ES2.3

Interdisciplinary systematic education about prevention of pressure injury among patient with spinal cord injury

Hanne Haugland[1], *Ingebjørg Irgens*[2], *Anne Riisøen Selsjord*[2], *Unn Svarverud*[2]

1 *Sunnaas Rehabilitation Hospital, Department of Spinal Cord Injury, Bjonemyr, Norway*
2 *Sunnaas rehabilitation hospital, Bjørnemyr, Norway*

People with spinal cord injury (SCI) using wheelchair are at high risk of incurring pressure injury . Obtaining such pressure injury is usually a serious and prolonged condition, which requires systematic monitoring from various participants in the treatment line. Sunnaas Rehabilitation Hospital has extended experience in life-time, interdisciplinary monitoring follow- up. The interdisciplinary team is well aware of the risk these patients experiencing while sitting.

Objectives: Ensure quality of interdisciplinary prevention of pressure injury in people with SCI. To increase the knowledge of SCI and pressure injury risk and prevention among patients and healthcare professionals in own institution, and towards the community healthcare services. Develop education programs that assess activities within a 24:7 perspective. Develop education programs for patients, next of kin, homecare services and nursing institutions. Utilize Tele rehabilitation as a tool in the collaboration and knowledge translation of the patient with an aim to prevent pressure injury. Which educational method(s) did you use and how did you apply them in practice?: Based on interdisciplinary teamwork, clinical experience and literature review, a structured approached has been established, where user participation is crucial.

Oral communication: Weekly lecture for in-patients about risks and prevention Twice- a- year lectures for the interdisciplinary staff at the hospital

Written information: Wallet information cards, brochures and booklets given to the patiients Online: Webinar Available on https://www.youtube.com/watch?v=zMqlbG8Fus4, E-learning course available on www:// https: Sunnaas.no and www.//https:helsesorost.no

Tele-rehabilitation: Videoconference between Sunnaas Rehabilitation Hospital, the patient and the homecare services. Plastic surgeons included when needed. Group guidance from Sunnaas Rehabilitation Hospital to the municipality Hot Line: Dedicated mobile number operated by a specialized wound nurse. Conferences and meetings: Information share and knowledge transfer.

What were the results?: Low threshold for contact from the patients and the homecare services. Early contact when the pressure injury is at grade 1 or 2 Increased possibility to reverse and to prevent further worsening of the pressure injury.

Discussion and further steps: Maintain and further develop the outpatient service Need for a competent and dedicated wound team and to continue the work in the hospital. Changing the focus from treatment to prevention. Further develop systematic, predictable multi- and interdisciplinary cooperation

Clinical relevance: Prevention of pressure injury should be given even closer attention and top priority in educating hospitalized patients, and also in education of the interdisciplinary staff at the hospital and the local care givers.

References:

1. *Bach, B., Sørli, H. & Driveklepp, A. M. (2010). Telemedisin i rehabilitering – bruk av IKT i pasientoppfølgingen. Sunnaas-modellen. (project report). Tromsø:NST.*
2. *Bjørlo K , Ribu L. "Pilotstudie av trykksårprevalens I et norsk sykehus". Sykepleien Forskning 2009; 4(4): 299- 305.*
3. *Bjoro K; "Clinical nursing-pressure ulcers in 33 000 hospital patients. Interview by Kjell Arne Bakke". Journal: Sykepleien 1997 May 6; 85 (8): 10-17.*
4. *Claudia Zanini, Mirjam Brach, Nadia Lustenberger, Anke Scheel-Sailer, Hans Georg Koch, Gerold Stucki & Sara Rubinelli (2018): Engaging in the prevention of pressure injuries in spinal cord injury: A qualitative study of community-dwelling individuals' different styles of prevention in Switzerland, The Journal of Spinal Cord Medicine, DOI: 10.1080/10790268.2018.1543094*
5. *Finch T et al, "Integrating service development with evaluation in telehealthcare: an ethnographic study". BMJ, 2003 Nov 22;327(7425);1205-9.*

ES3.1

A novel approach to identify individual positioning in a range of supine postures

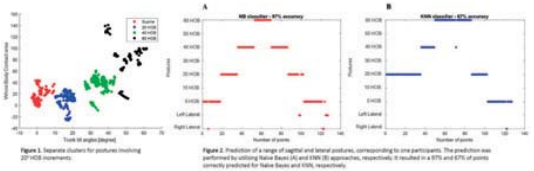
Silvia Caggiari[1], *Peter Worsley*[1], *Yohan Payan*[2], *Marek Bucki*[3], *Dan Bader*[1]

1 *University of Southampton , Skin Health Research Group, Faculty of Environmental and Life Sciences, Southampton, United Kingdom*
2 *University of Grenoble Alpes, CNRS, TIMC-IMAG, Grenoble, France*
3 *Texisense, France*

Introduction: Pressure mapping provides visual feedback of the interface pressures between vulnerable tissues and supporting surfaces [1]. However, the short-term nature of these measures provides limited insight into the temporal changes in pressure during evoked or self-induced movements. We examined the performance of selected parameters derived from continuous pressure monitoring and actimetry to detect postural changes [2]. This yielded large data sets, which would benefit from intelligent data processing. This motivates the present study, which examines the accuracy of machine learning for the prediction of supine postures.

Methods: Nineteen healthy participants adopted supine postures on a standard mattress, movements were evoked using the head of bed (HOB) angle and a tilting system to achieve sagittal (HOB between 0 and 60o) and lateral (left and right) postures, respectively. A series of time-related biomechanical parameters were estimated using a pressure monitor* and actimetry** placed on the sternum. Two supervised machine learning algorithms were assessed, namely K-nearest neighbors (KNN) and Naïve-Bayes (NB), established with training data (n=9) and cross-validated with test data (n=10). KNN estimates the distance between a test data point and the nearest data point in the training phase, and NB the probability that a test data point belongs to specific cluster of postures.

Results: Ranking of the biomechanical parameters revealed whole body contact area (>20mmHg) and trunk tilt angles provided the highest discrimination for postural changes. Separate clusters were identified for postures incorporating 20oHOB increments (Figure1). The accuracy in predicting the range of sagittal and lateral postures was >80% for all subjects, for NB approach. By contrast, KNN accuracy resulted >70% for 8/10 subjects. An exemplar of both results are presented for one participant (Figure2). The NB algorithm was probably able to accommodate part of the non-linearity in the data, which could explain the differences in accuracy.



Conclusions: Accurate prediction of supine postures was achieved by combining machine-learning approaches with robust parameters estimated from two monitoring systems. This approach represents an advanced method of monitoring postures and mobility. Future work will combined evaluation of the local physiological response to these postures in order to create intelligent monitoring solutions. These technologies have the potential to identify pressure ulcer risk and efficient strategies for prevention in practice.

Acknowledgments: This work was supported by an EPUAP grant and a UK EPSRC CASE award with Sumed International.

** ForeSitePT, Xsensor, Canada* *** Shimmer, Ireland*

References:

[1] Wong, Trials (2015)
[2] Caggiari, Med Eng & Phys (2019)