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Identification and quantification of myofascial taut bands with magnetic resonance elastography.

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Abstract

OBJECTIVE: To explore the feasibility of using a new magnetic resonance imaging (MRI) technique--magnetic resonance elastography (MRE)--to identify and quantitate the nature of myofascial taut bands.

DESIGN: This investigation consisted of 3 steps. The first involved proof of concept on gel phantoms, the second involved numeric modeling, and the third involved a pilot trial on 2 subjects. Imaging was performed with a 1.5 T MRI machine. Shear waves were produced with a custom-developed acoustically driven pneumatic transducer with gradient-echo image collection gated to the transducer's motion. Shear wave propagation were imaged by MRE.

SETTING: An MRI research laboratory.

PARTICIPANTS: Two women, one with a 3-year history of myofascial pain and the other serving as the control.

INTERVENTIONS: Not applicable.

MAIN OUTCOME MEASURES: MRE images, finite element analysis calculations, and tissue and phantom stiffness determinations.

RESULTS: Results of the phantom measurements, finite element calculations, and study patients were all consistent with the concept that taut bands are detectable and quantifiable with MRE imaging. The findings in the subjects suggest that the stiffness of the taut bands (9.0+/-0.9 KPa) in patients with myofascial pain may be 50% greater than that of the surrounding muscle tissue.

CONCLUSIONS: Our findings suggest that MRE can quantitate asymmetries in muscle tone that could previously only be identified subjectively by examination.

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