

Chronic Low Back Pain May Originate from Subfailure Injuries in Lumbar Fasciae

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BACKGROUND Recently Panjabi provided evidence for the hypothesis that chronic back pain originates from ligament subfailure injuries, which then send out corrupted transducer signals to the neuromuscular control unit, and as a result, corrupted muscle response patterns are generated which lead to further injuries and inflammation [1]. Previously, this explanatory model excluded the role of human lumbar fasciae, although they are anatomically equipped to serve an important role in tension transmission and proprioception during spinal flexion. Given their relative stiffness and distance from the axis of spinal flexion, these fasciae could be at least as prone to subfailure injuries as are spinal ligaments and could therefore be a frequent facilitator of chronic low back pain.

METHODS Samples of the posterior layer of the lumbar fascia at the level of L2, taken from twelve human donors (ages 19 to 76 yrs), were analyzed immunohistochemically for the presence of fiber bundles containing alpha smooth muscle-actin, a differential marker of myofibroblasts, i.e. cells associated with an increased local demand for tissue repair. 15 microscopic images from randomly chosen locations within each tissue sample were digitally quantified. Samples of the posterior layer of lumbar fascia from rats were also analyzed for comparison.

RESULTS Median values in human tissues varied from 0 to 120151 parts per million (ppm), representing a 0 to \approx 1.2% proportion of positively stained areas. Large variations in ppm values were apparent, not only among the 12 donors (SD 5358 ppm), but also between the 15 different images per sample. Most myofibroblasts were seen accumulated in clustered groups. Density of myofibroblasts in the lumbar fascia samples taken from rats was significantly lower than in that of humans.

CONCLUSIONS Our findings reveal that human lumbar fascia frequently shows signs of regions with increased tissue repair activity. This suggests that lumbar fasciae play a major role in the facilitation of chronic low back pain, which is induced by subfailure injuries and subsequent muscle control dysfunction, as suggested by Panjabi.

REFERENCES

[1] Panjabi MM: A hypothesis of chronic back pain: ligament subfailure injuries lead to muscle control dysfunction. *European Spine Journal* 2006; 15: 668-676