



EPUAP VIRTUAL MEETING

24 September 2020

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ABSTRACT BOOK

PROGRAMME OVERVIEW

Time zone CET	Thursday 24 September 2020		
	Track A	Track B	Track C
09:00 - 09:15	Opening by Dimitri Beeckman		
09:15 - 10:30	Session 1A: Medical device related pressure injuries; <i>Chair: Peter Worsley</i>	Session 1B: Prophylactic dressings; <i>Chair: Jane Nixon</i>	
09:15 - 09:35	Prevention and management of device related pressure ulcers: Reflecting on a decade of improvement and challenges to be addressed; <i>Janet Cuddigan, United States</i>	Effectiveness of two silicone dressings for sacral and heel pressure ulcer prevention in 475 high risk intensive care patients; <i>Elisabeth Hahnel, Germany</i>	
09:35 - 09:55	Evaluating performance of medical devices in minimising risk of soft tissue damage; <i>Dan Bader, United Kingdom</i>	Silicone adhesive multilayer foam dressings as adjuvant prophylactic therapy to prevent hospital-acquired pressure ulcers: a nationwide multicentre randomised open label parallel group medical device trial; <i>Dimitri Beeckman, Belgium</i>	
09:55 - 10:15	Clinical perspectives on preventing device related pressure ulcers and the new International Consensus; <i>Paulo Alves, Portugal</i>	Systematic review prophylactic dressings for heel pressure ulcers; <i>Clare Greenwood, United Kingdom</i>	
10:15 - 10:30	Q&A	Q&A	
10:30 - 10:45	Short break		
10:45 - 12:00	Session 2A: PPE and pressure injuries; <i>Chair: Carina Baath</i>	Session 2B: Prone positioning - patient perspective and staff perspective; <i>Chair: Maarit Ahtiala</i>	
10:45 - 11:05	The problem of facial injury using PPE in the general care setting; <i>Steven Smet, Belgium</i>	Prone positioning ARDS patients. Where are we and where do we go from there?; <i>Claude Guérin, France</i>	
11:05 - 11:25	The challenges of using PPE in the nursing home sector; <i>Paulo Alves, Portugal</i>	Pressure injury prevention for critically ill COVID-19 patients in a prone position; <i>Michelle Barakat-Johnson, Australia</i>	
11:25 - 11:45	Providing a solution for healthcare staff using PPE - The Facial Pressure Ulcer Prevention Programme; <i>Natalie McEvoy, Ireland</i>	Challenges faced with morbidity obese patients during COVID-19; <i>Chenel Trevellini, United States</i>	
11:45 - 12:00	Q&A	Q&A	
12:00 - 12:45	Lunch break		Industry session, Mölnlycke (12:00 - 12:45) Effective treatment of pressure ulcers during a pandemic
12:45 - 14:00	Session 3A: Pressure ulcer aetiology; <i>Chair: Amit Gefen</i>	Session 3B: Free Paper Session; <i>Chair: Dimitri Beeckman</i>	
12:45 - 13:05	Pressure ulcer aetiology viewed through the prism of COVID; <i>Amit Gefen, Israel</i>	Testing Sorptivity and Durability of Wound Dressings in a Simulated System; <i>Adi Lustig, Israel</i>	
13:05 - 13:25	Translating aetiological knowledge to support surface science; <i>David Brienza, United States</i>	An integrated modelling framework for optimizing NPWT; <i>Aleksei Orlov, Israel</i>	
13:25 - 13:45	Frequently moving patients may be just as at-risk as are immobile patients; <i>Aglecia Budri, Ireland</i>	Morbidly obese patient - is it a challenge for an intensive care multidisciplinary team?; <i>Vanda Tomášková, Czech Republic</i>	
13:45 - 14:00	Q&A	Prevention of pressure ulcers among individuals cared for in the prone position: lessons for the COVID-19 emergency; <i>Pinar Avsar, Ireland</i>	
14:00 - 14:15	Short break		
14:15 - 15:30	Session 4A: Guidelines session; <i>Chair: Zena Moore</i>	Session 4B: Contemporary issues for pressure ulcer prevention & management among children & young adults; <i>Chair: Guido Ciprandi</i>	
14:15 - 14:35	The International Prevention and Treatment of Pressure Ulcers/ Injuries Clinical Practice guideline: an update; <i>Jan Kottner, Germany</i>	Children show increase in burn and home-related injuries over COVID-19 lockdown; <i>Serena Crucianelli, Italy</i>	
14:35 - 14:55	The patient perspective: The consumer survey; <i>Emily Haesler, Australia</i>	Fast regenerative properties of acellular fish skin grafts in wounded children of the pandemic: An additional helping; <i>Guido Ciprandi, Italy</i>	
14:55 - 15:15	Guideline methodology: How to make the best out of theory and research for clinical practice in pressure ulcer prevention and management; <i>Katrin Balzer, Germany</i>	Characteristic of IAD in children with oncohematological disease during the Covid-19 pandemic period; <i>Marjola Gjergji, Italy</i>	
15:15 - 15:30	Q&A	Q&A	
15:30 - 15:45	Short break		
15:45 - 17:00	Session 5A: Surgical management of pressure ulcers; <i>Chair: Serena Crucianelli</i>	Session 5B: Student Free Paper Session; <i>Chair: Susanne Coleman</i>	Session 5C: Teaser/poster session; <i>Chair: Carina Baath</i>
15:45 - 16:05	Surgical repair of pressure ulcers; <i>Guido Ciprandi, Italy</i>	A multi-layered prophylactic dressing substantially alleviates facial tissue loads in prone-position surgeries; <i>Lea Peko, Israel</i>	
16:05 - 16:25	Post-operative management; <i>Paulo Alves, Portugal</i>	Feasibility of using 2D ultrasound data for building a personalized numerical model of the sacral region for the evaluation of the subject-specific risk of sacral pressure; <i>Ekaterina Mukhina, France</i>	
16:25 - 16:45	Rehabilitation and preparation for home; <i>Jitka Klugarova, Czech Republic</i>	The contribution of artificial intelligence to the diagnosis and management of chronic and acute wounds: A scoping review; <i>Dafna Schwartz, Israel</i>	
16:45 - 17:00	Q&A	The problematics of wounds related to nursing care in intensive care units - the questionnaire survey; <i>Natália Antalová, Czech Republic</i>	
17:00 - 17:05	Closing by Dimitri Beeckman		

Key session 1A: Medical device related pressure injuries; *Chair: Peter Worsley*

- 1A-1 Prevention and management of device related pressure ulcers: Reflecting on a decade of improvement and challenges to be addressed; *Janet Cuddigan, United States*
- 1A-2 Evaluating performance of medical devices in minimising risk of soft tissue damage; *Dan Bader, United Kingdom*
- 1A-3 Clinical perspectives on preventing device related pressure ulcers and the new International Consensus; *Paulo Alves, Portugal*

Key session 1B: Prophylactic dressings; *Chair: Jane Nixon*

- 1B-1 RCT silicone dressings for sacral and heel pressure ulcer prevention in 475 high risk intensive care patients; *Elisabeth Hahnel, Germany*
- 1B-2 Silicone adhesive multilayer foam dressings as adjuvant prophylactic therapy to prevent hospital-acquired pressure ulcers: a nationwide multicentre randomised open label parallel group medical device trial; *Dimitri Beeckman, Belgium*
- 1B-3 Systematic review prophylactic dressings for heel pressure ulcers; *Clare Greenwood, United Kingdom*

Key session 2A: PPE and pressure injuries; *Chair: Carina Baath*

- 2A-1 The problem of facial injury using PPE in the general care setting; *Steven Smet, Belgium*
- 2A-2 The challenges of using PPE in the nursing home sector; *Paulo Alves, Portugal*
- 2A-3 Providing a solution for healthcare staff using PPE - The Facial Pressure Ulcer Prevention Programme; *Natalie McEvoy, Ireland*

Key session 2B: Prone positioning - patient perspective and staff perspective; *Chair: Maarit Ahtiala*

- 2B-1 Prone positioning ARDS patients. Where are we and where do we go from there?; *Claude Guérin, France*
- 2B-2 Pressure injury prevention for critically ill COVID-19 patients in a prone position; *Michelle Barakat-Johnson, Australia*
- 2B-3 Challenges faced with morbidity obese patients during COVID-19; *Chenel Trevellini, United States*

Key session 3A: Pressure ulcer aetiology; *Chair: Amit Gefen*

- 3A-1 Pressure ulcer aetiology viewed through the prism of COVID; *Amit Gefen, Israel*
- 3A-2 Translating aetiological knowledge to support surface science; *David Brienza, United States*
- 3A-3 Frequently moving patients may be just as at-risk as are immobile patients; *Aglecia Budri, Ireland*

Key session 4A: Guidelines session; *Chair: Zena Moore*

- 4A-1 The International Prevention and Treatment of Pressure Ulcers/ Injuries Clinical Practice guideline: an update; *Jan Kottner, Germany*
- 4A-2 The patient perspective: The consumer survey; *Emily Haesler, Australia*
- 4A-3 Guideline methodology: How to make the best out of theory and research for clinical practice in pressure ulcer prevention and management; *Katrin Balzer, Germany*

Key session 4B: Contemporary issues for pressure ulcer prevention & management among children & young adults; *Chair: Guido Ciprandi*

- 4B-1 Children show increase in burn and home-related injuries over COVID-19 lockdown; *Serena Crucianelli, Italy*
- 4B-2 Fast regenerative properties of acellular fish skin grafts in wounded children of the pandemic: an additional helping; *Guido Ciprandi, Italy*
- 4B-3 Characteristic of IAD in children with oncohematological disease during the Covid-19 pandemic period; *Marjola Gjergji, Italy*

Key session 5A: Surgical management of pressure ulcers; *Chair: Serena Crucianelli*

- 5A-1 Surgical repair of pressure ulcers; *Guido Ciprandi, Italy*
- 5A-2 Post-operative management; *Paulo Alves, Portugal*
- 5A-3 Rehabilitation and preparation for home; *Jitka Klugarova, Czech Republic*

Free paper session 3B; *Chair: Dimitri Beeckman*

- 3B-1 Testing sorptivity and durability of wound dressings in a simulated system; *Adi Lustig, Israel*
- 3B-2 An integrated modelling framework for optimizing NPWT; *Aleksei Orlov, Israel*
- 3B-3 Morbidly obese patient - is it a challenge for an intensive care multidisciplinary team?; *Vanda Tomášková, Czech Republic*
- 3B-4 Prevention of pressure ulcers among individuals cared for in the prone position: lessons for the COVID-19 emergency; *Pinar Avsar, Ireland*
- 3B-5 Deferoxamine improves wound healing in a mouse model of pressure ulcers with delayed muscle regeneration; *Lisa Tucker-Kellogg, Singapore*
- 3B-6 Exudate fluid mechanics and its influence on wound healing; *Daphne Weihs, Israel*

Student free paper session 5B; Chair: *Susanne Coleman*

- 5B-1 A multi-layered prophylactic dressing substantially alleviates facial tissue loads in prone-position surgeries; *Lea Peko, Israel*
- 5B-2 Feasibility of using 2D ultrasound data for building a personalized numerical model of the sacral region for the evaluation of the subject-specific risk of sacral pressure; *Ekaterina Mukhina, France*
- 5B-3 The contribution of artificial intelligence to the diagnosis and management of chronic and acute wounds: A scoping review; *Dafna Schwartz, Israel*
- 5B-4 The problematics of wounds related to nursing care in intensive care units - the questionnaire survey; *Natália Antalová, Czech Republic*
- 5B-5 Transtibial prosthetic users as a risk group for deep tissue injuries; *Marisa Graser, United Kingdom*
- 5B-6 Development of a finite element model for the heterogeneous structure of the calcaneal fat pad to study its loading distribution. Insights for stress-related injuries; *Alessio Trebbi, France*

Teaser/poster session 5C; Chair: *Carina Baath*

- 5C-1 The role of mechanoactivation as a potential mechanism activated in vivo during the pressure ulcer healing under influence of the radial shock waves; *Mirosław Sopol*
- 5C-2 Preliminary placebo-controlled study on the clinical effects of radial shock waves in pressure ulcers using a planimetric and clinimetric assessments; *Robert Dymarek*
- 5C-4 Introducing the CREW programme (Carers Resource on Education for Wound care); *Kirstie Atkinson*
- 5C-5 Work in progress: preventing pressure ulcers using new technology to support real time repositioning in a hospital setting; *Anne Pontoppidan*
- 5C-6 Repeatability and reliability of sub-epidermal moisture (SEM) readings in dorsal (sternum) and ventral (sacrum and heel) anatomical locations; *Zoe Wood*
- 5C-7 Effectiveness of pressure injury prevention training; *Vanessa Abreu Da Silva*
- 5C-8 Using a thin silicone foam and a care pathway to support device related pressure ulcer prevention in an acute trust; *Sarah Charlton*
- 5C-9 How to manage a trachyostomy pressure injury -an innovative approach; *Alan McAlpine*
- 5C-10 Negative consequences and regression of pressure ulcer healing due to the lack of continuity of shock wave treatment - a clinical case report; *Izabela Kuberka*
- 5C-11 An evaluation of proning injuries in critical care during the covid-19 pandemic; *Claire Randell*
- 5C-12 Development and implementation prevention pressure ulcer protocol at surgical center; *Wallan Masson*
- 5C-13 PPE related skin reactions in healthcare professionals during covid19; *Nkemjika Abiakam*
- 5C-14 Prevalence of medical device-related pressure injury in hospitalized patients; *Aline Ramalho*
- 5C-15 Incidence, typology and measures of prevention and treatment of skin injuries associated with the use of personal protective equipment in health care professionals during the covid-19 pandemic in Spain.GNEAUPP-epi-lec-covid19 study (preliminary results); *Joan Enric Torra-Bou*
- 5C-16 Evaluation of cost effectiveness with the use standard resource in patient positioning compared to the use of moldable fluidized positioners in ICU s beds; *Paloma Lemos*
- 5C-17 Effect of two technologies on the prevention of pressure injury associated with the use of personal protection equipment in health professionals in front of the pandemic by covid-19: randomized clinical trial; *Vanessa Abreu Da Silva*
- 5C-18 Cost saving and reduction in pressure ulcers through use of hybrid mattress; *Paula O'Malley*
- 5C-19 Pressure injury prevention: implementation of strategies to reduce incidence in a private hospital in Sao Paulo; *Wallan Masson*
- 5C-20 Pu prevalence in patients hospitalized for covid-19 disease in France; *Sandrine Robineau*
- 5C-21 Initiatives from a research group in stomal therapy nursing for the skin health promotion in health professionals working in the front line of covid-19 pandemic; *Aline Ramalho*
- 5C-22 Case report skin manifestation in a patient With covid-19: Kennedy's terminal ulcer; *Amanda Cristina Maria Aparecida Gonçalves Brandão*

IA-I

PREVENTION & MANAGEMENT OF DEVICE RELATED PRESSURE ULCERS: REFLECTING ON A DECADE OF IMPROVEMENT AND CHALLENGES TO BE ADDRESSED

Janet Cuddigan¹

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Introduction: Device related pressure ulcers have occurred in our patients for as long as we have used medical devices. From the “plaster casts” of the 1800s to the more technologically advanced devices used today, all devices carry the risk of pressure induced tissue injury or pressure ulcers.

Methods: The peer reviewed literature on “medical device related pressure ulcers” was searched for the inclusive dates of 1966 through 2000. Data extraction tables, quality appraisals and evidence-to-decision frameworks from the 2019 EPUAP-NPIAP-PPPIA International Guideline were analyzed and peer review articles published between 2018 and 1 August 2020 were reviewed for new information.

Results: The year, 2010, was a pivotal point in our understanding of device related pressure ulcers. Prior to 2010, the literature primarily consisted of case study and case series descriptions of skin and soft tissue injuries caused by specific medical devices. The exception to this trend was a series of controlled clinical trials comparing endotracheal tubes and soft seal laryngeal mask airways for airway management in surgery. In 2010, we began classifying device related injuries as pressure ulcers. Over the past decade, we have monitored occurrence rates, identified risk factors and conducted clinical trials of preventive interventions. Crucial to the success of these efforts is the growing body of science developed by our colleagues in the field of bioengineering.

Conclusions: This presentation provides an overview of the past decade of scientific and clinical advances as well as a discussion of future challenges.

References:

1. Black, J.M., et al., *Medical device related pressure ulcers in hospitalized patients. International Wound Journal*, 2010. 7(5): p. 358-365.
2. *European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Advisory Panel, Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. Third ed. 2019: EPUAP-NPIAP-PPPIA.*
3. Bader, D.L., P.R. Worsley, and A. Gefen, *Bioengineering considerations in the prevention of medical device-related pressure ulcers. Clin Biomech (Bristol, Avon)*, 2019. 67: p. 70-77.
4. Jackson, D., et al., *Medical device-related pressure ulcers: A systematic review and meta-analysis. Int J Nurs Stud*, 2019. 92: p. 109-120.
5. Gefen, A., et al., *An international consensus on device-related pressure ulcers: SECURE prevention. Br J Nurs*, 2020. 29(5): p. S36-s38

IA-2

EVALUATING PERFORMANCE OF MEDICAL DEVICES IN MINIMISING RISK OF SOFT TISSUE DAMAGE

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Introduction: It is well established that the prolonged use of medical devices particularly when attached to vulnerable skin can lead to damage in the form of pressure ulcers. This has led to a number of studies to objectively assess the performance of these devices using an array of bioengineering tools [1]. The approaches taken have generally involved either laboratory-based tests using able-bodied participants [2] or computational modelling to predict specific conditions at both the device-skin interface and within the soft tissues [3]. An example of each approach will be presented with particular reference to the designs of respiratory face masks commonly used in ICUs. In addition, a recent survey will be described assessing the prevalence of skin damage among healthcare workers using PPE to manage patients with COVID-19.

Methods: The experimental study examined the interface conditions of two designs of face masks attached with various degrees of strap tension to an able-bodied cohort. Measurements included interface pressures, microclimate and skin response, in the form of inflammatory biomarkers. The modelling approach involves examining the goodness of fit of respiratory masks when assessed with 40 face shapes of different ages and gender selected from a large data base. A number of parameters were identified and analysed with a novel registration protocol. The questionnaire involved collecting data on the demographics of a large cohort of users of PPE (n>300), with particular emphasis on descriptions of any detectable skin damage to the head and face.

