="http://www.southampton.ac.uk/mdvsn">www.southampton.ac.uk/mdvsn</a></td>
<td>The global aim of the MDVSNPLUS: Intelligent sensing to promote self-management, is to bring disruptive technologies to the medical device market to promote sustainable evolution and long-term healthcare improvements. We work with partners to produce cost-effective functional medical device designs and sensing technologies that can minimise the risk of damage to vulnerable tissues to improve patient safety.</td>
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<tr>
<td>Medstrom</td>
<td><a href="http://www.medstrom.it">www.medstrom.it</a></td>
<td>The Dolphin Therapy mattress from Medstrom simulates immersion into a fluid medium, enabling full immersion and envelopment, significantly reducing pressure, shear and tissue deformation. Dolphin assists in the treatment of patients with very complex needs, protecting and healing vulnerable skin, helping with pain management and enabling a reduced the need to reposition.</td>
<td>18</td>
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<tr>
<td>Möllycke</td>
<td><a href="http://www.mollycke.com">www.mollycke.com</a></td>
<td>We deliver innovative solutions for managing wounds, improving surgical safety and efficiency and preventing pressure ulcers. Solutions that help achieve better outcomes and are backed by clinical and health-economic evidence. We are guided by a single purpose: to help healthcare professionals perform at their best. And we’re committed to proving it every day.</td>
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<td>PolyMem / Ferris</td>
<td><a href="http://www.polymem.com">www.polymem.com</a></td>
<td>PolyMem is a unique and patented multifunctional polymeric membrane dressing (not a foam dressing). PolyMem = More healing &amp; Less pain.</td>
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<tr>
<td>Service Med</td>
<td><a href="http://www.service-med.it">www.service-med.it</a></td>
<td>Since 1992 Service Med SpA offers rent and management services of high efficiency anti decubitus systems manufactured under our brand MKS-Innovatech. Given the large experience in wound prevention, our current goal is to give patients a complete support, including the wound care management.</td>
<td>20</td>
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<tr>
<td>Smith &amp; Nephew</td>
<td><a href="http://www.smith-nephew.com">www.smith-nephew.com</a></td>
<td>Smith &amp; Nephew supports healthcare professionals in more than 100 countries in their daily efforts to improve the lives of their patients. We do this by taking a pioneering approach to the design of our advanced medical products and services, by securing wider access to our diverse technologies for more customers globally, and by enabling better outcomes for patients and healthcare systems.</td>
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<tr>
<td>Sofar</td>
<td><a href="http://www.sofarfarm.it">www.sofarfarm.it</a></td>
<td>Sofar S.p.A is 50 years old. Company founded in 1968. Missions: to create the most valued Company by providing Advanced Wound Care solutions to patients suffering from Chronic and Acute wounds.</td>
<td>16</td>
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<tr>
<td>Stryker</td>
<td>patientcare.eu.stryker.com</td>
<td>Stryker’s Medical division develops innovative medical equipment focused on improving outcomes for patients and caregivers. We are focused on safety, prevention, and ease of use - bringing caregivers confidence and delivering proven outcomes.</td>
<td>24</td>
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<tr>
<td>Texisense</td>
<td><a href="http://www.texisense.com">www.texisense.com</a></td>
<td>Texisense addresses pressure ulcer prevention in wheelchair or bed ridden patients. Our devices rely on pressure sensing fabric continuously monitoring the skin-support interface. In our TextiCare product, this measurement is processed by a smart algorithm that analyses the patient’s postural habits, and suggests the most favorable seating configuration.</td>
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<tr>
<td>WUWHs</td>
<td><a href="http://www.wuwhs.com">www.wuwhs.com</a></td>
<td>WUWHs is the premier wound care professional association and presents more than 90% of all practicing wound care specialist in the world. The Association’s top priority is to raise and maintain the standard of the medical practice of wound care and improve its practice.</td>
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EPUAP 2018 Exhibitors

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<td>Abigo</td>
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<td>Acelity</td>
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<td>APEX Medical</td>
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<td>Arjo</td>
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<td>B.Braun Medical AG</td>
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<td>Bruin Biometrics</td>
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<td>Care of Sweden</td>
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<td>CollPlant</td>
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<td>Endospin Italia</td>
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<td>Integra</td>
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<td>Journal of Wound Care</td>
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<td>Klox Technologies</td>
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<td>LINET</td>
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<td>Mölnlycke</td>
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Catering Stations:
- Hall no. 2
- Hall no. 11

Exhibition Areas:
- Hall no. 2
- Hall no. 11

 Speakers Upload Centre

Orangery Garden

EPUAP Organisers Office

Exhibitors Storage Room

Collone Hall

Aula Minor

Aula Major (Plenary Hall)

Poster Area

Main Entrance

Registration Desk
Notes
Gold sponsors

3M

KCI

APEX

arjo

Care of Sweden

ConvaTec

KLOX Technologies

Linet

Mölnlycke

PolyMem

Service Med

Stryker

Silver sponsors

B Braun

Smith & Nephew