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ABSTRACT BOOK

STINTS8

THE EFFECTS OF PERCEIVED SKIN SENSITIVITY ON THE PHYSIOLOGICAL RESPONSE TO MECHANICAL LOADING

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Introduction: It is known that skin loading can lead to tissue damage in the form of pressure ulcers ¹. Similarly, consumer products such as electrical shavers may affect skin while exerting a combination of dynamic pressure and shear loading. Such adverse skin responses could be exacerbated in individuals with enhanced skin sensitivity, e.g., due a reduced tolerance to loading, and has led to a demand for personalised prevention strategies. Many efforts have been taken to quantify skin sensitivity (SS), although evaluations have been hindered by the lack of an objective definition ². The aim of this PhD project is to evaluate the structural and physiological response of the skin to mechanical loading, in cohorts of individuals with and without perceived SS.

Methods: A review of the scientific literature regarding different parameters attributed to the loss of (facial) skin integrity and SS was conducted. Articles were screened for mechanical stimulation of the skin, with objective quantification of tissue responses. Furthermore, preliminary experiments exploring the suitability of such objective tools for characterizing local skin structure and physiology were conducted. The mechanical stimuli utilized in these experiments included tape stripping and the application of a novel instrumented shaver which measured the applied force.

Results: The review revealed that most literature to date has focussed on chemical stimuli to trigger SS and utilized subjective methods such as self-reports and visual assessment. In the few studies comparing SS and non-SS groups following mechanical stimuli, the integrity of the stratum corneum and its effective barrier function appears to be closely related with SS ^{3,4}. Thus, an array of parameters including both structural and physiological responses are required to monitor SS. Results from preliminary analysis include differences in structural parameters obtained from OCT images of the cheek and neck (e.g., thickness, roughness, blood vessel density), and changes in skin barrier properties (e.g., TEWL, hydration) following tape stripping.

Conclusions: A multimodal approach is needed to both characterize SS and monitor its relation to skins tolerance to mechanical loading. The combination of techniques including OCT images, biophysical measures of SC function, and biomarkers of skin health could provide the comprehensive parameters critical to better our understanding SS. Future studies will include evaluations of both perceived and measured skin symptoms, establishing differences in sensitivity before, during and after mechanical stimuli. The results of such studies will support the identification of individuals who may be at greater risk of developing pressure ulcers and provide the means for robust monitoring.

References:

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