Results: Experimental data indicated an increase in interface pressures when the straps on the respiratory masks were tightened and these changes were associated with elevated humidity at the interface and an up-regulation of inflammatory biomarkers. The modelling approach highlighted that many combinations of mask designs and face shapes resulted in either excessive compression of skin tissues or gapping of the mask was evident. The limited range of mask sizes clearly did not match the variability of face shapes and sizes. The findings from the questionnaire revealed various forms of damage at critical facial skin locations with some associations with the wearing periods of PPE devices.

Conclusions: The performance of mask designs with particular reference to minimizing their potential to cause skin damage can be objectively assessed using complementary bioengineering tools. The continued reporting of device-related events can only help to improve designs of for use by both patients and healthcare professionals, who inevitably present with differences in face shapes and tolerance to prolonged mechanical loading.

References:

- 1 Bader and Worsley (2018) Technologies to monitor the health of loaded skin tissues. *Biomed Eng Online*. 17(1):40
- 2 Worsley et al. (2016) Investigating the effects of strap tension during non-invasive ventilation mask application: a combined biomechanical and biomarker approach. *Med Devices* 9: 409-417
- 3 Amrani et al. (2020) Which endotracheal tube location minimizes the device-related pressure ulcer risk: The center or a corner of the mouth? *Int Wound J* 17(2):268-276.

IA-3

CLINICAL PERSPECTIVES ON PREVENTING DEVICE RELATED PRESSURE ULCERS AND THE NEW INTERNATIONAL CONSENSUS

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Coronavirus disease (COVID-19) because of SARS-CoV-2 has led to a substantial increase in the demands on acute and critical care services in hospitals around the world. The severity of the clinical situations associated with techniques, like invasive mechanical ventilation, prone positions, vasoconstrictive therapy, or ECMO for example, put them at greater risk of Pressure Ulcer development.

The need to use medical devices also increases and the patient is in contact with a vast number of different devices such as endotracheal and nasogastric tubes, oxygen tubing, noninvasive ventilation masks, urinary catheters among others. Patients of all ages are affected, with the typical scenario being an environment dense with equipment, tubing, electrodes and wiring. Patients managed using medical devices are more likely to develop a PU or skin breakdown. It will be discussed the more frequent medical devices associated to pressure ulcer development, strategies to prevent and discuss the consensus document as a valuable tool in improving the care provided.

IB-1

EFFECTIVENESS OF TWO SILICONE DRESSINGS FOR SACRAL AND HEEL PRESSURE ULCER PREVENTION IN 475 HIGH RISK INTENSIVE CARE PATIENTS

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² Charité – Universitätsmedizin Berlin; Clinical Research Center for Hair and Skin Science, Department of Dermatology and Allergy; Berlin, Germany

Introduction: Pressure ulcer incidence in intensive care unit patients is high, despite various preventive measures. There is emerging evidence that the application of dressings on pressure ulcer predilection sites may help to prevent pressure ulcer development (Moore and Webster 2018; Clark et al. 2014). This is also recommended in the latest international guideline (EPUAP/NPIAP/PPPIA 2019). Therefore, the application of preventive dressings might potentially further reduce the incidence.

The objective of this study was to determine whether preventive dressings, applied to sacrum and heels of high-risk ICU patients, in addition to standard prevention procedures, reduces the incidence of pressure ulcers and to evaluate the cost-effectiveness of this intervention.

Methods: A randomized controlled trial was performed between June 2015 and July 2018 with a 1:1 allocation to the intervention and control groups. Patients assigned to the intervention group received dressings applied to sacrum and both heels. Pressure ulcers were categorized according to the NPUAP/EPUAP 2014 classification system.

Direct costs for preventive dressings in the intervention group and costs for treatment of incident pressure ulcers in both groups were measured using a bottom-up approach. A cost-effectiveness analysis by calculating the incremental cost-effectiveness ratio using different assumptions was performed.

Results: In total 475 patients were included and randomized. Finally, 238 subjects were allocated to the intervention and 237 to the control group. Mean age was 63.5 (SD 15.4) years and most were male (65.4%). The cumulative pressure ulcer incidence category II and above was 2.8% in the intervention and 10.5% in the control group ($p = 0.001$). The absolute risk reduction in the intervention group compared to the control group was 0.08 (95% CI 0.03 to 0.13) (Hahnel et al. 2019).

Additional dressing and labour costs of €150.81 (€116.45 heels; €34.36 sacrum) per patient occurred in the intervention group. The incremental cost-effectiveness ratio was €1945.30 per pressure ulcer avoided (€8144.72 on heels; €701.54 sacrum) in the intervention group (El Genedy et al. 2020).

Conclusions: Results indicate that the application of preventive dressings in addition to standard preventive procedures in high-risk ICU patients is effective to prevent pressure ulcers at the heels and sacrum. We further conclude that application of preventive dressings is cost-effective for the sacral area, but only marginal on heels for critically ill patients. However, within this trial one dressing was used only. Therefore, it is unclear whether the performance and cost-effectiveness of other dressings is similar. Additionally, our results show that pressure ulcer incidence in ICUs among high-risk patients remains high. Although the treatment effect was substantial, pressure ulcers in the intervention group still occurred. This indicates that pressure ulcer prevention is still not optimal and is an ongoing and an unneglectable task in the care of critically ill ICU patients.

References:

Clark M et al. Systematic review of the use of prophylactic dressings in the prevention of pressure ulcers. *Int Wound J.* 2014;11(5):460-71.

El Genedy M et al. Cost-effectiveness of multi-layered silicone foam dressings for prevention of sacral and heel pressure ulcers in high-risk intensive care unit patients: An economic analysis of a randomised controlled trial. *Int Wound J.* 2020;1-9. <https://doi.org/10.1111/iwj.13390>.

European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. *Prevention and Treatment of Pressure Ulcers/Injuries: Quick Reference Guide.* Emily Haesler (Ed.). EPUAP/NPIAP/PPPIA: 2019.

Hahnel E et al. The effectiveness of two silicone dressings for sacral and heel pressure ulcer prevention in high risk intensive care unit patients compared to no dressings: a randomized controlled parallelgroup trial. *Br J Dermatol.* 2019. <https://doi.org/10.1111/bjd.18621>.

Moore ZE, Webster J. Dressings and topical agents for preventing pressure ulcers. *The Cochrane database of systematic reviews.* 2018;12:Cd009362.

IB-2

SILICONE ADHESIVE MULTILAYER FOAM DRESSINGS AS ADJUVANT PROPHYLACTIC THERAPY TO PREVENT HOSPITAL-ACQUIRED PRESSURE ULCERS: A MULTICENTRE RANDOMISED OPEN LABEL PARALLEL GROUP MEDICAL DEVICE TRIAL

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Introduction: There is a worldwide growth in the use of silicone adhesive multilayer foam dressings as adjuvant prophylactic therapy to prevent hospital-acquired pressure ulcers. Their use may further reduce pressure and shear on vulnerable body areas, and additionally act on the skin's microclimate. The objective of this trial was to determine if silicone adhesive multilayer foam dressings applied to the sacrum, heels, and greater trochanters in addition to standard prevention reduce pressure ulcer incidence category 2 or worse compared to standard prevention alone.

Methods: The design was a multicentre, randomised controlled, open label, parallel group medical device trial. The study was performed in 2018 and enrolled 1605 patients in eight Belgian hospitals (University/Teaching hospitals and General hospitals), including ICU and non-ICU wards. The participants were > 18 years old, at risk for pressure ulcer development (Braden score < 17), and hospitalised within the previous 48 hours. The experimental groups received standard pressure ulcer prevention according to hospital protocol (standard of care), and additionally a silicone adhesive multilayer foam dressing on sacrum, heels, and greater trochanter. The control group received standard of care. The maximum treatment period was 14 days. The primary endpoint was the incidence of a new pressure ulcer category 2 or worse at sacrum, heels, or greater trochanter.

Results: In the intention-to-treat population (n=1605); 4.0% developed pressure ulcers category 2 or worse in the treatment group and 6.3% in the control group (RR=0.64, 95% CI 0.41-0.99, P=.04). Sacral pressure ulcers were observed in 2.8% and 4.8% of the patients in the treatment group and the control group, respectively (RR=0.59, 95% CI 0.35-0.98, P=.04). Heel pressure ulcers occurred in 1.4% and 1.9% of patients in the treatment and control group respectively, with no statistical difference (RR=0.76, 95% CI 0.34-1.68, P=.49). One patient (0.1%) developed a pressure ulcer on the trochanter.

Conclusions: It can be concluded that silicone adhesive multilayer foam dressings reduce the incidence of sacral pressure ulcers in hospitalised patients in addition to standard of care. No statistical difference was identified at heel or trochanter areas. Study data can be translated into clinical practice to enhance patient quality outcomes, support formulation of new clinical guidelines, and call for further research to analyse health economic impact of using this adjuvant therapy. The trial was funded by the Belgian Health Care Knowledge Centre (KCE).

IB-3

SYSTEMATIC REVIEW OF PROPHYLACTIC DRESSINGS FOR THE PREVENTION OF HEEL PRESSURE ULCERS

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² University of Leeds, United Kingdom

³ University of Glasgow, United Kingdom

Introduction: The posterior heel has a small surface area, which along with the small volume of subcutaneous tissue, means that mechanical loads are transmitted directly to the bone when in a supine position; making it a challenging site for pressure ulcer prevention. There is limited evidence regarding the use of dressings to prevent (rather than treat) heel pressure ulcers. Current guidelines (EPUAP et al., 2019) recommend using a prophylactic dressing as an adjunct to heel offloading and other strategies to prevent heel pressure injuries (Strength of Evidence = B1; Strength of Recommendation =), although this was based on general trial results without identifying specifically the heel data. A systematic review by Moore and Webster (2018) found that silicone foam dressings may reduce the incidence of pressure ulcers, although there was a low level of evidence certainty due to included trials being imprecise or at risk of bias. This review did not report body site of pressure ulcer development so the effectiveness of dressings for the prevention of heel pressure ulcers remains unknown.

Methods: A systematic review of the effectiveness of dressings for the prevention of heel pressure ulcers. The most recent database search took place September 2019, and an additional trial identified from the ISRCTN registry was included in August 2020 once the results became available. RCTs comparing the effects of any dressing for heel pressure ulcer prevention were included. Participants of any age in any care setting, any level of risk, without a Category 2 or greater heel pressure ulcer were considered. The primary outcome was incidence of new heel pressure ulcers.

Results: Six trials were included comparing prophylactic dressings (two trials used polyurethane foam and four trials used multi-layered foam and silicone dressings) vs standard care. Five trials were pooled with a total of 1543 participants and found a non-significant difference in effectiveness in favour of dressings for preventing Category 1 or above heel pressure ulcers, with an incidence of 15/780 in the dressings group and 49/763 in the standard care group (RR 0.31, 95%CI 0.10 to 1.01). The evidence was very low quality. Four trials were pooled that reported the effectiveness of dressings for the prevention of Category 2 or above heel pressure ulcers, with a total of 2724 participants. No difference was seen with an incidence of 21/1624 in the dressings group and 15/1100 in the standard care group (RR 0.94, 95%CI 0.32 to 2.71).

Reporting of concurrent prevention was poor, e.g. offloading or positioning strategies. Two trials described costs, and both reported these to be lower with the dressing. Only one trial reported quality of life, acceptability of the intervention, adverse events, or device deficiencies. A notable device deficiency reported was dressings causing the floor to be slippery, increasing the risk for falling. No trials reported on compliance.

Conclusions: Recommendations for heel pressure ulcer prevention need to be based on heel specific comparisons. Two additional large RCTs have been completed since the publication of the EPUAP guidelines, but the event rate is very low for each trial. This review does not provide evidence to support the use of prophylactic dressings as an adjunct to offloading for the prevention of heel pressure ulcers.

References:

EPUAP, NPIAP & PPIA 2019. *Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline*. In: EMILY HAESLER (ed.). EPUAP/NPIAP/PPPI.

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2A-1

THE PROBLEM OF FACIAL INJURY USING PPE IN THE GENERAL CARE SETTING

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Introduction: Because of the coronavirus disease 2019 (COVID-19) pandemic, health professionals suddenly got confronted with enhanced infection control measures, including the intensive use of personal protective equipment (PPE). The use of PPE, including masks, goggles, face shields, and protective gowns, has led to an increased incidence of DRPUs among health professionals.

Methods: During the EPUAP webinar in May 2020, clinical experiences, recommendations, implementation examples and challenges and opportunities for prevention and treatment of skin and tissue damage due to wearing Personal Protective Equipment were presented. This session will provide an update on the most recent literature and available evidence and will structure this information into a practical overview.

Results: The most reported injuries associated with the use of N95 masks are facial pruritis (51,4%) and rash (35,8%). Results of surveys and questionnaires indicate that prevalence rates of skin injuries when using PPE during the COVID-19 crisis are higher than 40%. Facial injuries can create an additional risk for health care workers, not only by infecting themselves with COVID-19, but especially by other viral, bacterial or fungal infections of the open lesions. The most important cause of the facial lesions are the combination of high frictional causes and the weakened structure and function of the skin. Impact on the skin and subdermal tissues by continuous static (strapping) and dynamic (sliding) frictional forces leads to considerable shearing in skin and subdermal tissues. Also the tight seal of the high filtration masks creates significant pressure which can even lead to deep tissue injuries. To prevent this damage, the facial skin should be protected, cleansed and restored. Although it's important to keep in mind that there must be a reasonable balance between the prevention measures taken and the (low, but present) risk of coronavirus infection involved in every change, manoeuvre or manipulation of the PPE. When, why and how to use available products and some implementation examples from publications will be presented in more detail during the session.

Conclusions: The end of the first wave of the COVID-19 pandemic in Europe offers possibilities to reflect and review the existing protocols and clinical practice regarding the prevention and treatment of facial injury using PPE. A correct understanding of the causes, prevalence and consequences of facial injuries and to know how specific preventive measures help to maintain skin integrity, will be a strong advantage to evaluate current practice and to keep motivating health professionals to follow the protocols.

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2A-2

THE CHALLENGES OF USING PPE IN THE NURSING HOME SECTOR

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In countries with community transmission of COVID-19, over 40% of total confirmed COVID-19 deaths occur in long-term care facilities, and in some cases, this is closer to 60%. Nursing home and home care sector is not different than the other contexts of care in relation to personal protective Equipment (PPE), but there are several barriers and limitations that we need to overcome. Two of the problems were, not receiving proper training regarding Covid-19 or scarcity of personal protective equipment. Find out more during this session, our experience in these contexts and strategies to overtake the challenges.

2A-3

PROVIDING A SOLUTION FOR HEALTHCARE STAFF USING PPE “THE FACIAL PRESSURE ULCER PREVENTION PROGRAMME”

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Introduction: The aim of this study was to determine the impact of a specially designed care bundle on the development of facial pressure injuries among front line health care workers wearing PPE during the COVID-19 Pandemic. The primary outcome of interest was the incidence of facial pressure injuries. The secondary outcomes of interest were pain and ease of use of the care bundle.

Methods: This was an observational study. The intervention was a care bundle consisting of an easy to follow five-step process in line with international best practice guidelines. The five steps to the bundle were skin protection, face mask selection, material use, inspection and skin cleansing and hydration. This study took place in one large Irish acute hospital over a two month period. A total population sample approach was used with all staff (n=300) working in COVID-19 wards, intensive care unit and the Emergency Department in the hospital receiving a kit bag containing the elements of the care bundle, protective tape, moisturising cream and face cleanser. All of these staff were then invited to participate in the study, by completing the study questionnaire. Judgemental sampling was used to select 14 interview participants, all of whom who used the bundle.

Results: A total of 114 staff provided feedback on the use of the care bundle. Prior to using the care bundle 29% (n=33) of the staff developed a skin injury, whereas after using the care bundle only 8% (n=9) developed a skin injury. The odds ratio (OR) of skin injury development is 4.75 (95% CI: 2.15 to 10.49; p=0.0001), meaning that with use of the care bundle staff are almost 5 times less likely to develop a skin injury. Staff rated their pain on a scale of 0-10 while using PPE with the care bundle. The mean pain score was 3.18/10 (SD: 2.44; median: 3; min 0, max 10). Staff also rated their pain, on a scale of 0-10, once the PPE was removed. The mean pain score when PPE was removed was 1.73/10 (SD: 2.11; median: 1; min 0, max 9). Staff rated on a scale of 0-10, how easy they found the care bundle to use. The mean score was 7.76 (SD: 3.06; median: 9; min 0, max 9). Staff also rated on a scale of 0-10, how likely they would recommend the care bundle to a colleague. The mean score was 8.25 (SD: 2.61; median: 10; min 0, max 10). Fourteen participants were also interviewed. Following thematic analysis of the interview data, three key themes emerged. The themes identified were: The care bundle maintained my safety; The care bundle and its effect on my mask; Ease of use of the care bundle.

Conclusions: The use of the bundle reduced the incidence of facial skin injury from 29% to 8%, and staff found the bundle easy to use, safe, and effective. As with evidence from the international literature, this study has identified that when skincare is prioritised, and a systematic preventative care bundle approach is adopted, there are clear benefits for the individuals involved.

2B-1

PRONE POSITIONING ARDS PATIENTS. WHERE ARE WE AND WHERE DO WE GO FROM THERE?

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Prone position has been used for many years in patients with hypoxemic acute respiratory failure and of notice in those with the acute respiratory distress syndrome (ARDS). It has been proven to be effective in improving oxygenation, sometimes dramatically and in maintaining systemic hemodynamics including right ventricle function. Trials conducted since 1997 concluded that prone position can improve survival in patients with hypoxemia at a threshold of PaO₂/FIO₂ of 150 mmHg or less (moderate to severe ARDS). Several mechanisms can explain the improvement in oxygenation but the main effect of pronation is the homogenization it makes throughout the lungs in terms of lung ventilation, perfusion and aeration. It also favors a more homogenization of stress and strain even though it can reduce the overall lung stress. Serious side effects have been reduced by the experience in centers and the volume of procedure. It remains that pressure sores are still an issue.

