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ABSTRACT BOOK

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Can non-invasive skin parameters reflect changes at grade 1 pressure ulcer skin sites?

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Introduction: When the skin is exposed to prolonged mechanical forces, pressure ulcers (PUs) can occur. This is often observed in the skin of elderly individuals in acute and long-term care facilities who present with impaired mobility. Clinicians register the first signs of localised skin compromise as a category 1 PU, defined by an area of non-blanching erythema. Although there are many studies in relation to PUs, there is still a limited understanding of the temporal and spatial evolution of this condition.

Methods: A cohort of inpatients is being recruited for this longitudinal study design following ethical approval. The data from the first ten inpatients aged between 75 and 94 years old, presenting with stage 1 PU, are presented in this abstract. The PU compromised sites, either sacrum or ischial tuberosity, and a control skin site at a distance of 10 cm from the PU were assessed on two consecutive days using biophysical sensors and biochemical markers. Skin parameters were estimated involving transepidermal water loss (TEWL), Stratum Corneum (SC) hydration and inflammatory cytokines sampled from skin sebum.

Results: TEWL showed a statistically significant increase ($p < 0.001$) at the PU site compared to the healthy site on the first day of assessment (Figure 1). On day 2, the cohort presented with a similar increase in TEWL relative to the healthy site, although across the cohort individual values varied relative to the day 1 value (from -55% to 187% change). The spatial and temporal differences in skin hydration values were less significant between the two sites with values ranging from 5.8 to 83.4 AUs. Nonetheless, temporal profiles of each participant were repeatable across the assessment days.

Conclusions: Preliminary data revealed distinct temporal and spatial differences in TEWL responses between a grade 1 PU compromised site and a healthy adjacent anatomical location. Collected skin samples are to be analysed to examine whether the concentration of inflammatory biomarkers, such as IL-1α and TNF-α are related to changes evident in the biophysical parameters. Such an approach involving both biophysical parameters and biomarkers can offer the potential to identify early changes in the skin integrity of individuals at risk of developing PUs.
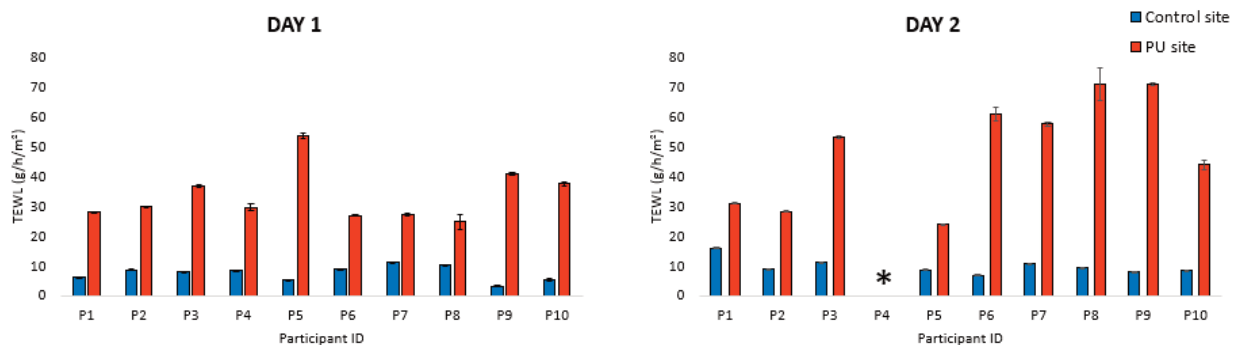

Figure 1. Differences in TEWL responses between an anatomical PU compromise location and a 10 cm adjacent site across two days of data collection. *Missing data.