The Strain Patterns of the Deep Fascia of the Lower Limb

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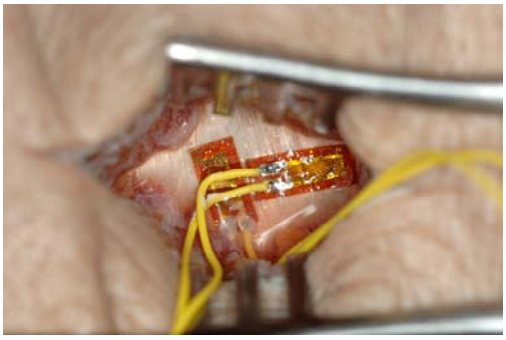
BACKGROUND There are many theories as to lower limb fascial function including the hydraulic amplifier effect [1]with respect to lumbar fascia, the crossover effect in support of bipedal motion[2] and tensioning theory[3]. Schleip,et al[4] have demonstrated contractile properties of fascia and Barker[5] and others have demonstrated discrete collagen fiber orientation. The authors set out to find patterns of strain in the lower limb fascia when performing a movement protocol

METHODS Five, fresh cadavers were used. Insulated, 10mm, 120Ohm foil-type micro-strain gauges (BCM Sensor Technologies, Belgium) were attached to the external surface of the fascia (Fig.1) using a gauge specific cyanoacrylate adhesive (TML, Japan) prior to the performance of a movement protocol of the lower limb. Data was acquired at 50Hz via a USB-based CompactDAQ system, and was normalized and calibrated using a combination of Signal Express 2.0 and Labview 8.5 software (National Instruments, U.S.A.).

RESULTS Microstrain(me) results for the straight leg raise (SLR) are presented below, strain gauges were parallel to gross fibre direction.

Location of Strain Gauge	Median Strain in SLR
Contralateral Lumbar Fascia	6.7
Ipsilateral Lumbar Fascia	21.8
ITB	35.3
Posterior Thigh	14.9
Lateral Compartment	15.3
Achilles	15.0
Plantar Fascia	3.9



CONCLUSIONS This work concurs with the theory of fascial strain transmission in the lumbar and lower limb fascia and with collagen fibre orientation as per earlier work provides potential insight into the fascial role in overuse musculoskeletal disorders.Fig 1. Micro-strain gauges on lumbar fascia

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