The recent COVID-19 pandemic showed that prone position has largely been used, at a much greater rate than reported in studies performed before pandemic. Before pandemic, but enhance by this, is the attempt to use proning before intubation in spontaneously breathing patients without sedation. Data confirmed the feasibility. Trials testing the impact of prone position in this settings are in preparation.

2B-2

PRESSURE INJURY PREVENTION FOR COVID-19 PATIENTS IN A PRONE POSITION

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Prone positioning is a method used to manage ventilator-associated lung injury and promote oxygenation in severe acute respiratory distress syndrome (ARDS).¹ With the COVID-19 pandemic and the increased numbers of patients presenting with acute respiratory illness and clinical pictures of ARDS, critical care practice guidelines and governing bodies are recommending prone positioning for adult patients with ARDS related to severe COVID-19 infection.^{2,3}

Complications associated with prone positioning in critical care have the potential to cause patient morbidity. Common complications with prone positioning include pressure injuries (PIs) on the forehead, chest, pelvis, chin, shoulders, genitalia, iliac crest and knees.⁴ These complications are largely avoidable by implementing appropriate interventions.

This paper summarises current best practice and literature on interventions to reduce skin injury and other complications associated with prone positioning of COVID-19 patients with ARDS complications.

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2B-3

CHALLENGES FACED WITH MORBIDLY OBESE PATIENTS DURING COVID-19

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Introduction: The Covid-19 Pandemic hit New York State, and especially the NYC Metropolitan area during the spring of 2020. This session will discuss the documented prevalence of pressure injuries as a “snapshot in time”, and how this impacted the Nursing Care of Covid-19 patients. The session is specific to a 300+ bed Cardiac Hospital, designated as a hotspot for admissions and treatment in Long Island, NY. This session will focus on the relationship between Covid-19 and Pressure Injury Prevalence, with special attention to the morbidly obese population.

Methods: Monthly point prevalence studies were continued during the Covid-19 Pandemic. The prevalence study team leader was a Master’s prepared RN, CWOCN with over 15 years of acute care experience. The team consisted of 14 Master’s prepared RN’s in the Nursing Education Department operating under titles of Clinical Nurse Specialist, Clinical Nurse Educator, Nurse Practitioner, or Certified Wound Ostomy Continence Nurse. The team utilized the National Data Base of Nursing Quality Indicators (NDNQI) guidance on data collection techniques during the monthly point prevalence study. There were 6 telemetry Units and 4 intensive care units surveyed during the point prevalence study.

Results: The prevalence of pressure injuries were identified as exponentially higher in this population compared with any other time in recorded history at this institution. There was multiplicity of pressure injuries in the individual patients which had never been witnessed by this experienced clinical team. There were higher rates of pressure injuries identified in patients requiring prone positioning for life-saving treatment, as well as unusual presentations, multiplicity of occurrence, rapidity of onset noted, and severity of injury.

Conclusions: The clinical team utilized standard NDNQI data collection techniques to assess the patients during monthly pressure injury prevalence studies during the Covid-19 Pandemic in a Metropolitan NY Acute Care Hospital. This provides a “snapshot” in time of the impact a Covid-19 diagnosis, treatment, and obstacles to providing nursing care to such patients requiring hospitalization. The Clinicians identified lessons learned which are essential to share with other clinicians who need to strategize the care of similar populations in other parts of the U.S. and Abroad.

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3A-1

PRESSURE ULCER AETIOLOGY VIEWED THROUGH THE PRISM OF COVID

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COVID-19 has brought the effects of pressure ulcers (PUs) and device-related pressure ulcers (DRPUs) in particular into sharp focus. With the highly increased use of medical devices for the diagnosis and treatment of patients who require intensive care such as continuous positive airway pressure masks or ventilation and feeding tubing, and with the intense use of personal protective equipment (PPE) including face masks, respirators and goggles by healthcare professionals globally, the incidence of DRPUs has risen starkly. In my talk, I will explore the currently known aetiology of PUs with focus on the potential risks associated with medical devices used by patients and also, PPE used by health professionals during the current pandemic. I will also describe the worrying links between the aetiology of PUs and COVID-19. Lastly, I will discuss the relevant research underway in my laboratory and the long-term research & development work needed for the prevention and management of DRPUs from the perspectives of clinicians, patients, industry and regulators.

3A-2

TRANSLATING AETIOLOGICAL KNOWLEDGE INTO SUPPORT SURFACE SCIENCE

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Introduction: Understanding of PI aetiology has evolved and expanded over the last fifteen years to include explanations on how and why pressure injuries (PI) develop despite prevention strategies that address ischemic risk. Support surface technology may not be exploiting this new knowledge and potential new support surface technology could take better advantage of the same to improve clinical outcomes.

The theory that the primary cause of pressure injuries is deformation induced ischemia developed over the course of several hours has been replaced with a new understanding that deformation not only induces ischemic injury but also results in direct cellular damage on a much shorter timescale of tens of minutes. Support surface technology in use today was developed prior to understanding the direct deformation pathway so it is interesting and timely to ask whether prevention features such as alternating pressure, low air loss, and air fluidization are adequate, and if new features might better target the risk associated with direct deformation induced cellular damage.

Methods: Support surfaces employ various strategies to lower PI risk. One crucial aspect of prevention that addresses both ischemic and direct deformation damage aetiological pathways is that of reducing the external forces causing tissue deformation. The provision of a deformable contoured surface that envelops and immerses the body to evenly distribute support forces over a large area of the body addresses this goal. Both gravitational and forces resulting from user movement and positioning act on the body. These forces act in multiple directions and include high deformation inducing shear force acting parallel to the surface. The coefficient of friction between the support surface and the contacting skin or clothing governs shear force magnitude. Coefficient of friction is affected by either controlling humidity at the interface or by using covers that have low friction characteristics. Low air loss is a feature that is intended to control humidity by transporting water vapor away from the surface. Alternating pressure is a feature whereby support forces are cycled between different locations to periodically relieve forces. Relief periods are intended to allow reperfusion.

Results: Despite the use of advanced support surface technology and other preventive measures, PI incidence rates remain too high. Improvement may be possible if support surface technology takes advantage of improved understanding of PI aetiology combined with new sensing, information, and other technology. Prevention starts with assessment, and risk is primarily a function of mobility and activity. Traditionally, risk assessment is thought to be an episodic activity occurring at the beginning of a period of care and occasionally throughout the period. But consider how much additional security might be gained if risk is monitored continuously. Transient dangerous positioning conditions or the early signs of tissue injury might be detected in time for tissue damage to be reversed. Because the support surface is in constant contact with the patient, it may be the best vehicle in which to implement these monitoring technologies.

Technologies for risk and early detection monitoring tasks include pressure measurement, temperature measurement, and tissue moisture content measurement. Movement monitoring strategies such as centre of gravity tracking and inertial sensors may also prove to be useful features of support surface systems. Continuous pressure sensing can be integrated and used to monitor both frequency and quality of repositioning. Temperature sensors might be integrated into support surfaces for continuous monitoring. Thermography has been shown to effectively detect high temperature areas of inflammation, which can lead to tissue damage, and areas of lower temperature, which have been shown to correspond to areas with advanced tissue injury. Inflammatory oedema secondary to tissue damage has also been shown to be detectable using biocapacitance measurement devices. Finally, simple weight sensors on the bed supports might be used to monitor shifts in centre of mass that would be translated into patient movement measurements and used for activity monitoring.

Conclusions: We now know that tissue damage leading to pressure injuries can occur quickly. With this knowledge, enhanced support surface products could be developed with features that monitor patient responses and movement on a continuous basis to alert and screen for conditions that are either signs of impending tissue damage, such as inflammation, or signal conditions that suggest sudden increased risk, such as bouts of immobility or high pressure.

3A-3

FREQUENTLY MOVING PATIENTS MAY BE JUST AS AT-RISK AS ARE IMMOBILE PATIENTS

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Introduction: Pressure ulcer (PU) research has pointed to immobility as being the primary condition that exposes individuals to pressure and shear and preventive measures are targeting at addressing this immobility (1-3). However, PU incidence is still increasing especially within older persons (4). This abstract aim to discuss how activity and mobility lead to PU development.

Methods: This presentation is based on a study (5) that included 150 older persons from long-term settings. Participants were followed-up for 20 days, skin was assessed daily using visual skin assessment (VSA) and sub-epidermal moisture (SEM) assessment. Activity was measured using the Braden subscale and "movement score" (MS) (mean number of movements/hour) was quantified using a piezoelectric motion sensor.

Results: PU incidence using VSA was 12.7% (N=19; low movers=6.7%; high movers/agitated=6%); using SEM measurement, PU incidence was 78.7% (N=118; low movers=40.0%; high movers/agitated=38.7%). On 100% of PU assessed using VSA, were confirmed using SEM measurement. Further, SEM measurement detected a PU, on average, 8.2 days before the PU appeared on skin surface (min: 1 day, max: 18 days; SD: 6.3 days). PU detection was 25 times greater using SEM than VSA (OR 25.42 (95% CI: 13.68-47.25)). The movement assessment showed 47.3% (N=71) of the participants as being low movers and 52.7 (N=79) as being high movers.

Conclusions: The most striking finding of this study was that PU occurred both in low and high movers, which was unexpected as a similar finding has not been previously reported in the literature.

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3B-1

TESTING SORPTIVITY AND DURABILITY OF WOUND DRESSINGS IN A SIMULATED SYSTEM

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Introduction: Performances of wound dressings are potentially affected by exudate viscosity (correlated with protein contents and often associated with infection), applied bodyweight forces and resistance to flow by gravity (related to body positioning) and other mechanical forces that act, e.g. during dressing changes. In addition to the fluid retention properties which are classically addressed, the (i) sorptivity (the capacity of a dressing structure to transfer excessive exudate away from the wound bed by capillary action) and (ii) durability of a dressing so that it does not disintegrate in the wound over a period of use or on removal, are highly important to avoid wound maceration and inflammatory foreign-body reactions, respectively. We aimed to develop new laboratory tests for determining these parameters, in consideration of relevant clinical factors and practice.

Methods: A computer-controlled phantom of an exuding sacral wound has been developed to facilitate standardised experiments where dressings are exposed to exudate-like fluids, under mechanical and clinical use conditions which replicate real-world settings. We compared two primary dressing types: High-density dressings (HDDs) with an isotropic fibre arrangement versus low-density dressings (LDDs) with an anisotropic arrangement. Test parameters, e.g. the exudate-like flow rate and volume, dressing usage duration and phantom position were defined prior to each set of simulated experiments. We then applied primary and secondary dressing products onto the phantom and exposed them to the exudate substitutes. Sorptivity was determined through dressing weight tests which resulted in relative fluid mass distributions between the used primary and secondary dressings. In addition, tensile tests of the used primary dressings were conducted to measure the strain energy density (SED) levels required to induce dressing material failures.

Results: The percentage fluid content comparisons revealed significantly greater sorptivity of the HDDs, i.e. ~3-times more fluid transfer from the primary to the secondary dressing (and thereby, better clearance of exudate) than for the LDDs when the phantom was used in its supine configuration ($p < 0.05$). We further found that HDDs withstand ~5-times greater SED levels than LDDs before dressing material failure occurs.

Conclusions: The above laboratory test methodologies pave the way for objective, quantitative and standardized testing of wound dressings in all aspects of exudate management, including efficacy research and product evaluation. These tests are versatile and would be adequate for testing any combination of wound filler materials and secondary dressings or the interaction of dressings with a negative pressure wound therapy system.

3B-2

AN INTEGRATED MODELLING FRAMEWORK FOR OPTIMIZING NEGATIVE PRESSURE WOUND THERAPY

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Introduction: Negative pressure wound therapy (NPWT) is clinically effective in managing both acute and chronic wounds. However, little is known about the optimal settings and combination of treatment parameters e.g. the wave-shape of the negative pressure, frequency of pressure changes and importantly, how these translate to target tissue strains and stresses that would result the fastest healing, buildup of good-quality tissues and no keloid scarring. Work is underway in our group to develop an experimental-computational modelling framework for better understanding of the mechanobiology of cells and tissues at the peri-wound and wound-bed under NPWT.

Methods: From an experimental perspective, we developed a versatile cell culture stretching system which can replicate any static or dynamic deformation regime produced by existing or future NPWT systems, in terms of tissue deformation wave shapes and frequencies. From a computational perspective, we developed three-dimensional open wound and surgical incision finite element (FE) models that contain skin, adipose and skeletal muscle tissue layers and are used to determine the states of tissue strains and stresses around the aforementioned wound when subjected to NTPW. This FE modelling further facilitates studies of the influence of the foam dressing properties such as its stiffness on the dynamic strain and stress states generated in the tissues.

Results: Our mechanobiology work in fibroblast cultures revealed that these cells are irresponsive to low strains below 0.5%, however, fibroblast may accelerate their collective migration towards a damaged site in response to strains above 3%. Given that our published work demonstrated that the plasma membranes of cells may be damaged above strains of ~12%, there must be a strain sweet spot within the 0.5-12% range for optimally stimulating fibroblasts to migrate in response to NPWT. The strain state in peri-wound skin, stimulating fibroblasts to migrate and repair damaged tissues, can be potentially controlled by either adjusting the negative pressure level or the stiffness of the foam dressing. Interestingly, our FE modelling showed that the skin strain state is considerably more sensitive to the pressure level than to the stiffness of the foam dressing: Stiffer and softer foams over an order of magnitude around the mean industry standard yielded indistinguishable skin and adipose (peri-wound) strains.

Conclusions: Our integrated experimental-computational approach indicated that the strain state induced at the peri-wound tissues, particularly skin, can be more effectively controlled by adjusting the pressure level than by varying the stiffness of the foam dressing.

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3B-3

MORBIDLY OBESE PATIENT - IS IT A CHALLENGE FOR AN INTENSIVE CARE MULTIDISCIPLINARY TEAM?

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Introduction: According to the World Health Organization, 40% of the adult population is overweight, and 13% suffer from obesity. Because of diseases associated with obesity, an increasing number of morbidly obese individuals require hospital admission. Especially multidisciplinary teams of intensive care units are faced with many obstacles and challenges while planning and providing continuous medical and nursing care in immobile and unconscious, obese patients.

Methods: A three-year (2017-2019) retrospective observational study and data analysis of the patients admitted to the ICU of the Department of Anesthesiology, Resuscitation and Intensive Care Medicine, University hospital Pilsen, Czech Republic. Patients were screened for their body mass index (BMI). Besides, in the group of morbidly obese patients (BMI 40 - 85 kg/m²), we have evaluated the incidence of pressure ulcers and other associated problems (i.e., mapping of available aids for nursing care, rehabilitation, and mobilization of bariatric patients throughout the hospital).

Results: Out of the 1576 patients admitted to our ICU over the screening period, 1532 were evaluated for their BMI. The percentage of overweight, obese, and morbidly obese patients remained constant throughout the study (30%, 34%, and 8%, respectively). We treated 12 pressure ulcers in the group of 6 morbidly obese patients, out of which seven pressure ulcers developed in our unit, one pressure ulcer in another unit of our hospital, one pressure ulcer in another healthcare facility, and two pressure ulcers at-home care.

Following limits and opportunities for improvement were identified: personnel and equipment availability, facility design, repositioning/transfer protocols, and the patient discharge process.

Conclusions: Limits related to the handling and early mobilization of these patients appear to be the riskiest factor in treating these patients. This factor is closely linking to the equipment of intensive care units with adequate technology required to care for morbidly obese patients and sufficient well-trained nursing staff.

3B-4

PREVENTION OF PRESSURE ULCERS AMONG INDIVIDUALS CARED FOR IN THE PRONE POSITION: LESSONS FOR THE COVID-19 EMERGENCY

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Introduction: Prone positioning (PP) is a postural therapy that aims to enhance respiratory function through increasing oxygenation levels. In contemporary clinical practice, ventilation in the PP is indicated for patients with severe acute respiratory distress syndrome. Despite its advantages in terms of respiratory function, several studies have examined complications of PP ventilation and have identified pressure ulcers (PU) as a frequent complication in patients who are already in a precarious medical situation. International data suggest that up to 57% of patients nursed in the PP develop a PU^{1,2}. The aim of this clinical review is to identify and review evidence-based recommendations developed to facilitate the selection and application of preventive interventions aimed at reducing PU development in patients ventilated in the PP.

Methods: This clinical review included published and unpublished randomised controlled trials (RCTs), cluster-RCTs, Non RCT, prospective studies, pre-post studies, and interrupted time series studies, observational studies and case reports, clinical studies and guidelines. Given the current COVID-19 crisis, this review is timely as intensive care unit patients with COVID-19 require ventilation in the PPat a level that is disproportionate to the general intensive care population. Up to 28% of patients admitted to the ICU with confirmed infection due to severe COVID-19 are cared for in the PP. This review is limited to adult individuals.

Results: The skin assessment should be undertaken before proning and following positioning the patient back to the supine position. Whereas, it is essential to keep the skin clean and moisturized using pH balanced cleansers, there is inconsistency in terms of the evidence to support the type of a moisturizer. Use of positioning devices in addition to repositioning is recommended to offload pressure points on the face and body. Using dressings such as hydrocolloids, transparent film, and silicone may be of benefit in decreasing facial skin breakdown.

Conclusions: Given the importance of PU prevention in this cohort of patients, adopting a focussed prevention strategy including skin assessment and care, offloading and pressure redistribution and dressings for prevention may contribute to a reduction in the incidence and prevalence of these largely preventable wounds.

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3B-5

DEFEROXAMINE IMPROVES WOUND HEALING IN A MOUSE MODEL OF PRESSURE ULCERS WITH DELAYED MUSCLE REGENERATION

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Introduction: Pressure ulcers lack an effective drug treatment to improve regeneration. In this work, we investigate the therapeutic effect of the FDA-approved drug Deferoxamine for improving regeneration of pressure ulcers in mouse muscle. We also develop and study a mouse model of delayed healing induced by (non-diabetic) pressure ulcers.

Methods: Pressure ulcers were created in C57BL6 mice by applying a pair of 12mm magnets to the dorsal skinfold and panniculus carnosus muscle in two 12-hour intervals. Deferoxamine (or saline control) was injected subcutaneously for 16 days (n=7). For comparison with normal wound healing, acute-injured mice had the same muscles injured via cardiotoxin.

