

Deformation is a cell killer: Protecting tissues using deformation-alleviating prophylactic dressings

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We have demonstrated the biomechanical efficacy of specific multilayered prophylactic dressings in protecting deep as well as superficial tissues from pressure ulcers. This has been established using the finite element modeling method, based on three-dimensional magnetic resonance imaging scans of the heel and buttocks. Specifically, sets of computer model variants of the heel and buttocks/sacrum in supine lying were developed to represent patients with healthy tissue conditions as well as with diabetic and elderly tissue properties, at different body postures. The differences in tissue exposures to mechanical loads between the dressing and non-dressing models suggest that, provided that the prophylactic dressing was adequately designed, a multilayered dressing provides considerable tissue protection - by reducing internal deformations in deep soft tissues as well as on the skin, particularly shear deformations. The multi-layered dressings can effectively temper deformations from the tissues if they are able to deform internally themselves, especially in shear mode, which takes a substantial portion of the shear off the weight-bearing tissues.