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Spine postural change elicits localized skin structural deformation of the trunk dorsum *in vivo*

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Abstract

As the most superficial organ, the skin is the most accessible sensory system interfacing one's body and environment. With changes in posture, it is possible that the skin may undergo large deformations resulting in changes in its structural properties. The purpose of the current work was to determine the influence of spine posture on measures of trunk dorsum skin deformation, thickness and hardness *in vivo*. 28 young and healthy individuals were assessed while holding three static, supported spine postures (prone neutral, spine extension, and spine flexion). Skin stretch deformation was measured across each posture using an 11x9 dot matrix of 3D kinematic markers affixed to the skin of the back. Skin thickness (epidermis + dermis) was quantified using ultrasound images obtained from specific spinal levels (L4, L2, T12 and T10). Skin hardness was measured at the same specific spinal levels using a handheld Shore durometer. During the spine extension posture it was observed that the skin of the trunk dorsum relaxed/retracted on average by 12% to become both ~17% thicker and ~39% softer compared to

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