Results: In acute-injured mice (normal wound healing), muscle underwent phagocytosis and clearance of dead tissue within 3 days, but in mice with pressure ulcers, the clearance stage was impaired: there were regions of dead tissue that exhibited compaction, meaning round cells had been flattened. These regions lacked immune cell infiltration or phagocytosis at 3 days post-injury. At 8-10 days post-injury, the acute-injured mice already exhibited significant regeneration of a contiguous muscle layer, but the pressure-injured tissue exhibited granulation tissue with copious immune cells and fibroblasts but no regenerated muscle tissue. At 16 days post-injury, the acute-injured mice were completely regenerated. In contrast, in pressure-injured mice, muscle tissue was still actively regenerating at 40 days, as evidenced by myoblast-like cells and immature myofibers.

Deferoxamine treatment of the pressure ulcers caused acceleration of the early-stage wound response (at 3 days), as shown by increased infiltration of M2 macrophages and swelling of the dead muscle tissue. At 10 days post-injury, Deferoxamine treatment caused decreased levels of tissue-damaging extracellular traps and continued maintenance of M2 macrophages. At 40 days, Deferoxamine treatment had increased the speed and extent of muscle regeneration, compared with saline control treatment.

Conclusions: We find that Deferoxamine treatment improves regeneration of muscle pressure ulcers. Furthermore, we claim a successful non-diabetic animal model of delayed regeneration after pressure injury, associated with delay in the earliest stage of wound inflammation.

3B-6

EXUDATE FLUID MECHANICS AND ITS INFLUENCE ON WOUND HEALING

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Introduction: Exudates form naturally in response to wounds and a moist environment is important for wound healing, yet excessive exudate can interfere with healing. Exudates form as part of the initial immune response to tissue injury. They are blood-serum-based fluids that include immune cells and various proteins and enzymes required at the wound site to facilitate healing. As immune cells migrate out of capillaries and into the wound site, they expand the local vessels and make them permeable. As a result, increased amounts of exudate may then leak out of the blood vessel and into the wound site. Accumulation of excessive exudates may interfere with healing, damage healthy neighboring tissues, cause unpleasant odors and appearance, and affect effective application of dressings.

Exudate composition is dynamic, including varying amounts and types of constituents (e.g. immune cells, proteins), depending on the wound severity and stage of its healing. The exudate composition affects its fluidity and “thickness”, or ability to flow - its rheology. This ability affects exudate appearance, ease of cleansing, dressing application, and absorption by dressings. Grading of exudates has been focused on overall volume and viscosity,¹ the latter only referring to the material thickness. However, an important feature of the fluid is its elastic response, related to its stretchiness and to stickiness.

Methods: We apply shear rheometry on different materials (e.g. liquids, gels, biological tissues) to demonstrate effects of fluid compositions and internal microstructure on their viscoelastic response. We show that medical honey (a viscous material) added to the cell environment affects migration during gap closure.

Results: We demonstrate that with higher content of large elements, e.g. large proteins and cells, the viscoelastic fluid becomes more elastic. It has recently been shown that medical grade honey may slow down migration of cell during gap closure,² which may result from changes in the viscoelasticity of the local wound bed moisture.

Conclusions: Exudate fluidity is defined by both its viscosity and elasticity, its viscoelasticity. The viscoelasticity may affect choice of cleansing and dressing application procedures as well as treatment applied towards healing.

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4A-I

THE INTERNATIONAL PREVENTION AND TREATMENT OF PRESSURE ULCERS/INJURIES CLINICAL PRACTICE GUIDELINE: AN UPDATE

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In 2019, the third edition of the International Clinical Practice Guideline for the Prevention and Treatment of Pressure Ulcers/Injuries was released. This guideline is a joint project of the European Pressure Ulcer Advisory Panel (EPUAP), the National Pressure Injury Advisory Panel (NPIAP) and the Pan Pacific Pressure Injury Alliance (PPPIA). In addition, 14 Associate Organizations contributed to the guideline development. Based on methodological standards in guideline development, 115 evidence-based recommendations and 61 good practice statements have been developed. These recommendations should assist health professionals, patient consumers and informal care givers to make decisions about appropriate care. Based on an international standardized voting process, 'strengths of recommendations' were assigned to each guideline recommendation indicating the confidence that following this recommendation will do more good than harm. In total, strong positive recommendations are given for 34 recommendations. The needs of specific populations are addressed in the respective guideline chapters in addition to general recommendations. Recommendations and good practice statements are supported by implementation considerations that provide practical guidance for health professionals on implementing recommended practice. The International Clinical Practice Guideline for the Prevention and Treatment of Pressure Ulcers/Injuries is the latest summary of the state-of-the-art pressure ulcer prevention and treatment and should be disseminated and implemented worldwide.

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European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. *Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline*. Emily Haesler (Ed.). EPUAP/NPIAP/PPPIA 2019.

4A-2

THE PATIENT PERSPECTIVE: THE CONSUMER SURVEY

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Introduction: Focus is growing on patient consumer engagement in guideline development (1-4). From 2017-2019, the International Pressure Injury Clinical Guideline, underwent a third edition revision by representatives from international wound care organisations, led by the US National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan-Pacific Pressure Injury Alliance. The guideline revision project sought to engage patients and their informal caregivers in the guideline revision process. In order to determine patient and informal caregiver goals of care and priorities for information on pressure injuries, as well as to promote patient involvement in guideline development, a consumer survey was undertaken.

Methods: After approval from an ethics review board, a world-wide, web-based survey was developed by content experts based on consumer engagement recommendations (1-3). Dissemination of the survey was achieved using promotion by leading wound care bodies, consumer representative organisations and clinical staff in 30 countries and 9 languages. The survey was available online from April to October 2018. Descriptive statistics were conducted. Continuous data were summarized using means/standard deviation, and categorical data were summarized using frequencies/ percentages.

Results: Responses were received from 2,133 individuals in 27 countries, of whom 383 (31%) identified as patients and 840 (69%) identified as informal caregivers. Most individuals identifying as a patient were in the 31-50 year age range (44.91%) and a further 37% were aged over 50 years. Preventing any pressure injury was a care goal selected by 264 (68.9%) of patients and preventing large pressure injuries was selected by 172 (44.9%) of patients. Managing pain was a care goal for 178 (46.4%) of patients. Having their caregiver know about pressure injuries (82.5%), preventing a pressure injury when immobile (79.9%) and performing skin care (79.3) were topics that patients were most likely to rate as important or very important educational needs.

Conclusions: The project highlighted ways in which patients and informal caregivers can engage in clinical guideline development. The survey findings contributed to the evidence presented in the 2019 International Pressure Injury Clinical Guideline (5) and informed the assignment of strengths of recommendations in the guideline. The findings highlighted topics on which patients and their informal caregivers need more education and identified that their goals of care extend beyond preventing any pressure injury and achieving complete healing.

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4A-3

GUIDELINE METHODOLOGY: HOW TO MAKE THE BEST OUT OF THEORY AND RESEARCH FOR CLINICAL PRACTICE IN PRESSURE ULCER PREVENTION AND MANAGEMENT

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Introduction: In 2019, the updated International Guideline on Prevention and Treatment of Pressure Ulcers/Injuries was published [1]. Based on up-to-date evidence and input from all relevant stakeholders including service users [2], this guideline provides health professionals, patients and informal caregivers detailed guidance for decision-making on pressure ulcer prevention and treatment in clinical practice. However, since the body of research is continuously growing and technologies for guideline generation and utilisation advance, methods for guideline development need to be adapted regularly as well in order to ensure that guideline recommendations can easily be implemented and, thus, significantly contribute to the quality of care [3]. The aim of this presentation is to discuss currently ongoing developments in the field of guideline methodology and to reflect on their potential relevance for future evidence-based recommendations on prevention and treatment of pressure ulcers.

Methods: The aim of this presentation is to discuss currently ongoing developments in the field of guideline methodology and to reflect on their potential relevance for future evidence-based recommendations on prevention and treatment of pressure ulcers. Based on typical clinical questions of pressure ulcer prevention, challenges in the development of guideline recommendations for clinical practice will be illustrated, and potentially suitable methods currently under discussion in the field of guideline methodology will be introduced and discussed with regard to their relevance and feasibility.

Results: This presentation provides an overview of future perspectives for the development and update of guideline recommendations, both in general and with regard to pressure ulcer prevention and treatment.

Conclusions: This overview as well as the critical reflection on these perspectives will be directed and informed by the core objective of clinical guidelines which is to provide the best evidenced and most useful source of knowledge to facilitate implementation of patient-centred care in clinical practice.

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4B-1

CHILDREN SHOW INCREASE IN BURNS AND HOME RELATED INJURIES OVER COVID-19 LOCKDOWN

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Introduction: From March to June 2020 Italy has been locked down because of the covid pandemic dissemination. Children of all ages prevented from school attendance, experimented different domestic daily life thus reporting a wide spectrum of traumas more typical of holidays or summer vacations. This retrospective study reports the incidence of different traumas during the selected period, compared to traumas occurring during the same months of 2019. All children admitted to the Emergency department were screened for covid infection.

Methods: All admissions to the emergency department during the selected period were screened for trauma diagnosis. Number of cases, Gender, age, were collected and compared to the institutional cases with same diagnosis during the same time interval of 2019.

Diagnosis were then divided into 6 major subdiagnosis:

- burns
- Head bones fractures
- Fingers subamputations
- Head wounds
- Facial wounds
- Dog/animal bites

Results: 249 children reported the traumatic diagnosis selected compared to 195 in 2019. The whole trauma diagnosis increased of 27,7% during the covid pandemic.

In particular:

- Burns + 10.6%
- Head bones fractures (nose + 105%; mandible +50%)
- Fingers subamputations + 60.9%
- Head wounds + 350%
- Facial wounds + 19.4%
- Dog/ animal bites + 33.5%

Just one burned girl out of 249 children co-presented covid infection at the moment of admission (0.4%)

Conclusions: This study reports as all the trauma diagnosis increased during the pandemic or moved up of 3 months because typical of summer/ holidays patterns. Domestic life and parental care appeared as not protective against traumatic events.

4B-2

FAST REGENERATIVE PROPERTIES OF ACELLULAR FISH SKIN GRAFTS IN WOUNDED CHILDREN OF THE PANDEMIC: AN ADDITIONAL HELPING

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Introduction: Deep epidermal and dermal full thickness wounds require both an early wound bed preparation and an immediate or delayed skin grafting depending on the type of dermal substitute that was used. Acellular fish skin grafts (AFSGs) for management of wound defects of different origin in a Pediatric population during the recent unexpected Pandemia is reported. This is the first series described in children and the choice was based on the following characteristics: AFSGs is safe and valid dermal substitute, free from viral disease transmission and auto-immune reaction risk. Another valid reason during the Covid-19 pandemic is due to the need to quickly discharge the small patients and their careers.

Materials and Methods: 8 consecutive children affected by 4 postraumatic lesions (horse bite, dog bite, 2 lawnmower injuries), 2 wounds from autoimmune diseases (hypocomplementemic vasculitis, scleroderma), 2 surgical dehiscence (after microtia/aural atresia ear reconstruction), have been treated with Atlantic cod Icelandic fish skin*. The engraftment time was reduced by 50% with the use of the NPWT**, applied in 7 out of 8 patients. All AFSGs used were tailored in a meticulous way, fixed with sutures in 6 cases and the others left free.

Results: All children tolerated well AFSGs, without any minimal sign of rejection. In 4 cases pain wound-associated immediately decreased and then ceased after 48 hrs. In all cases the patients were discharged after 12-24 hrs, with a semi-compression bandage and parental-counselling. All postoperative courses were uncomplicated, movements were not restricted and lockdown in children was not made more difficult by positioning AFSGs. At the same time we did not observe an increase in parental stress.

Conclusions: AFSGs showed an optimal compliance with wound bed and were rapidly included into the host tissues, without any exudate production, critical contamination/infection. A rapid wound transition from an inflammatory phase into an acute proliferation phase of healing was found in all: probably this is supported at the same time by the Omega3 PFA, EPA and DHA, which increase production of the proinflammatory cytokines able to promote wound healing. In summary this first as well as initial series of children treated with AFSGs shows that Omega3 wound matrix is an effective and innovative biological wound dressing and a valid treatment option for complicated wounds of various etiology in pediatric patients.

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* KerecisTM Omega3 Wound

** Acti-VACTM, 3M-Acelity-KCI

4B-3

CHARACTERISTIC OF IAD IN CHILDREN WITH ONCOHEMATOLOGICAL DISEASE DURING THE COVID-19 PANDEMIC PERIOD

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Incontinence-associated dermatitis (IAD) in pediatric population has a different etiology respect to adults. In children incontinence is a physiologic issue up to 3 years of age, in older patients it is always related to other comorbidities, disabilities or acute phase of diseases. We focalized our attention on a specific type of IAD resulting from diarrhea and/ or fecal incontinence in children with onco- hematological diseases. In this children, faecal alteration and diarrhea onset is mainly caused by chemotropic treatment causing mucositis or microbiota alterations. Success obtained thanks to new therapies shift mortality causes from onco-haematological disease itself to septic complications. Wounds caused by IAD, very prone to contamination, can easily represent a source of bacterial dissemination.

The enduring epidemic outbreak caused by COVID-19 has created a dangerous and deadly Public Health disaster of International apprehension. This novel community health trouble is frightening the universe with clinical, psychological, emotional, collapse of health system and economic slowdown in each and every part of the world. Due to this, the whole world was stopped, and this was reflected also in the World Health System where medical equipment were not always enough to upfront the emergency.

The medical staff found themselves dealing this emergency by making the best use of the medical material available, while ensuring optimal assistance.

The lack of material like ASP, used for IAD prevention and treatment in our center, make the nursing staff to put more attention in prevention and meticulous monitoring of GP area in all oncohematological patient with very good results.

5A-1

SURGICAL REPAIR OF PRESSURE ULCERS

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Introduction: Pediatric Surgical Wound healing means to take care of a lot of different main topics such as Prevention, Risk-assessment, Skin Lesions, debridement, interactive dress and NPWT actions. That is why when we're speaking about Surgery we have to focus on skin, soft tissues, deep tissues, cells, transfer, transplantation, modulation, genetics.

Aim: The most important intraoperative recommendations include accurate positioning, meticulous surgical and/or microsurgical debridement and wound bed preparation, careful choice of the flap-site when required or the proper and best suitable dermal substitute. Finally, minimizing the suture-line tension is of great value and NPWT should be used both for the best graft adherence to the wound bed and to reduce possible postoperative hypertrophic scar. Following different surgical steps, as if to climb a ladder, we start from secondary closure and vacuum, dermal and skin substitutes, skin and advanced skin grafts, tissue expansion, local distant perforating and free flaps.

Results: In our experience, during the last 3 yrs, 420 pressure injuries staged as advanced IIrd, IIIrd and IV stage were analysed because of their treatment: 78% were submitted to NPWT as the only cure or associated with a local skin graft and dermal substitute. 22% were submitted to major surgical procedure including skin and advanced skin-graft (5%), local flaps with or without skin expander (11%), distant flaps (4.5%), perforating flaps (1%) and microsurgical free flaps (0.5%).

Conclusions: WOUND, DEFECT and DEFORMITY are the most important challenges encountered by the Surgeon facing pressure ulcers. The surgical planning include: 1.sharp debridement; 2.infection control by the use of local antimicrobials; 3.relieving factors responsible for spasm and contractures; 4.nutritional detailed status assessment; 5.reconstructive options depending on the body area; 6.possible use of the sparing procedures techniques; 7.maximal respect for the Very Important Points to be discussed before surgical practice: investigation on adjacent tissues impaired perfusion, loss of elasticity, fibrosis, deep infections. In conclusion, to close a wound it's not just like fixing a hole and surgery is part of a well scheduled protocol including a Team devoted to Pressure Injuries: in our experience a meticulous Prevention is able to reduce to a minimum the surgical maneuvers and at the same time an early surgery is greatly advocate when NPWT failed or when possible infectious complications could occur. At last, surgery is everyday required in order to make rehabilitation and neurorehabilitation maneuvers possible.

5A-2

POST-OPERATIVE MANAGEMENT

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The clinical circumstances surrounding the pre, intra and post-operative are fundamental to consider when assessing pressure injury risk factors in individuals undergoing surgery. Post-operative management involves several interventions ranging from pressure-relieving measures such as repositioning, support surfaces, as well, continuous monitoring and early referral. All of this different phases or steps will be presented based on the best evidence available. During this session we will discuss the evidence based interventions that needs to be implemented to strengthen the multidisciplinary team and guarantee the safety and quality of care provided.

5A-3

REHABILITATION AND PREPARATION FOR HOME

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Introduction: Pressure ulcers or pressure injuries (PUs/PIs) are serious, avoidable, costly, and common complications, which are developing as a result of a combination of physiologic events and external conditions. As the incidence of PUs is increasing not only due to the aging population and the increase in the elderly living with a disability, the role of physiotherapists as the part multidisciplinary team is still not very well known.

Aim: The main objective is to highlight the importance of rehabilitation and physiotherapy in PUs management and to focus on the physiotherapist role in a multidisciplinary approach.

Results and conclusions: Rehabilitation plays its specific role in every level of comprehensive care in patients with high risk or already developed pressure ulcer, including primary prevention, conservative management, and also surgical treatment. The essential is the individual approach and plan for every single patient based on complex kinesiological assessment. The key role also plays communication between physiotherapists and members of the multidisciplinary team, especially about timing, order, frequency, and combination of nursing and rehabilitation interventions and procedures. There are several rehabilitation approaches. However, generally, the most important is early verticalisation, regular mobilisation, and soft tissue techniques. There are also other specific physical therapy techniques that are effective in particular types of pressure ulcers and injuries (e.g., electric stimulation, negative pressure wound therapy, ultrasonic debridement). A very often neglected component of not only rehabilitation but generally wound care is patient's education, specifically their preparation for home-care and their ability to handle home-based rehabilitation on their own successfully. There are also several forms of delivering rehabilitation itself or consultation with colleagues, such as face to face, virtual, using a cellphone, etc. In the current very difficult situation due to the COVID-19 pandemic, face to face rehabilitation or consultation is often impossible. So, it is probably time to start using more impersonal forms of rehabilitation and control of patients, or and consultation with colleagues. Above all, we should think about making them more efficient.

