CAN BIDIRECTIONAL SKIN TENSION CREATE SUBCUTANEOUS MYOFASCIAL MOVEMENT?

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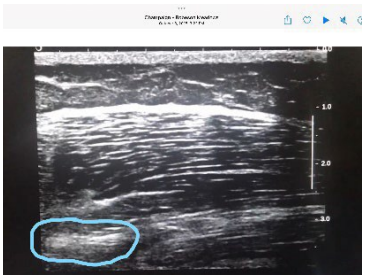
BACKGROUND. Can manual bidirectional tension to skin create subcutaneous myofascial movement? Skin and fascia exhibit tensegrity (intrinsic tension). Gracovetsky suggested "While it is not known how much energy can be transferred from skin surface to deeper layers, it can be speculated that at least some of the therapist's energy, applied to skin, will end up being transferred." Guimberteau demonstrated how forces applied to skin ends up being dissipated deep into tissues via densely interconnected network of collagenous tissues. Viscoelastic responses to mechanical forces are determined by their connective tissue (CT) extracellular matrix (ECM) composition and architecture. Mechanical tension can induce changes in ECM subsequently modulating biological functions. CT fibroblasts play pivotal role in both immediate and long-term CT responses to mechanical forces. Ultrasound elastography imaging is an emerging powerful non-invasive technique to quantify biomechanical tissue behavior.

METHODS. Using ultrafast high frequency elastography we videoed relaxed (non-contracting) hamstring with subject prone and knee fully extended. Examiner lightly gripped skin with latex finger cots to minimize downward compression applying minimal, mild, and moderate bidirectional tension to lightly gripped skin. Ultrasound transducer head was placed parallel between bidirectional forces.

RESULTS. Video imaging captured significant subcutaneous and deeper myofascial sliding and movement. Quantifiable movement was observed at depths greater than 3 cm. Video and still pictures, Fig. 1, of three different time sequences illustrate change in tissue structure and position.

Figure. **3:22:15** **3:22:17** **3:22:19**



Minimal Bidirectional Tension

Mild Bidirectional Tension

Moderate Bidirectional Tension

Figure 1

CONCLUSION. Skin directly connects underlying subcutaneous and superficial fascia through reticular cutis fibers. Bidirectional mechanically manipulated skin facilitated myofascial sliding and movement greater than 3 cm. depth. The effect of mechanical forces on connective tissue fibroblasts may be key to therapeutic mechanism of manual therapies by causing important cellular effects both immediate (activation of signaling mechanisms) and delayed.