

The frictional energy absorber effectiveness and its impact on the pressure injury prevention performance of multilayer dressings

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1. Background

Research is growing to identify potential existing and new mechanisms of action (MOA) by which dressings may contribute to pressure injury prevention (PIP). As part of the Prophylactic Dressing Standards Initiative (PDSI), new laboratory methods are currently being developed specifically for evaluating the PIP performance of dressings, quantitatively and robustly [1].

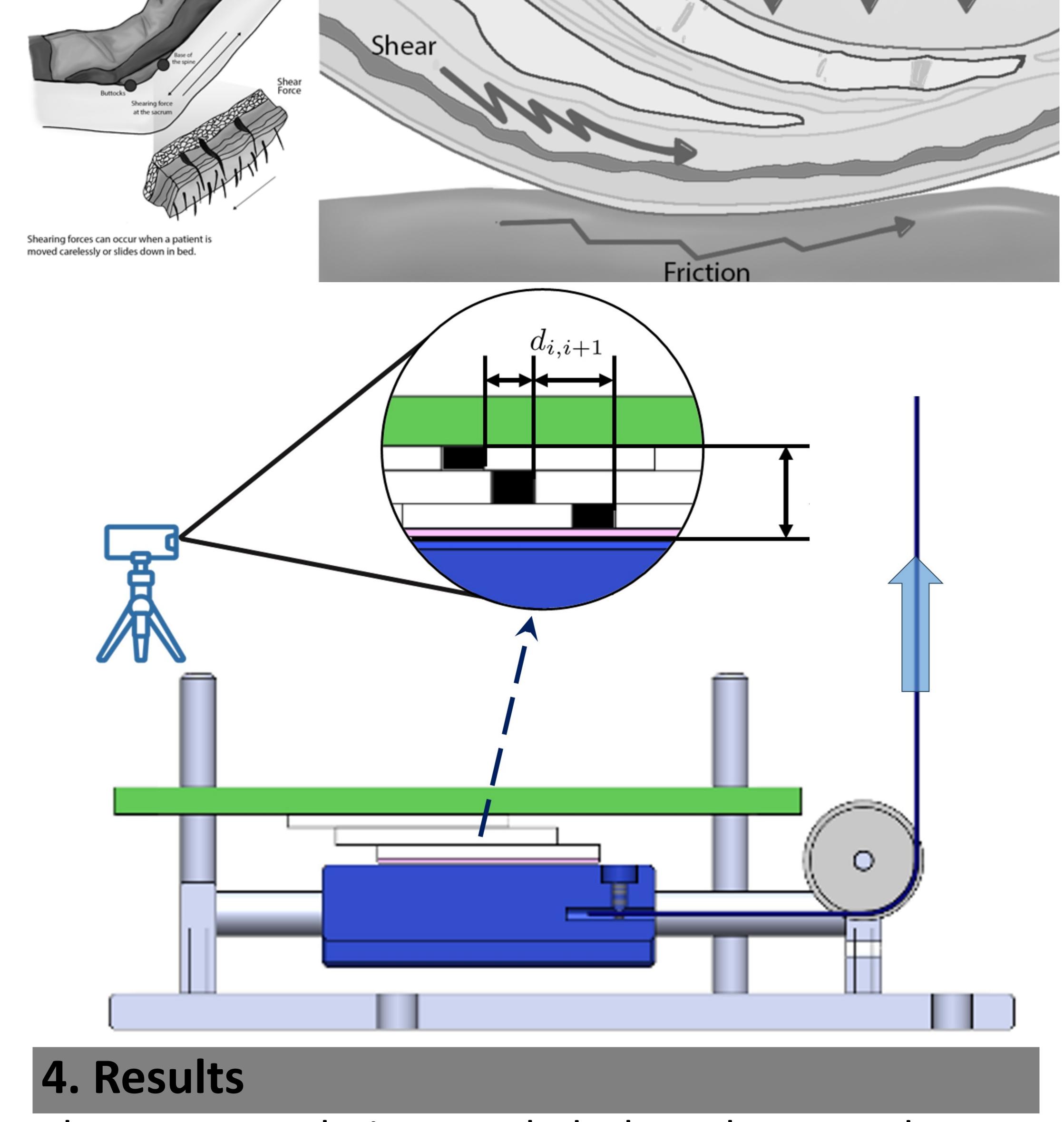
2. Purpose

This study aims to assess the frictional sliding's role in absorbing mechanical energy within a five-layer hydrocellular polyurethane foam dressing (HPFD) during mechanical loading similar to clinical use conditions.

We introduce a new metric, frictional energy absorber effectiveness (FEAE), to quantify the internal mechanical energy dissipation in dressings for PIP.

3. Methodology

We examined a commercial HPFD's frictional force dissipation using the novel FEAE. This involved a unique test apparatus for optical measurements of frictional sliding displacements during realistic in-use loads [2]. Additionally, we conducted a narrative review of published clinical evidence on the chosen HPFD in PIP to correlate laboratory findings with clinical relevance.



The FEAE analysis revealed that the tested HPFD absorbs a significant portion, approximately 30 - 45% of the mechanical energy during simulated in-use 7. Acknowledgements loading through frictional sliding and internal shear.

published indicating enhanced efficacy of the HPFD in PIP compared to interventions prevention without prophylactic application of dressings.

5. Conclusions

We conclude that prophylactic application of the HPFD effectively absorbs mechanical energy through both layer-on-layer frictional sliding and material shear occurring internally in the dressing, thus potentially alleviating sustained soft tissue stress concentrations within the heels associated with frictional forces acting on the supported surfaces of the heels. This MOA explains the abundant published clinical research demonstrating PIP efficacy for the same HPFD type [3,4].

6. References

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