5B-1

A MULTI-LAYERED PROPHYLACTIC DRESSING SUBSTANTIALLY ALLEVIATES FACIAL TISSUE LOADS IN PRONE-POSITION SURGERIES

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Introduction: Prone positioning is typically used where surgical access to the posterior head and spine are required, but this is known to involve a risk for facial pressure ulcers/injuries. Here we aimed at evaluating facial tissue exposures to sustained mechanical loads during a prone surgical position, with or without multi-layered dressings applied as tissue protectors at the primary face-support contact areas, i.e. the forehead and chin.

Methods: We computationally determined the differences in facial tissue stresses and strain energy densities (SEDs, a measure of the mechanical energy delivered to tissues) at the forehead and chin in a prone surgical position, with the 5-layer bordered foam dressings described in [1] applied at these sites, against the bare skin conditions. For this purpose, we employed a three-dimensional anatomically-realistic finite element model of an adult head which has been validated against experimental interface pressure measurements at the forehead and chin in a prone position (for N=3 healthy young adult subjects).

Results: Application of the dressings considerably alleviated the exposures of facial skin and subdermal tissues to stresses and SEDs at the load-bearing sites, compared to the no-dressing case. For example, application of dressings at the forehead and chin resulted in 71% and 92% reductions in facial tissue exposures to SEDs at the respective locations during the prone positioning.

Conclusions: We found that application of the 5-layer border foam dressings [1] to the forehead and chin was biomechanically very effective in substantially reducing the exposures of facial tissues to the sustained head-weight loads at these sites. The modes of action of these dressings in mitigating the facial injury risk associated with prone-position surgeries resemble the ones of the sacral and heel dressings reviewed in [2].

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5B-2

FEASIBILITY OF USING 2D ULTRASOUND DATA FOR BUILDING A PERSONALIZED NUMERICAL MODEL OF THE SACRAL REGION FOR THE EVALUATION OF THE SUBJECT-SPECIFIC RISK OF SACRAL PRESSURE ULCER

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Introduction: The motivation of this work is to evaluate the correlation between mechanical and biological risk factors to evaluate subject-specific risk of sacral Pressure Ulcer (PU). From the mechanical perspective, the high internal strains were proven to be a cause of the PU onset [1], while from the biological perspective, inflammatory biomarkers showed correlation with tissue deformation [2]. The global objective is to interrogate the following concept: can inter-individual variability in biological response be partly explained by the variability in internal soft tissue mechanical response to external load? As a first step, this abstract will focus only on the mechanical response, validating the concept that it could be quantified using the B-mode 2D ultrasound (US) image.

Methods: 2D US data for the subdermal tissues in sacral region was acquired for one healthy volunteer (male, 33y.o., BMI=26.1kg/m²) laying in the prone position. A linear probe combined with a custom-made load sensor following the protocol described in [3] was used as an indenter. Fourteen loading cycles were performed. Geometry of a 2D subject-specific finite element model was then built based on the frames recorded for one cycle. Soft tissues behavior was represented by first order Ogden hyperelastic material model. Personalization of the tissue elastic properties was derived using an inverse procedure.

Results: Shear strain was chosen as a parameter for the mechanical response quantification, since it previously showed correlation with the internal tissue damage [1]. Personalized model was used to evaluate the maximum shear strain area, which occurred in the region of fat/skin contact.

Conclusions: This work shows the feasibility of using 2D US data for building a subject-specific numerical model to evaluate the mechanical response of soft tissues induced by the load. Ultrasound thus allows obtaining anatomical data and is accessible in clinical setting. Future work will include the comparison of the above results with the ones obtained using an MRI, reliable but costlier technique.

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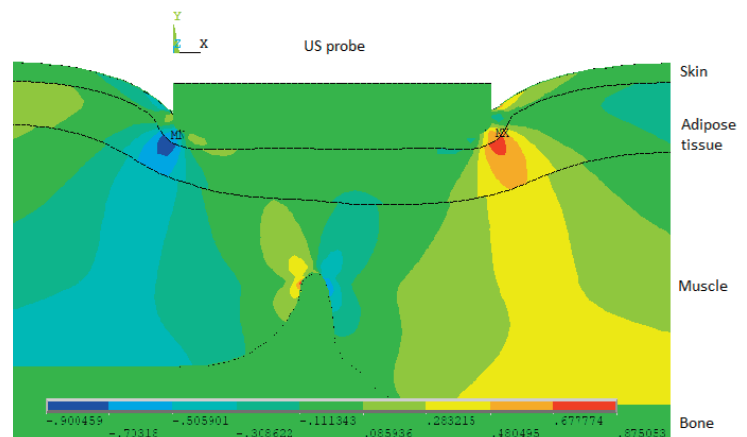


Figure: Shear mechanical strain

5B-3

THE CONTRIBUTION OF ARTIFICIAL INTELLIGENCE TO THE DIAGNOSIS AND MANAGEMENT OF CHRONIC AND ACUTE WOUNDS: A SCOPING REVIEW

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Introduction: Artificial intelligence (AI) algorithms allow computer power to replace the traditionally required human expertise, and even outperform human professionals in some tasks. Early and accurate diagnosis and corresponding adjustment of suitable treatments is crucial for effective wound healing and management. Currently, such diagnosis relies entirely on human experts and thus, is typically costly, time-consuming and is prone to subjective considerations, which all points to the clear benefits from use of modern AI algorithms in wound diagnosis.

Methods: To explore the breadth and depth of integration of AI methodologies in wounds diagnosis and management in the past decade, a scoping review was conducted. Relevant studies were reviewed and analyzed using 5 major databases, each scanned for search terms derived from the research question: How does AI contribute to the diagnosis and management of chronic and acute wounds?

Results: 49 journal publications describing relevant AI methodologies were included. We considered pressure ulcers, diabetic foot ulcers, other chronic wounds as well as burns and surgical incisions (including infected). The most significant identified contribution of AI is to the clinical visual assessment (VA) process, where classification and tissue-type segmentation algorithms have been successfully employed, demonstrating a potential for objective, rapid and systematic VA of wounds to support clinical decision-making. In particular, deep convolutional neural networks demonstrated the highest (>95%) accuracy in both automatic wound classification and tissue segmentation tasks. It also appears that there are feasible options to embed such AI tools in electronic health care records, in combination with physiological measures of the healing process.

Conclusions: While AI-based computer vision has started to impact wound diagnosis and management practices, there are still major gaps between the technological capacities and clinical implementation. Barriers to implementation need to be understood and mapped towards developing accessible AI-based technologies for healthcare professionals who treat wounds.

5B-4

THE PROBLEMATICS OF WOUNDS RELATED TO NURSING CARE IN INTENSIVE CARE UNITS - THE QUESTIONNAIRE SURVEY

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Introduction: The wounds related to nursing care interventions are one of the most severe and frequent complications during inpatient care. This complication can worsen the overall health status of the patients and can also be the reason for additional financial expenses as well as a longer hospital stay. Thus, the presentation aims to evaluate the level of knowledge and skills in nursing care professionals in this issue.

Methods: The quantitative questionnaire survey focusing on nursing care in the prevention and therapy of medical devices-related (MDR) wounds was used. The questionnaire was filling out by nursing professionals from intensive care units (ICUs) of different specialties (surgical, internal, anesthesiology, and resuscitation). The questionnaire consisted of 15 different questions focusing on the level of knowledge and skills of the respondents. In the end, the questions were statistically evaluated, and the results presented.

Results: Ninety-six nursing professionals filled out the questionnaire and were enrolled in the analysis. 91 of them was female, 5 males. The mean age of respondents was $33,1 \pm 8,9$. Among them, 22 were general nurses, 11 general nurses with further special education, 61 with a university degree (BSc., MSc), and 1 with a higher university degree (Ph.D.). The average grade of subjective knowledge evaluation about MDRs was $2,9 \pm 0,9$ (scale from 1 to 5). 90 nurses had personal experiences with MDRs. 24 respondents correctly identified all potential risks of MDRs occurrence when using medical tools. 36 respondents correctly identified all potential risk factors of MDRs occurrence of different origins. The Spearman correlation revealed the non-significant correlation between the level of education and knowledge about MDRs ($p = .149$). The nurses working on surgical ICUs presented the highest knowledge level.

Conclusions: The statistical analysis identified that there is still a knowledge gap about MDRs among ICUs nursing healthcare professionals. Identification of these pitfalls may help to deal with preventable complications better and can potentially save financial means in the healthcare system.

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5B-5

TRANSTIBIAL PROSTHETIC USERS AS A RISK GROUP FOR DEEP TISSUE INJURIES

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Introduction: The replacement of the lower leg with a transtibial prosthesis poses a high biomechanical challenge for the surrounding body structures: Loads that are usually distributed across the skeletal system are now transferred to the prosthesis via soft tissues. Since those tissue layers are not physiologically adapted to be weight-bearing structures, amputees might develop Deep Tissue Injuries (DTI). To gain a better understanding of the underlying processes and population-specific influences, we aimed to map out and analyse existing research on aetiology and risk factors for DTI in transtibial amputees, and highlight open questions.

Methods: Following the PRISMA-ScR guidelines for scoping reviews, we conducted a systematic search across the databases Pubmed, Ovid Excerpta Medica, and Scopus on June 14th, 2019. This search returned 99 records, of which 11 met the inclusion criteria. An additional 5 sources were identified through supplementary scanning of reference lists and forward citations. We extracted information using a pre-designed data charting form, before grouping the studies by research focus into the following categories: (1) Aetiology, (2) Risk factors, and (3) Methodologies to investigate both.

Results: A total of 16 studies were evaluated. The analysis of various loading scenarios indicates that transtibial prosthetic users may be at risk for DTI development. Individual surgical, morphological, and physiological determinants, as well as the choice of prosthetic componentry seem to play a major role in this. However, the methodologies employed within the studies showed substantial heterogeneity in design and outcomes, and often suffered from high inter-patient variability and small sample sizes, which interfered with the comparison and interpretation of outcome measures. For a comprehensive insight into the underlying processes, fundamental research on cell and tissue reactions to dynamic loading and on its influence on the vascular and lymphatic systems would need to be integrated as well.

Conclusions: The overall body of research on DTI in transtibial prosthetic users is sparse. However, as there is a strong indication of transtibial prosthetic users being a risk group of DTI, we recommend an increased interdisciplinary research effort within this area. A better understanding of prosthesis-related deep soft tissue damage has the potential to initiate much-needed clinical advances in surgical and prosthetic practice and can complement existing research and practices related to DTI in general.

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5B-6

DEVELOPMENT OF A FINITE ELEMENT MODEL FOR THE HETEROGENEOUS STRUCTURE OF THE CALCANEAL FAT PAD TO STUDY ITS LOADING DISTRIBUTION. INSIGHTS FOR STRESS-RELATED INJURIES

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Introduction: The calcaneal heel pad is a heterogeneous structure composed by fat clusters separated by an elastic fibrous septa. Fat clusters are composed by fully grown adipocytes that bounded together form fat cambers arranged in a honeycomb structure [1]. The fibrous septa is crucial to maintain the structural integrity and separate the fat clusters. The role of the heel pad is fundamental in the absorption of impact forces during ambulation. Its complex structure is used to distribute the mechanical loads in such a way that the single fat cells can sustain the pressure without permanent damage. A good understanding on the mechanical properties and the loading distribution of the calcaneal fat pad could give insight in stress-related injuries as diabetic ulceration and plantar fasciitis [2].

Methods: The objective of the present study is to develop a three-dimensional subject-specific heel pad Finite Element (FE) model that considers the honeycomb structure composed by fat clusters and fibrous septa and their biomechanical properties. In order to gain insight on the stress propagation inside the fat pad structure an MRI-compatible device was built in order to apply displacements on the human heel sole and measure the corresponding force. The device is capable of applying compression and shear forces independently to analyze the mechanical response for both types of loads. MRI data were acquired in five different scenarios, including a rest position and two loading configurations for the compression and shear respectively (Figure 1). The MRI data were then processed in order to generate a FE model of the heel and estimate the soft tissue elasticity parameters by comparison with the different loading situations (Figure 2).

Results: The heel tissues showed a hyperelastic material behaviour. Under compression and shear loading the calcaneal pad initially has low stiffness, subsequently, increasing the load, the fibrous septa and the fat clusters come under tension and compression respectively, limiting the deformation.

Conclusion: The numerical model developed in this study can be used to define a protocol to establish a set of parameters to describe patient specific material properties of the calcaneal fat pad. This will allow to analyze with multiscale models the amount of load distributed to the single fat cells which is not possible with experimental tests. Finally, this would lead to an optimization in the design of orthotics and shoes to avoid dangerous strains that could generate pressure injuries.

Acknowledgment: This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No. 811965.

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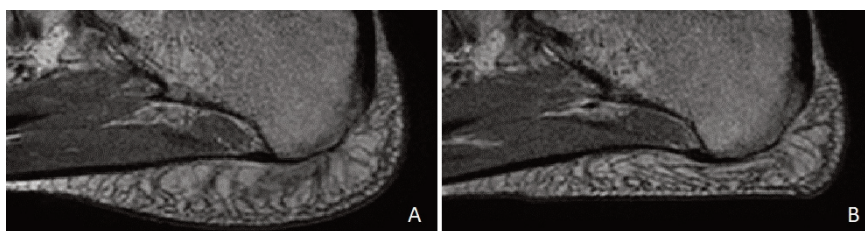


Figure 1. The deformation of the internal soft tissues of the calcaneal pad, a comparison between (A) relaxed and (B) vertically loaded configuration.

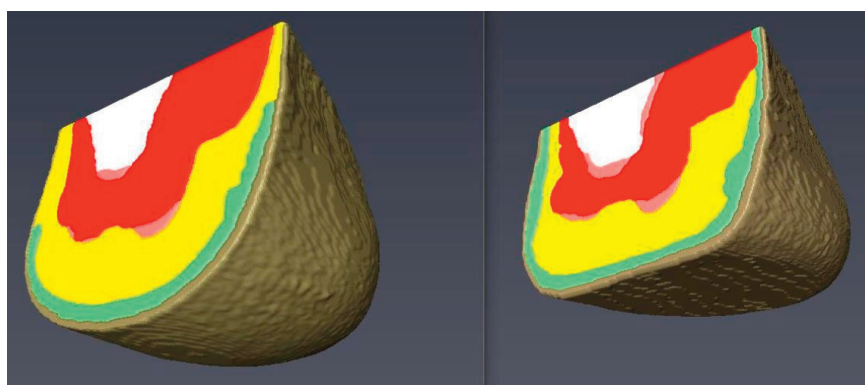


Figure 2. Comparison between the segmented surfaces of the heel in relaxed and vertically loaded configuration.

5C-1

THE ROLE OF MECHANOACTIVATION AS A POTENTIAL MECHANISM ACTIVATED IN VIVO DURING THE PRESSURE ULCER HEALING UNDER INFLUENCE OF THE RADIAL SHOCK WAVES

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Introduction: Wound healing involves the coordinated action of many types of cells including epidermal reepithelization, extracellular matrix deposition, connective tissue cell contraction, and angiogenic response. Yes-associated protein (YAP) is a key component of the Hippo pathway. It plays an important role in stem cell proliferation, stem cell self-renewal, apoptosis, organogenesis, epithelial-mesenchymal transition (EMT) and contact inhibition. Numerous studies have shown the important role of YAP in the wound healing process. So far, the mechanisms of extracorporeal shock waves (ESW) activated in vivo are poorly documented. The purpose of this study is to analyze a potential biological mechanism of ESW on human pressure ulcers (PU).

Methods: Ten female patients with PU in the sacral localization received three ESW applications (300 + 100/cm² pulses, 2.5 bars, 0.15 mJ/mm², 5 Hz). The biopsy specimens were collected from the most contaminated area of the PU at baseline (M0) and 24 hours (M1) after the last ESW. Immunohistochemical staining was performed by a standard immunoperoxidase staining procedure. The results were quantified based on a standard scoring system.

Results: YAP was expressed in both nuclear and cytoplasmic locations in the epithelium and conceive tissues. In skin before the ESW intervention, YAP was weakly expressed in the stratum basale. After interventions, YAP was mainly expressed in the stratum basale and lower stratum spinosum in the samples. YAP expression in basal cells at the nucleus localization correlates with the expression of proliferation marker Ki67. Results show that increased expression of YAP may cause a higher proliferation of keratinocytes, directly contributing to epithelial regeneration. In pre-intervention wounds, YAP in dermal fibroblasts has mainly cytoplasmic localization, while after the ESW intervention in the wound healing phase it has a high level of expression in the nuclei of fibroblasts in the wound bed. Moreover, the YAP expression level in cytoplasm correlated with an increase in the number of myofibroblasts in the wound bed defined by immunocytochemical expression of smooth muscle actin.

Conclusions: YAP may affect wound closure and identify YAP as key regulators of keratinocyte and fibroblast mechanoactivation. It may have pleiotropic effects, influencing wound closure, cell proliferation, and tissue contraction.

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5C-2

PRELIMINARY PLACEBO-CONTROLLED STUDY ON THE CLINICAL EFFECTS OF RADIAL SHOCK WAVES IN PRESSURE ULCERS USING A PLANIMETRIC AND CLINIMETRIC ASSESSMENTS

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Introduction: Extracorporeal shock waves (ESW) are confirmed to be a useful and safe biophysical agent in chronic wounds. Up to date, there is missing data based on well-designed clinical studies presenting evidence for using ESW in patients with pressure ulcers (PUs). The aim of this preliminary placebo-controlled study was to investigate the effectiveness of ESW in PUs using planimetric and clinimetric assessment.

Methods: A group of 12 elderly patients with PU were included and randomly allocated in group A treated with ESW (n=6, 3 sessions of radial ESW, 300 + 100 pulses/cm², 2.5 bars, 0.15 mJ/mm², 5 Hz) and group B (n=6, placebo radial ESW). Both groups continued their standard wound care procedures. The innovative planimetric smartphone application (PLA) was used as an objective tool and wound bed score (WBS) was used as a visual tool. All assessments were performed at baseline (M0), one week after each of three ESWT (M1–M3).

