

Vibration inhibits deterioration in rat deep-tissue injury through HIF1-MMP axis

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First Author	
Last Author	
Authors	Sari, Y; Sanada, H; Minematsu, T; Nakagami, G; Nagase, T; Huang, LJ; Noguchi, H; Mori, T; Yoshimura, K; Sugama, J;
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Abstract	<p>Deep-tissue injury (DTI) is a unique type of pressure ulcer (PU) in which deep-tissue damage expands outwards to the superficial skin. DTI progresses rapidly into a severe PU, despite initially appearing as only a bruise or darkened tissue in the superficial skin. Although some DTI detection methods are available, there is currently no strategy for treating deteriorating DTI. This study investigated the efficacy of vibration therapy for preventing DTI deterioration through down-regulation of the hypoxia-inducible factor-1 matrix metalloproteinase (MMP) axis in rats. We prepared a conventional PU rat model (PU group) and a DTI deterioration rat model (DTI group). The DTI group was further divided into two groups subjected to vibration and control treatments, respectively. Macroscopic and histological features, hypoxia, oxidative stress, apoptosis, and MMP2 and MMP9 activities in compressed skin were analyzed. Hypoxia, oxidative stress, and MMP activity were enhanced in the DTI group compared with the PU group. Vibration remarkably inhibited DTI deterioration, hypoxia, and the expression/activities of MMP2 and MMP9. These results suggest that vibration therapy can effectively attenuate deterioration of DTI. This report provides the first evidence for a therapeutic treatment for deteriorating DTI.</p>
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Author	Ners YUNITA SARI, Ph.D