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Lessons learned in the past for a brighter future for pressure ulcer prevention and management

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ABSTRACT BOOK

STINTS3

WHAT MAKES A HYDROGEL-BASED DRESSING ADVANTAGEOUS FOR THE PREVENTION OF MEDICAL DEVICE-RELATED PRESSURE ULCERS

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Introduction: The synergistic influences of geometrical, mechanical and thermal mismatches between a skin-contacting medical device and the skin may cause tissue stress concentrations and sharp temperature gradients, both of which contribute to the risk for medical device-related pressure ulcers/injuries.

Methods: In this work we developed an innovative, integrated experimental bioengineering approach encompassing mechanical stiffness, friction and thermal property studies for testing the biomechanical suitability of a hydrogel-based dressing in prophylaxis of injuries caused by medical devices. We characterized the viscoelastic stress relaxation of the aforementioned dressing and determined its long-term elastic modulus. We further measured the coefficient of friction of the hydrogel-based dressing at dressing-device and skin-dressing interfaces, using a tilting table tribometer. Lastly, we measured the thermal conductivity of the dressing, using a heat-flow meter and infrared thermography-based method. All the above measurements considered dry and moist conditions of the dressing, the latter simulating skin perspiration effects.

Results: Our results revealed that the long-term stiffness and the thermal conductivity of the hydrogel-based dressing matched the corresponding biomechanical and biothermal properties of human skin, respectively, for both dry and moist conditions. The dressing further demonstrated a relatively high coefficient of friction at its skin-facing and device-facing aspects, indicating minimal frictional sliding.

Conclusions: All the properties listed above make the currently tested hydrogel-based dressing advantageous for prevention of medical device-related injuries.

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