Results: Statistically significant results were obtained according to both PLA method and WBS tool in group A (p<0.05). The remaining PLA parameters of the PUs such as length, width, depth, undermining, and tunneling have been also improved compared to group B (p<0.05).

Conclusions: This preliminary study reports that ESW has beneficial clinical effectiveness and safety thus this adjunctive method might be useful for patients with PUs. Further studies on a larger population are needed including follow-up observations as well as along with basic science methods such as histopathology and immunohistochemistry.

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5C-4

INTRODUCING THE CREW PROGRAMME (CARERS RESOURCE ON EDUCATION FOR WOUND CARE)

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Introduction: There is an ageing population and a continued need to enhance care in the community away from provider services. Patients cared for within community settings and at home have many co-morbidities, most of which have a detrimental impact on skin integrity.

The focus within primary settings should be for prevention of pressure ulcers and moisture lesions rather than the treatment of such events. Very often however it is not until a pressure ulcer or moisture lesion has been identified that prevention strategies are appropriately put in place. This is likely due to a lack of knowledge into the aetiology of development and confusion and misinterpretation of the definition of the changes. There is a plethora of skin care products on the market which leads to difficulties in decision making for clinical care, confusion with application aims and very often multiple products being utilised in short time periods, thus delaying wound healing, and leading to prevention strategies being unsuccessful. The recommendation for best practice would be to standardise education for all care settings, utilising shared protocols and collaborative practices.

Methods: The Tissue Viability Project Team have developed an education programme named the Carers Resource on Education in Wound care- CREW programme, to provide a comprehensive education package on the prevention of pressure and moisture damage within care homes and home-care settings.

Our CREW Project aims:

- Provide a standardised education programme on pressure and moisture damage prevention, including general skin care, normal skin physiology, and age degeneration on skin physiology to all Nursing/Residential/Domiciliary care organisations.
- Establish a baseline number of pressure ulcers within the community
- Reduce the number of pressure ulcers acquired across all categories
- Achieve cost savings through utilisation of prevention strategies
- Promote knowledge and increase information to facilitate appropriate treatment in a timely manner.

Results: The CREW programme has commenced and been very well received. Early analysis of evaluation forms confirms staff are gaining new knowledge, refreshing existing knowledge, and removing the perceived barriers between care at home and secondary care. Skin care education is being standardized across the county in all care settings and patients' homes.

Conclusions: We aim to repeat the point prevalence and wound care audit to obtain data confirming we have achieved our aim of reducing the incidence of pressure ulcers and moisture damage. Initial data supports the fact that we are making a positive change to patient care.

5C-5

WORK IN PROGRESS: PREVENTING PRESSURE ULCERS USING NEW TECHNOLOGY TO SUPPORT REAL TIME REPOSITIONING IN A HOSPITAL SETTING

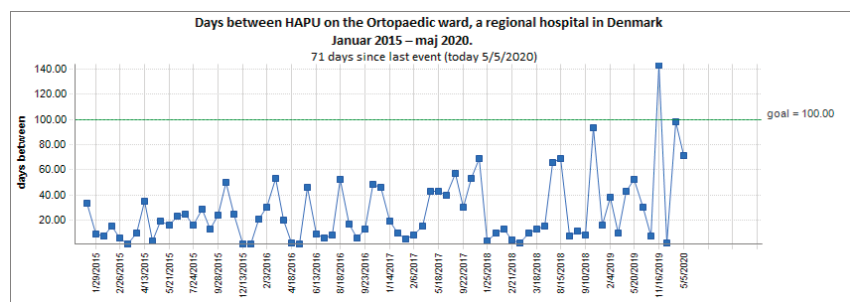
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Introduction: A Danish national quality improvement program in 2010-2014 introduced care bundles; one was dedicated to preventing Hospital Acquired Pressure Ulcers (HAPU).

The hospital setting is an Orthopaedic surgical in-patient ward, in a Danish 604 bed regional teaching hospital. The ward has patients with hip fractures, chronic ulcers and amputations. Despite being at very high risk, patients on this ward have not developed HAPU worse than category 2 for several years.



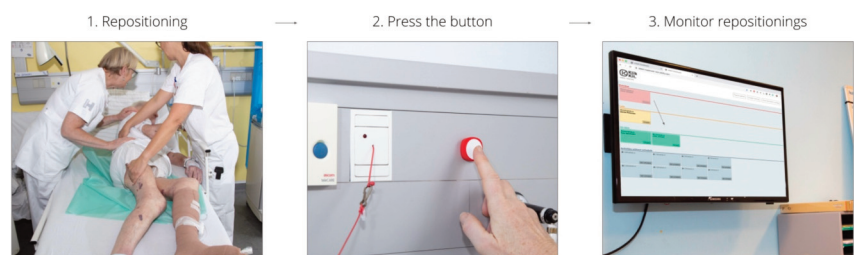
An initial audit of the ward's high-risk patients' charts revealed excellent documentation of risk assessment (Braden), mobilization, use of pressure relieving devices and focus on nutrition. However,

documentation of repositioning was incomplete. The aim of this project is to test a new technology that intends to improve ongoing HAPU prevention efforts by ensuring:

- That the staff has an overview of the scheduled repositioning for patients.
- Real time documentation of the patients repositioning by simple new routines.

Methods: Patients with Braden score ≤ 15 are included in the test. We test a Bluetooth-enabled button attached to each bed. The button is connected to a central monitoring dashboard providing live overview of all monitored beds. Upon patient repositioning, the healthcare professional presses the button updating the dashboard.

The Braden score and repositioning time are logged for documentation purposes allowing data driven optimisation of work routines. We use the Model for Improvement with small scale testing and data collection at ward level. The project focuses on co-creation, adapting the solution to user needs and work routines.



The solution has been tested in two patient rooms and all patients in the ward will be included from 1st of June 2020, expecting 200 patients over a year. All healthcare professionals (caregivers, physicians, and therapists) have been involved in the testing.

The project is a contractual collaboration between a public hospital and a private company, with no services or remuneration involved.

Results: The solution meets our needs, is intuitive and easy to manage. The dashboard provides a user-friendly overview of upcoming patient repositioning, increasing the patient safety especially regarding staff shifts. It is easy to document repositioning with one push on a button. We have extended the options for documentation to type of repositioning, e.g. "side positioning" or "chair positioning".

Conclusions: The solution seems promising. The visual overview of deadlines for repositioning the most urgent and high-risk patients supports the healthcare professionals' efforts in preventing HAPU.

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5C-6

REPEATABILITY AND RELIABILITY OF SUB-EPIDERMAL MOISTURE (SEM) READINGS IN DORSAL (STERNUM) AND VENTRAL (SACRUM AND HEEL) ANATOMICAL LOCATIONS

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Introduction: A formal prospective single-arm study (IRB: 28415/1) was conducted to demonstrate the repeatability and reliability of Sub-Epidermal (SEM) moisture readings, a biophysical marker associated with development of early and deep pressure injuries/ulcers (PI/PUs), as an objective tool in discriminating healthy versus damaged tissue at anatomies commonly at risk for PI/PUs.

Methods: From each of the 31 confirmed healthy subjects, a total of 108 SEM readings were collected per subject by 3 trained operators, 3 different devices of the same model, recording 3 separate SEM readings from four anatomical sites (sternum, sacrum, left and right heels). Individual SEM readings were collected directly over the bony prominence, 1 cm to the left and 1 cm to the right of the bony prominence for all four anatomical locations. Participants had a mean age of 29.6 years and a mean weight of 72.03 kg. Demographic characteristics of the enrolled subjects were recorded. Descriptive statistics for SEM readings were calculated for each anatomical site and intra-class correlation (ICC) coefficients were calculated using multiple linear regression.

Results: Analysis of sternal SEM values (N= 735) showed the highest ICC at 0.961 and the lowest ICC values were recorded for the left heel (N = 245) at 0.84. The ICC statistics at all anatomical sites exceeded 0.8, indicating a high degree of repeatability and reliability between consecutive SEM readings.[1]

Conclusions: The results indicate that measuring SEM across dorsal and ventral anatomical sites is repeatable and reliable. ICC analyses suggest that measuring SEM at multiple anatomical sites at high risk for developing early and deep PI/PUs is indicative of a good quality assessment tool that will provide reproducible results at dorsal and ventral anatomical sites. In resource-limited critical care settings, and the overwhelming burden from unanticipated outbreaks of respiratory infectious diseases, tracking repeated and reliable SEM values during intermittent proning and supine repositioning, allows for easy ventral skin tissue assessments and, may help support health care practitioners' decision to intervene earlier and prevent PI/PUs.

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EFFECTIVENESS OF PRESSURE INJURY PREVENTION TRAINING

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Introduction: Searching for quality in health care and discussion on patient safety have been growing in recent years, which has led the WHO to define patient safety as reducing the risk of damage to an minimum acceptable. In this context, in 2013, the Ministry of Health of Brazil instituted the National Patient Safety Program with the objective of contributing to qualify of health care, in public and private health care system. In the same year, the Agency National Health Surveillance Agency published a resolution that aims to promote actions for the safety and improvement of quality in health services, regulating aspects of patient safety, such as the implementation of Safety Centers, preparation of the Patient Safety Plan and the obligation to notify adverse events. Considering that pressure injuries have been a major concern for health services, as their occurrence has an impact both on patients and their families, as well as on the health system itself, with length of hospital stay, risk of infection and, consequently, increased costs and that the implementation of teaching strategies must guarantee the effectiveness of the development of professional skills, the aimed To evaluate the effectiveness of training to implement pressure injury prevention measures.

Methods: A quasi-experimental, descriptive and cross-sectional study conducted in five wards of a university hospital in Campinas, São Paulo, Brazil. The study was developed in four stages: 1) content validation of the pressure injury (PI) prevention audit instrument by six experts. The agreement between the experts was measured using the Content Validity Index (CVI) and values above 0.9 were considered satisfactory; 2) audit to assess whether the PI prevention measures described in the institutional protocol were being implemented by the nursing staff; 3) training of the nursing professional team through clinical simulation, with pretest and posttest application and reaction evaluation 4) audit to evaluate the implementation of PI prevention measures after educational intervention.

Results: The audit instrument, after two rounds, was validated by the experts with a CVI greater than 0.9. The final version has 33 items divided into four subtitles. In the first audit, 28 patients participated and the average compliance found was 65.1. In the training, 127 nursing professionals (72% of the total) participated and the average of pre and post-test hits, respectively, by professional group, was 7.9 (SD = 1.3) and 8.4 (SD = 1.2) ($p = 0.0007$) for nursing technicians and 8.3 (SD = 0.7) and 8.6 (SD = 0.8) for nurses ($p = 0.0299$). In the audit, performed two months after training, in 28 patients, the average compliance found was 56.2.

Conclusions: Although the team added knowledge through training, in practice the professionals did not change their attitudes, showing that other factors besides knowledge interfere with behaviour change.

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5C-8

USING A THIN SILICONE FOAM AND A CARE PATHWAY TO SUPPORT DEVICE RELATED PRESSURE ULCER PREVENTION IN AN ACUTE TRUST

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Introduction: In one acute Trust during 2018-19, patient's requiring oxygen therapy via Non-Invasive Ventilation systems (NIVs) or nasal cannula represented 15.3% of hospital acquired device related pressure ulcers. These were predominantly located across the nose, cheeks and chin. This highlighted issues with standard practice; retaining gel strips under oxygen tubing was challenging and achieving an effective seal under NIVs was inconsistent. The alternative was to place NIVs directly onto the patient's face affording no protection from potential pressure damage.

A 4-week evaluation on the Respiratory Unit assessed effectiveness of a thin adhesive silicone foam to address device related pressure damage for patients requiring long term oxygen therapy.

Methods: The evaluation assessed how the thin silicone adhesive foam performed when worn as protection for patients receiving long term oxygen therapy via nasal cannula or NIVs.

Inclusion criteria: all patients requiring a NIVs or nasal cannula during the evaluation period.

A project plan and Trust evaluation form were provided.

The evaluation assessed the following criteria scoring each out of 5:

Comfort, Ease of application, Conformability, Stays in place, Acceptability to patient, Acceptability to clinician and overall performance.

The Tissue Viability Nurse analysed data collected.

Results: 5 completed forms were returned. Whilst a low response, feedback showed 100% satisfaction across all criteria. ranging from conformability, overall performance, clinician and patient satisfaction. The nurses provided positive verbal feedback.

No issues with achieving seals were identified. The dressing could be wrapped around oxygen tubing resolving issues of retaining product in situ. No device related pressure ulcers were reported during the evaluation.

As an outcome, the dressing was approved as first line prevention for this clinical indication. A simple care pathway supported implementation.

The evaluation showed high satisfaction amongst nurses and patients with the dressing for this indication. It is gentle on patient's skin and provides atraumatic removal.

Sizes fit over the nose, cheekbones, chin, and around oxygen tubing. The nurses developed effective application techniques to support use. Clinically, fit and seal of NIVs is not compromised. It is cost-effective compared to the gel product.

Conclusions: As an outcome of this small evaluation, implementation of the dressing, supported by a care pathway, has become standard practice for preventing device related pressure ulcer for patients requiring long term oxygen therapy. Reported reduction in pressure damage may be partly due to nurses increased awareness of effective prevention strategies. On-going data analysis will establish if this trend is sustained.

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Foam Lite™ ConvaTec

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5C-9

HOW TO MANAGE A TRACHYOSTOMY PRESSURE INJURY -AN INNOVATIVE APPROACH

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Introduction: Prevention and management of device related pressure injuries is an area of increased interest 1. Previous research between 2008–2010 noted a decrease in the frequency of tracheostomy related pressure ulcers, from 8.1% pre-intervention to 0.3% after the implementation of a tracheostomy related pressure ulcer prevention bundle 2.

Patients with medical devices in situ are 2.4 times more likely to develop a pressure injury than those without 4. A medical device, for example, permanent tracheostomy as in this case, is likely to exert suffice and sustained pressure over skin susceptible to breaking down. Guidance on the correct placement and fixation of a permanent tracheostomy is important 3.

In my professional experience, I have found that the potential challenges and increased risk factors associated with young and or obese patients who have a tracheostomy of developing a pressure injury are that they often present with shorter or obese necks, skin folds and consequently areas of moist or macerated skin.

Whilst Incorporating a Multi-Disciplinary Team approach, we report on a solution for an individual with complex care needs who had developed an unstageable, tracheostomy acquired pressure injury.

The Multi-disciplinary team consisted of a healthcare scientist; tissue viability nurse; district nurse and carers

Methods: After discussions between the patient and the Multi-Disciplinary Team, the most suitable intervention, along with the continued dressing regime was to use a tri-polymer gel pad 5 cut and modified to the specific dimensions. (see figure 1) The modifications allowed a more consistent and effective fit around the tracheostomy flange. Figures (see figure 2)

The main aims were to reduce excessive pressures and increase offloading in and around the tracheostomy tube flange.

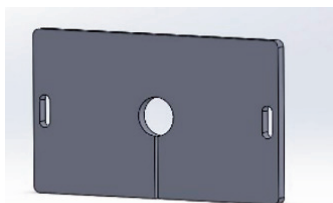


Figure 1

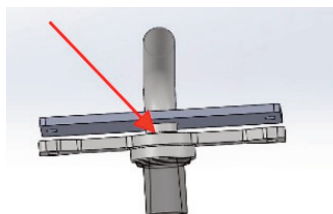


Figure 2

Results: The customised pressure reducing pad was strategically placed under the flange and on top of the dressing and within two days improvement of the wound was noted. This improvement continued until complete healing occurred after one month. At the time of writing the wound has remained healed for three months with the patient still using the customised product.

Conclusions: The innovative use of a pressure redistribution pad by a Multi-Disciplinary Team has reduced the secondary complications from pressure damage ensuring a positive patient experience meaning that they can continue to live in and as part of the community

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5C-10

NEGATIVE CONSEQUENCES AND REGRESSION OF PRESSURE ULCER HEALING DUE TO THE LACK OF CONTINUITY OF SHOCK WAVE TREATMENT - A CLINICAL CASE REPORT

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Introduction: The key role of implementing innovative methods such as shock waves (ESW) in the management of pressure ulcers (PUs) is to intensify and maintain the therapeutic effect. The specialists emphasize that in the management of each chronic wound, it is important to ensure the repeatability of individual actions in line with the TIME strategy and to maintain continuity of treatment. In case of discontinuation of effective procedures, there is a serious risk that the healing process will be stopped or that the clinical condition of the wound will severely regress.

Methods: The study was conducted in an inpatient long-term care center based on observation and clinical assessment of PU in sacral area. The presented case shows the effect of discontinuation of therapy with ESW combined with local wound specialist care. The treatment was discontinued due to the necessity of hospitalization in another center, which resulted in the lack of access to previously used methods. The paper points out the need to maintain continuity of treatment using a combination of standard and innovative supporting procedures.

Results: It was observed that when ESW treatments were used, the angiogenesis was stimulated and healing process was faster. After 9-month period, PU decreased from 42.9 cm² to 6.0 cm² (86%). After about one month of discontinuation of the therapy so far, the clinical condition of the PU significantly worsened, with the surface area increasing from 6.0 cm² to 23.8 cm² (297%). The wound was infected and necrotic tissues appeared and a "pocket" in the upper pole appeared. After re-implementation of the ESW therapy, the PU decreased from 23.8 cm² to 6.1 cm² (74%). Clinically, the wound was clearly contracted, the inflammatory response was eliminated and proliferation was stimulated.

Conclusions: In the process of PU healing, an important factor is the individual choice of the treatment methods, which accelerates the healing process, but also maintaining repeatability without unjustified discontinuation until a complete healing. Discontinuation of therapy when the patient's general condition deteriorates may cause stopping the healing process and worsening of the clinical condition of PU.

References:

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5C-11

AN EVALUATION OF PRONING INJURIES IN CRITICAL CARE DURING THE COVID-19 PANDEMIC

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Prone positioning has been used to treat patients in critical care with severe ARDS for over two decades. A national survey of proning practice carried out by the intensive care society found that pressure damage was the most cited complication.

Following a suspected increase in reported pressure ulcers during the peak of the COVID-19 pandemic a review was undertaken to assess the incidence of pressure ulcers in patients that were nursed in the prone position.

Methods: A combination of patient safety reports, Intensive Care National Audit and Research Centre (ICNARC) data

and patient records were reviewed to identify the number of patients with COVID-19 who were treated in the prone position and developed pressure damage. A review of positioning practices was also undertaken.

The data was taken over a 9 week period at the peak of COVID-19 activity within the organisation. Four adult critical care units across 2 sites participated.

Results: During a nine week period forty six (n=46) patients with COVID-19 required invasive ventilation and thirty (n=30; 65%) were treated in the prone position. Fourteen (n=14; 46%) of the patients that were prone developed one or more areas of damage to the skin.

Frequency and Length of Time Patients Nursed Prone

The fourteen (n=14; 46%) patients who developed pressure damage received a total of thirty six (n=36) episodes of prone positioning. Nine (n=9; 64%) patients were treated in the prone position on two or more occasions. The length of time of each episode of prone positioning varied from 1 hour to 24 hours with an average time of 16.0 hours. Most episodes lasted the recommended 16-18hrs.

Skin Damage

Twenty eight areas of skin damage were reported for the fourteen patients who were treated in the prone position. Nineteen (n=19; 67%) areas of skin damage were facial injuries while 6 (n=6; 5%) were non-prone related.

Proning Practices

All four adult critical care units have a standardised guideline for prone positioning. However, this cohort of patients required longer and more frequent periods of prone positioning. Difficulties in positioning the head and the volume of excessive secretions were also frequently reported. Other challenges included staff being redeployed from other areas that may not have had experience in nursing patients in the prone position as well as possible errors in 'positional change' documentation.

Conclusions: A quality improvement initiative has been set up by the 'Critical Care Stop the Pressure Task Force' with an aim to reduce the incidence of prone positioning related pressure damage in critical care. It includes

- Test preventive facial dressings and positioning aid
- Develop guidance on skin protection for prone patients
- Improve electronic documentation
- Include 'prone positioning' in training that is delivered to all new staff and on annual updates
- Purchase dynamic mattresses in preparation to use in cohorted critical care areas
- Monitor pressure ulcer data for prone patients and act on findings.

In addition we aim to develop a more robust multi professional approach to the prevention of pressure damage in the critically ill.

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Guidance for Prone Positioning in Adult Critical Care. Version 1 November 2019 Faculty of Intensive Care Medicine and Intensive Care Society

5C-12

DEVELOPMENT AND IMPLEMENTATION PREVENTION PRESSURE ULCER PROTOCOL AT SURGICAL CENTER

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Introduction: Pressure injury (PI) is an adverse event that can occur during and after surgical procedures¹. The risks vary according to the patient's situation and the surgical position. Updating prevention pressure injuries/ulcers protocols in the operating room is a strategy to reduce the incidence of these injuries. The objective of this study is to develop and implement prevention pressure injuries/ulcers protocol in the operating room at Private General Hospital in Campinas, São Paulo.

Methods: Cross-sectional, descriptive and exploratory study, performed in a Surgical Center of a general hospital in the city of Campinas. The study was developed from August 2019 to January 2020. The need to implement prevention pressure injury protocol at the Surgical Center was identified. The protocol development was carried out in some stages: 1) Indicators survey pressure injury in Surgical Center; 2) Literature review and studies selection with relevant evidence level for selection prevention pressure injury strategies to be implemented; 3) Selection of Elpo's scale to assess patient risks in the preoperative period; 4) Inclusion of five layers with soft silicone and edges for the bony prominences at risk according to the surgical position associated with standard care²; 5) Conducting training for the entire nursing team of the Surgical Center and for the hospital's skin care reference team; 6) Monthly monitoring of pressure injury indicators in the Surgical Center by the team referring to hospital skin care

Results: The protocol was made available in print and online. This was developed and implemented in the institution's Surgical Center, where all nursing professionals in this sector participated in the training. The protocol was released online and distributed in printed form at the hospital's operating room. A simplified poster was developed and posted at the Surgical Center. Continuing the implementation process, a module was developed in the Online Permanent Education Program for nursing professionals at the Surgical Center. As initial results, it was observed that all patients have their risk assessed after admission to the OR, which makes it possible to implement assertive strategies and reduce pressure ulcers incidence. From January to July 2020, only 02 pressure injuries were reported in the OR.

Conclusions: The protocols promote positive impacts on the prevention pressure injuries and people's quality of life, being an essential resource for humanized care based on health needs. Updating the prevention protocol proved to be effective in reducing the incidence in surgical patients

References:

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5C-13

PPE RELATED SKIN REACTIONS IN HEALTHCARE PROFESSIONALS DURING COVID 19

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Introduction: Since the outbreak of COVID-19 pandemic, clinicians have had to use personal protective equipment (PPE) for prolonged periods. This has been associated with detrimental effects, especially in relation to the skin health. Among the conditions, pressure ulcers (PUs), erythema, contact dermatitis and moisture associated dermatitis have been the most commonly reported (Wang and Parish 2019). In particular, respirator protective equipment (RPE) have been associated with skin damage most frequently, as indicated by nasal bridge, cheek and ear symptoms.

The present study describes a comprehensive survey of healthcare workers (HCWs) with a focus on reporting the nature and frequencies of adverse skin reactions to PPE, as well as addressing factors which are implicated in skin reactions.

Methods: A prospective survey questionnaire was designed to capture the impact of respirator protective equipment (RPE) on the skin of hospital staff. The survey, disseminated to HCWs at three different UK NHS acute centers, collected information in relation to staff experience with PPE.

Results: A total of 307 HCWs responded to the survey. 38 (12%) were male, 268 (88%) were female, 51 (17%) were doctors and 209 (68%) were nurses. Six adverse skin reactions were reported, namely, redness blanching (33%), pressure damage (12%), itchiness (22%), rash (9%), dry skin (13%) and spots (11%). These occurred on anatomic skin locations associated with RPE and face shields. Statistically significant correlations ($p < 0.05$) were observed between the average daily time of PPE usage (Figure 1A), the time period for which the PPE was doffed from the skin (Figure 1B) and the manifestation of skin adverse reactions at the anatomic site of investigation, namely the bridge of the nose.

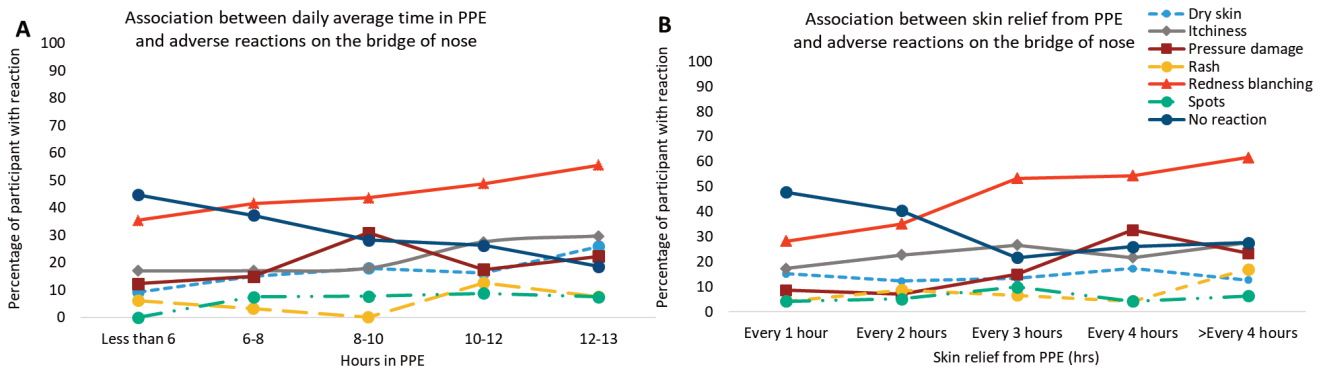


Figure 1. Correlations between the average daily time of PPE use (A), the frequencies of skin relief from PPE (B) and adverse skin reactions on the bridge of nose.

Conclusions: Adverse skin reactions to PPE were related to the duration of use and the frequency of removals during a given clinical shift. Sites most effected included the bridge of the nose associated with generic RPE designs incorporating stiff materials at the skin interface. Improvements in guidelines for PPE use and modifications to RPE designs are required to protect skin health.

References:

Wang, J. and L. Parish (2019). "Dermatologic Manifestations of the 1918-1919 Influenza Pandemic." *Skinmed* 17(5): 296.

5C-14

PREVALENCE OF MEDICAL DEVICE-RELATED PRESSURE INJURY IN HOSPITALIZED PATIENTS

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Introduction: Pressure injury (PI) in health systems deserve special attention from prevention through care, in view of their risk and damage. Pressure injuries related to medical devices (MDRPI) occur in hospitalized or institutionalized patients as well as outpatients diagnostic services¹.

Due to the vast use of medical devices in health care (e.g. catheter, pressure socks, tubes), the risk for patients to acquire pressure injury double². The goal of this study is verify the prevalence of pressure injuries related to medical devices in hospitalized patients.

Methods: This is a retrospective cohort study, in a large philanthropic hospital in the state of São Paulo / Brazil, from January 2018 to December 2019. The sample included all patients who presented pressure injuries, on the day of collection, once a month, through a complete skin assessment of all hospitalized patients, by a trained professional. The data was analyzed using descriptive statistics, average, standard deviation (SD), absolute and relative frequency, presented in tables and graphs. Data was collected after approval by Institution's Research Ethics Committee with the opinion number: 3,641,989.

Results: The total number of patients in the sample was 8773, of these a total of 654 had some pressure injury, with a point prevalence of 7.5%, of which 46 related to MDRPI, with a point prevalence of 7% of PI found. The prevalence in adults was 6.7% and in the pediatric population 0.33%. Average age in adults was 66.4 years and in pediatric patients 5.9 years. 82.6% of patients were hospitalized for clinical reasons and 60.9% were hospitalized in critical units. Regarding the morbidities presented, the presence of hypertension (19 - 13.7%) and diabetes (13 - 9.3%) stands out. The most affected areas were nose, legs and feet and were related to nasogastric catheter (22.1%) and elastic stockings (17.3%) devices, respectively. The most frequently found stages were stage 1 (46.1%) and stage 2 (25%). As for the risk of PI according to the Braden scale, 34.8% were high risk and 26.1% low risk.

Conclusions: It is believed that based on the information identified, it is possible to design and implement a prevention protocol for MDRPI, just as it already exists for PIs in general. It is suggested as a basis, the use of the SECURE mnemonic (GEFEN et al., 2020), which has already been implemented in international hospital institutions, for the organization of these interventions, based on the worldwide prevention recommendations.

References:

- 1 Jackson D, Sarki MA, Betteridge R, Brooke J. Medical device-related pressure ulcers: A systematic review and meta-analysis. *J. Nurs. Stud.* 2019 Apr; 92: 109-120.
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5C-15

INCIDENCE, TYPOLOGY AND MEASURES OF PREVENTION AND TREATMENT OF SKIN INJURIES ASSOCIATED WITH THE USE OF PERSONAL PROTECTIVE EQUIPMENT IN HEALTH CARE PROFESSIONALS DURING THE COVID-19 PANDEMIC IN SPAIN. GNEAUPP-EPI-LEC-COVID19 STUDY (PRELIMINARY RESULTS)

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Introduction: The recent COVID-19 pandemic has represented the use by health care professionals (HCP) of different personal protective equipment (PPE), resulting in the appearance of skin injuries associated with PPE (PPE-SI). Knowing the epidemiology, characteristics and factors related to the use of different types of PPE and the prevention and treatment of PPE-SI can be very useful to understand the scope of the problem and to define strategies for its prevention and treatment in possible future pandemics.

Methods: To this end, the GNEAUPP proposed the performance of a cross-sectional study, in the geographical area of the Spanish state, by means of a self-administered survey using a Google forms questionnaire. The study universe was HCP, from any discipline and from any level of care or type of institution with patients who have been in contact with COVID-19 patients or COVID-19 suspects and have used PPE during the recent COVID-19 pandemic in Spain.

Main results: We obtained 2078 questionnaires, 75.5% from nurses, 10.79% from EDCTs, and 6.6% from physicians. Of these, 84.7% were women and 15.3% were men with an average age of 43.7 years. In 18.2% of the cases the institution of the professional had a protocol for the prevention of PPE-SI, in 10.2% the professional did not know if it existed or not and in the remaining 71.3% the institution did not have such a protocol. 29.9% of the professionals always used some prevention product and 25.3% sometimes. 52.4% of respondents reported having submitted at least one PPE-SI, of which 39% had submitted one, 35.8% two, 14.3% three, 2.2% four and 8.6% more than four. In relation to PPE-SI, 74.3% were defined as pressure injuries (PI), 11% were friction injuries (FI), 8.5% were combined or multicausal injuries (CMCI) and 6.1% were skin injuries associated with moisture (MASI). The mean duration of incident injuries was 11.6 days (9.7 days for PI, 10.2 days for FI, 19.9 days for CMCI and 19.4 days for MASI). More detailed information is presented by type of device causing, typology and severity of injuries per device as well as preventive measures used.

5C-16

EVALUATION OF COST EFFECTIVENESS WITH THE USE STANDARD RESOURCE IN PATIENT POSITIONING COMPARED TO THE USE OF MOLDABLE FLUIDIZED POSITIONERS IN ICU'S BEDS

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Introduction: The pressure injuries development is a multifactorial event and an appropriate care protocol can prevent and / or minimize the formation of these injuries. The body position of the critically ill patient is intended to ensure the patient's safety and comfort; prevent complications from pressure injuries, relieve pressure and shear, being an effective measure during periods of restricted mobility. The study objective's to conduct a comparative cost-benefit analysis between conventional cushions for positioning (sheet roll and blanket) and moldable fluidized positioners in an Intensive Care Unit of a State Public hospital that is a reference for infectious diseases in São Paulo.

Methods: Descriptive study with a quantitative approach, carried out in an Intensive Care Unit of a State Public hospital reference for infectious diseases in São Paulo. The study period was from May to October 2019. In order to carry out the cost-benefit assessment, a survey of data on the consumption of hospital clothes (such as sheets, pillowcases, blankets) used in the manufacture of auxiliary devices (cushions) was carried out. in the appropriate body position of an Intensive Care patient according to the institutional protocol. The cushions were made and then weighed using a conventional scale. The weight of the cushions was necessary to estimate the cost of washing the parts used. The collected information was recorded in a spreadsheet using the Excell program. After this stage, the application of the moldable fluidized positioner in an adult ICU patient was initiated to provide the proper positioning for reference of the necessary quantity of this input per bed. Data on the costs of implementing fluidized positioners in an ICU patient were recorded in a spreadsheet using the Excell program. For the calculation basis, the 6-month durability of the moldable fluidized positioner in use was considered according to the manufacturer's information. The recorded data were then compared to the cost evaluation between the two evaluated positioning technologies. The result obtained in this evaluation was designed to obtain an estimate of the impact of these costs on the 17 beds that make up this ICU in periods corresponding to 3 months, 6 months and one year; using spreadsheets and graphs built in the Excell program. The results of these studies are presented below.

Results: To position an intensive care patient, 4 cushions are required, according to the institutional protocol, made from 3 sheets, 01 pillow and a blanket, totaling a weight of 4.95 kg. The cost to wash each Kg of clothes in this institution is R\$ 2.65, totaling R\$ 13.12 of daily cost for washing these supplies. The projection of monthly expenses corresponds to R\$ 6,691.20 for cleaning the cushions of the 17 ICU's beds. The projection of monthly cost with the replacement of the damaged arsenal in the manufacture of conventional cushions (damages, stains and losses), resulted in a value of R\$ 2,432.00. In total, the estimated laundry costs related to the use of cushions made from bed linen in the 17 beds of the ICU were estimated at R\$ 54,739.20 considering a projection of monthly expenses for a period of 6 months. In this calculation, other additional costs were not considered, such as the professional's time for repositioning and making the cushions, for example. The projected costs with the implementation of the moldable fluidized positioner for 6 months of use, in the 17 beds of this ICU corresponds to R\$ xxxxx, which is equivalent to a cost 34% lower than the findings with the standard cushion.

Conclusions: The replacement of the standard cushions of the institution analyzed by the technology of moldable fluidized positioners projects a reduction of 34% in hospital costs with adequate positioning of patients in ICU's beds. There was a reduction in the consumption of hospital linen materials (sheets, pillowcases, blankets) and decreased loss and loss of sheets. Although not analyzed in this study, the use of the fluidized positioner allows the implementation of safer care, better practices in the prevention of pressure injuries, incorporating the use of adequate positioning devices, better body alignment, in addition to saving nursing time spent in the manufacture of positioners pattern. From the foregoing, it is concluded that the fluidized positioner demonstrated significant economy to the public health service.

5C-17

EFFECT OF TWO TECHNOLOGIES ON THE PREVENTION OF PRESSURE INJURY ASSOCIATED WITH THE USE OF PERSONAL PROTECTION EQUIPMENT IN HEALTH PROFESSIONALS IN FRONT OF THE PANDEMIC BY COVID-19: RANDOMIZED CLINICAL TRIAL

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Introduction: The disease caused by the coronavirus, an emerging virus, is a respiratory tract infection with a high rate of transmissibility, morbidity and mortality. Due to its transmission route, the use of Personal Protective Equipment (PPE) is essential. However, the prolonged use of this equipment puts the professional at risk of pressure injuries, which increases the risk of infection, in addition to causing discomfort, pain and negative impacts not only on the physical level, but also financial, emotional, psychological and social and therefore, preventing the development of these injuries is of utmost importance. Therefore, the aim of this study was to evaluate the effect of using two technologies in the prevention of pressure injuries associated with the use of PPE in professionals who provide assistance to patients with suspected or confirmed coronavirus disease 19.

Methods: This is a randomized, parallel, two-arm, open clinical trial, without the use of a control group, in which 88 professionals work in direct or indirect assistance to patients admitted to intensive care units, with a diagnosis of suspicion or confirmation of coronaviruses were randomly divided into two groups: Foam Group (44 professionals) and Hydrocolloid Extra Fine Group (44 participants). Participants in both groups were approached only once. The project was approved by the Hospital Infection Control Committee where the research was carried out and by the University's Research Ethics Committee.

Results: The mean age of the 84 participants was 38.0 years (SD = 9.0), the majority being female (69; 82.1%), who declared themselves to be white (55; 65.5%) and without chronic disease (73; 86.9%). The average time of experience was 13.2 years (SD = 7.3) and working in the unit for 5.8 years (SD = 6.8). Regarding the use of PPE, the majority (78; 92.9%) received training on the use of this equipment to provide care to patients with symptoms or diagnosis of COVID-19. All professionals used N95 mask during the shift and 81 (96.4%) used a head cap and face shield. No participant developed skin lesions, however, erythema that pales at digital pressure was identified in the frontal region of the face of 2 (2.4%), in the right ear of 1 (1.2%) and left of 1 (1.2%), in the zygomatic region 1 (1.2%) and nasal bone of 3 (3.6%) participants. Regarding the discomfort resulting from the use of covers, 21 complaints were mentioned in the foam group, including detachment (14, 66.7%), itching (3.3%) and mask sealing problems (3.3%). In relation to the hydrocolloid group, 32 discomforts were reported, which included difficulty in removing the dressing (10; 31.3%), itching (7.21.9%) and pain (4.12.5%). Considering the coverage measures used to prevent skin lesions in each region studied (frontal region of the face, right and left pavilion, zygomatic region and region over nasal bone), the average cost in the foam group was US\$ 5.84/person and the \$4.44/person in the hydrocolloid group.

Conclusions: Foam and extra-fine hydrocolloid have been shown to be effective in preventing pressure injury associated with the use of PPE by health professionals, at the forefront of combating the new coronavirus. Discomfort related to the use of coverage was reported in both groups, however, no significant differences were found.

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5C-18

COST SAVING AND REDUCTION IN PRESSURE ULCERS THROUGH USE OF HYBRID MATTRESS

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Introduction:

- Hybrid mattresses have been shown to reduce pressure ulceration in the dependant individual (Fletcher et al, 2015). They work by improving the pressure redistribution of the support surface. Traditional hospital support surfaces are made of solid foam or cut foam and provide limited pressure relief (Ousey and Parfitt, 2017). Hybrid mattresses use a combination of air and foam to enhance the pressure redistribution.
- The need to rent alternating air surfaces leads to a delay in patients receiving appropriate pressure relief. Fletcher et al (2015) report average delays of seven hours due to administration, delivery time and patient care time. The use of hybrids removes this.

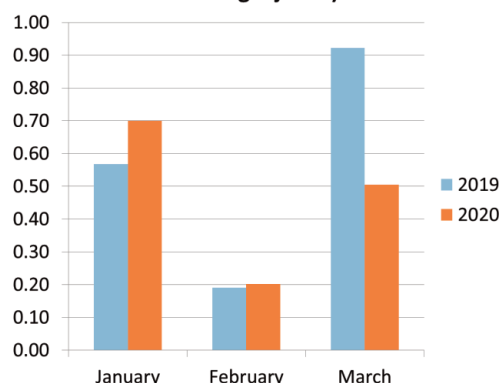
Methods:

- An acute 209 bed urban tertiary hospital elected to replace the cut foam mattresses with hybrid mattresses.
- This process was on a phased bases with the higher dependency areas being transitioned first. To date 50% of mattresses have been replaced.
- The supplier for the alternating air support systems that were used for patients with higher pressure offloading needs was also changed. This was to simplify the products used, and provide cost saving.

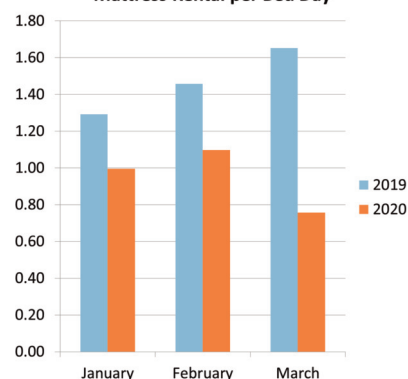
Results:

- Due to having a higher specification mattress as standard there was a decrease in rentals of alternating surfaces.
- Decrease in rentals has reduced costs from E1.47/bed day to E0.95/bed day. This represents a cost saving per annum of E32,029.14
- Decrease in hospital acquired pressure ulcers (not device or seating related) from 9 to 7, representing a 22% reduction in pressure ulcers.

Hospital Aquired Pressure Ulcers per 1000 bed days (excluding device or seating injuries)



Mattress Rental per Bed Day



Conclusions:

- There is a clear benefit to the hospital and to the patient of the transition from cut foam to hybrid system.
- This reduction in pressure ulcers has a secondary cost saving as pressure ulcers have been found to cost £43-374/day and increase length of stay by 5-8 days (Dealey et al, 2012).
- The data analysed was for Quarter One of 2019 and 2020. Only Quarter one data was used as Covid-19, impacted on the bed days and demographics of the patients cared for.

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PRESSURE INJURY PREVENTION: IMPLEMENTATION OF STRATEGIES TO REDUCE INCIDENCE IN A PRIVATE HOSPITAL IN SÃO PAULO

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Introduction: Pressure injuries are preventable adverse events that have a high mortality, generate serious and often irreversible sequelae for the patient¹. Strategies for the prevention of these injuries must be implemented based on best practices, already proven by clinical and scientific evidence. The multidisciplinary team is responsible for identifying and implementing the appropriate strategies for its clientele in order to reduce pressure injuries occurrence. The objective of this study is to assess the incidence of pressure injuries after implementing changes in prevention strategies in a private hospital in Campinas, São Paulo.

Methods: Descriptive study, with quantitative analysis, carried out in a general hospital located in Campinas, São Paulo. To reduce the incidence of pressure injuries and achieve the improvement established by the institution, an improvement project was developed that included the following steps: 1) Review of the current literature including guidelines and publications from the last 5 years (2014 to 2019); 2) Update of strategies based on the evidence selected for pressure injuries prevention; 3) Proposal for the implementation of five-layer cover with soft silicone and border on bony prominences at risk (Sacral, trochanter, calcaneus) 2,3,4,5 in patients with high and very high risk score according to braden's scale and Elpo's scale; 4) Replacement of support surfaces for viscoelastic or pneumatic technology; 5) Review of the Prevention Pressure Injury Protocol with new technologies inclusion after approval by the technical board; 6) New protocol training for healthcare professionals; 7) Analysis of the Pressure Injury indicator monthly by the institution's skin care reference team. After carrying out these steps, a comparative analysis of the Pressure Injury incidence indicator was carried out from May to July 2019 and the same period in the year 2020. This period was selected for comparison due to the completion of the implementation of institutional changes, as well as full training of the team regarding the changes implemented.

Results: After implementing the strategies, there was a significant reduction in the incidence of Pressure Ulcers/Injuries. In the months of May to July 2020, Pressure Ulcers/Injuries incidence indicator decreased by 25%, compared to the indicators for the same period in 2019. With an average incidence of 1.02%, lower than the new target established by ANAHP, which is 1.38%.

Conclusions: There was a reduction in Pressure Ulcers/Injuries indicator after the implementation Pressure Ulcers/Injuries new strategies by prevention team. It is necessary to continue monitoring these strategies, as well as educating the health care team so that these actions remain used in patients at risk of developing LP. The success of this initiative exemplifies the importance of evidence-based actions for the prevention of pressure injuries.

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5C-20

PU PREVALENCE IN PATIENTS HOSPITALIZED FOR COVID-19 DISEASE IN FRANCE

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Introduction: In patients hospitalized for coronavirus infection, PU occurrence risk is high due to combined risk factors, especially immobilization and denutrition.

The aim of this study is to assess PU prevalence during hospitalization in the COVID unit in France.

Methods: The study was conducted by La Société Française de l'Escarre among public and private hospitals in France to identify the number of patients with PU during their hospitalization in a COVID unit during the month of April 2020.

The survey were sent by email to professionals and the results were collected: PU prevalence, patients age and gender, PU locations, medical devices associated with PU (urinary catheter, oxygen probe...), length of stay in days and mortality.

Results: 948 patients were included in this study. Preliminary results show a prevalence of

17,2% (n=163 patients with PU).

Most of patients are over 65 y.o. and have one or several PU. Most frequent locations are sacrum and heels. Locations less usual -as ears, sternum, knees, elbows, chin, neck- are found in this study, because they are associated with medical devices and with prone position.

Conclusions: this study results are important to know PU prevalence in Covid patients in France. They will allow to define special bests practice to prevent PU occurrence in case of new COVID infection wave

5C-21

INITIATIVES FROM A RESEARCH GROUP IN STOMAL THERAPY NURSING FOR THE SKIN HEALTH PROMOTION IN HEALTH PROFESSIONALS WORKING IN THE FRONT LINE OF COVID-19 PANDEMIC

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Introduction: The essential role of the health professionals during the COVID-19 pandemic has been exhaustive and highlighted. However, some negative impact on the health of these professionals have emerged such as Medical Device-Related Pressure Injuries (MRPI) due to the prolonged use of personal protective equipment (PPE), anxiety, and physical tiredness, decreasing their Quality of life. In this context, research groups in wound, ostomy and continence care have a primary role in enhancing implementation initiatives related to the promotion of health care not only for patients but also for health professionals. The aim of this study was to report our experience on the educative materials development to help health professionals in their self-care related to the prevention of MRPI and preservation of well-being.

Methods: This is a report of three different educative materials related to MRPI prevention and well-being preservation created by the Research Group on Stomal Therapy Nursing-GPET from the School of Nursing, University of São Paulo in Brazil. In response to the MRPI increased prevalence in Health Professionals in hospitals in São Paulo, members of GPET worked on a literature review looking for strategies for prevention, using scientific papers published on databases and the discussion with specialists working in the front line of COVID19 pandemic in different scenarios, as well as local strategies validation maintaining global and national standards to avoid COVID transmission.

Results: The first educative material was a scientific article presenting the epidemiological scenario of PPE MRPI-related in health professionals and listing the main recommendations for its prevention. It was published on the Brazilian Association of Enterostomal Therapy-SOBEST Journal and the World Council of Enterostomal Therapists Journal (WCET-Journal).

An instructive manual was also created to illustrate guidelines for maintaining skin integrity and self-care, available in Brazilian Portuguese, English and Spanish and disseminated through SOBEST and the Multidisciplinary Latin American Confederation of wound, ostomy and incontinence - COMLHEI. The manual was composed for 18 pages beginning with the COVID-19 epidemiological scenario at the time, evidence for MRPI causes and the summary of seven recommendations for prevention: 1-hand washing; 2-hygiene of the skin in contact with PPEs; 3-skin hydration; 4-skin protection on places with high-pressure, friction and shear forces; 5-promotion of pressure relief; 6-skin inspection; 7-treatment of existing injuries. Finally, the manual also included well-being recommendations as adequate eating and drinking, exercise, eating and sleeping activities. The manual was made available on the website of SOBEST, and on Research Gate platform in which it reached around 2,600 reads in the Spanish version.

As a third material, an educational video was created in Brazilian Portuguese based on the published scientific paper and manual. It described the prevention measures within a health professional routine in the front-line practice. The video was made available on the Youtube platform and disseminated on social media networks, also achieving around 2,600 views.

Conclusions: Academic research groups in Stomal Therapy Nursing have the unquestionable role of supporting clinicians with a scientific basis in crises, helping to promote effective care, not only for patients but also for health professionals. Furthermore, the availability of educational materials in different languages on digital social platforms facilitates access to scientifically based information, for general and specialized professionals, minimizing the "fake news" or the "unknown-sourced knowledge" frequent in nowadays world.

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CASE REPORT SKIN MANIFESTATION IN A PATIENT WITH COVID-19: KENNEDY'S TERMINAL ULCER

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Introduction: Patients with severe COVID-19 may evolve with an important microvascular lesion with activation of a procoagulant state, however, its diagnosis must be made through biopsy of the lesion, which can sometimes be impossible to be performed in the face of clinical instability. Differential diagnosis of skin lesions is of paramount importance. Kennedy's terminal ulcer was one of the first ulcers reported in modern literature. Lesion with sudden onset prognostic of imminent death. To describe the skin manifestation in a patient with COVID-19.

Methods: Case Report: A patient diagnosed with COVID-19 presented a purpuric-looking lesion in the sacro-gluteal region at a time of significant hemodynamic instability. It evolved with clinical improvement and follow-up with a plastic surgeon.

Results: A patient diagnosed with COVID-19 presented a purpuric-looking lesion in the sacro-gluteal region at a time of significant hemodynamic instability.

Conclusions: The development of skin lesions in a hospital has a negative impact on the care provided, thus, the differential diagnosis is of great relevance. Kennedy's terminal ulcer, little discussed in the national literature, can appear in extremely severe patients, on the verge of death. Studies are needed to clarify and bring clear diagnostic criteria and a global consensus on terminal injuries.

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AUTHOR INDEX

Bold = Presenting author

A. Heemskerk, Johannes	3B5	Fourie, Anika	1B2	Angélica	5C7
Abiakam, Nkemjika	5C13	Franck dos Santos, Francisleine	5C19	O'Malley, Paula	5C18
Abreu da Silva, Vanessa	5C7, 5C17	García Fernández., Francisco Pedro	5C15	Orlov, Aleksei	3B2
Alves, Paulo	3B1, 1A3, 2A2, 5A2	Gasparino, Renata Cristina G	5C7, 5C17	Patton, Declan	3B4, 3A3, 2A3
Anderson, Jessamy	5C11	Gefen, Amit	3B1, 3A1 , 5B1,	Payan, Yohan	5B2, 5B6
Antalová, Natália	5B4	Gjergji, Marjola	4B3	Peko, Lea	5B1
Antunes ² , Ivan Rogério	5C17, 5C7	Graser, Marisa	5B5	Perrier, Antoine	5B6
Atkinson, Kirstie	5C4	Greenwood, Clare	1B3	Pinto Martins, Maria Carolina	5C7
Aves, Emma	5C11	Greifman, Rona	3B2	Pokorna, Andrea	5A3, 5B4
Avsar, Pinar	3A3, 2A3, 3B4	Grussu, Francesca	5A1	Pontoppidan, Anne	5C5
Bader, Dan	1A2 , 5C13	Haesler, Emily	4A2	Ramalho, Aline	5C21, 5C14
Bailet, Mathieu	5B6	Hahnel, Elisabeth	1B1	Randell, Claire	5C11
Balzer, Katrin	4A3	Hansen, Vivian	5C5	Renwick, Caroline	5C4
Barakat-Johnson, Michelle	2B2	Hocking, Kathy	2B2	Robineau, Sandrine	5C20
Barateau, Martine	5C20	Iyer, Vignesh	5C6	Rodriguez-Palma, Manuel	5C15
Barrois, Brigitte	5C20	Jayabal, Hemalatha	5C13	Rohan, Pierre-Yves	5B2
Beeckman, Dimitri	1B2 , 5B3	Jesus Meszaros, Mariana	5C17	Rosa, Talita	5C21
Benes, Jan	3B3	Jiménez García, Juan Francisco	5C15	Rosińczuk, Joanna	5C2, 5C10, 5C1
Benoît, Nicolas	5C20	Johnson, Carol	5C4	Santamaria, Nick	3B1
Bourke, Frank	2A3	Jørgensen, Morten	5C5	Schwartz, Dafna	5B3
Budri, Aglécia	3B4, 3A3 , 2A3	Klugarová, Jitka	5A3	Serna González, Carol Viviana	5C21
Buis, Arjan	5B5	Kottner, Jan	1B1, 4A1	Smet, Steven	2A1
Cajozzo, Marta	5A1	Kuberka, Izabela	5C2, 5C10 , 5C1	Soldevilla Agreda, J. Javier	5C15
Call, Evan	3B1	Lemos, Paloma	5C12, 5C19	Sopel, Mirosław	5C2, 5C10, 5C1
Carey, Ruaidhri	2B2	Leong, Thomas	2B2	Souza Oliveira Kumakura, Ana Raikka	5C17
Charlton, Sarah	5C8	Lodge, Louise	5C4	Spuntarelli, Giorgio	4B2
Ciprandi, Guido	4B1, 4B3, 5A1 , 4B2	Lustig, Adi	3B1	T. C. So, Peter	3B5
Coleman, Kerrie	2B2	M. Nasir, M. Jannah	3B5	Taradaj, Jakub	5C2, 5C10, 5C1
Conceição Gouveia Santos, Vera Lucia	5C21	Masson, Wallan	5C12, 5C19	Todd, Cathryn	5C4
Connesson, Nathanael	5B2	Matsudaira, Paul	3B5	Tomášková, Vanda	3B3
Counter, Kimberley	2B2	Mazocoli, Eliane	5C14	Torra-Bou, Joan Enric	5C15
Coyer, Fiona	2B2	McAlpine, Alan	5C9	Trebbi, Alessio	5B6
Cristina Gomes de Oliveira, Maria	5C12, 5C19	Mcevoy, Natalie	3B4, 2A3	Trevellini, Chenel	2B3
Cristina Mota Furlan, Adriana	5C12	McGinnis, Elizabeth	1B3	Tucker-Kellogg, Lisa	3B5
Crucianelli, Serena	4B1 , 4B3, 5A1, 4B2	Melo Lima, Maria Helena	5C17	Turek, Jakub	5B4
Cuddigan, Janet	1A1	Moore, Zena	3B4, 3A3, 2A3	Urbani, Urbano	4B2
Curley, Gerard	2A3, 3B4	Mukhina, Ekaterina	5B2	Verdú Soriano, José	5C15
Dawkins, Helen	5C9	Nazareth Cainé Pereira R oscani ² , Alessandra	5C7	Vlasáková, Adéla	3B3
Day, Sarah	5B5	Nelson, Andrea	1B3	Wagner Costa de Oliveira Junior, Adilson	5C19, 5C12
de Souza Santos, Acauan	5C19	Nixon, Jane	1B3	Walsh, Simone	2A3
Dos Santos Freitas, Paula	5C21	Nogueira, Paula	5C21, 5C14	Weihs, Daphne	3B6
Dymarek, Robert	5C2 , 5C10, 5C1	Nogueira Santos, Gabriela	5C14	Wood, Zoe	5C6
Eiken, Aleksander	5C5	Nugent, Linda	3B4, 2A3	Worsley, Peter	1A2, 5C13
El Genedy, Monira	1B1	O'Connor, Tom	3A3, 2A3	Zama, Mario	5A1, 4B2, 4B1
Engell, Merete	5C5	Olivetto de Almeida ² ,			

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