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Chronic low back pain may originate from sub-failure 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 (Panjabi, 2006). Previously, this explanatory model excluded the role of human lumbar fasciae, although this fascia is 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 19–76 yr), 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. Fifteen 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. Mann–Whitney Test (*U*-test) was used to test for significant differences between samples from different species. A significance level of $p < 0.05$ was applied.

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 may be induced by subfailure injuries and subsequent muscle control dysfunction, as suggested by Panjabi.

Reference

Panjabi, M.M., 2006. A hypothesis of chronic back pain: ligament subfailure injuries lead to muscle control dysfunction. European Spine Journal 15, 668–676.

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Functional fascial taping® for lower back pain: A case report

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Objective

To examine the effectiveness of functional fascial taping® (FFT®) on a young female with chronic lower back pain for 14 years. The patient had two procedures 18 months apart for decompression and discectomy (L4 and L5) for back and leg pain, the second procedure was 2 years prior. Despite these procedures she had experienced persistent pain and restricted range of trunk flexion 15°, for 3 months prior to treatment. Other treatments had not improved her symptoms.

Method

Patient screened to determine her suitability for FFT, as well as any propensity to tape allergy. FFT was applied and

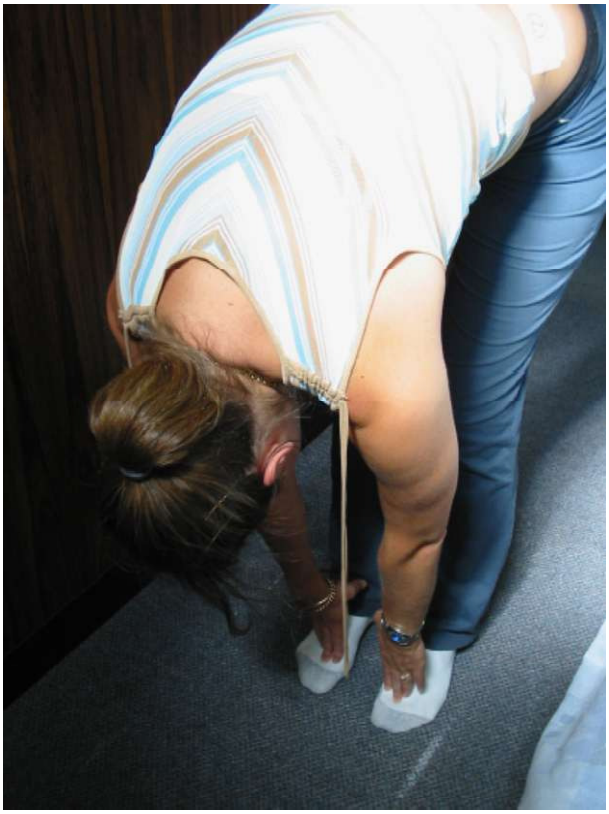

Figure 1 Photo taken 1 week after treatment commenced.

Figure 2 Sequence of tapes used for patient.

assessed in the functional pain range. The direction and tension/load of the tape were determined by assessing symptomatic skin and tissue responses. The skin and underlying superficial tissues were objectively and systematically distracted away from the source of pain. Once pain reduction was realised and functional skin biomechanics were taken into consideration, hypoallergenic film was applied to the region to help protect the skin and enhance the adhesive quality of the tape. This was followed by white hypoallergenic tape. Rigid strapping tape was applied at the point of pain and using optimal tension/load, the tape was applied in the direction of ease using the FFT gathering technique (Alexander, '96).

Results

Session one resulted in a range increase from 15° to 35° of trunk flexion. With no pain present in the new range, pain was experienced $>35°$. Session two immediately decreased pain and increased range to 80° of flexion, with pain present $>80°$. Session three, 1 week later, achieved full flexion and no pain present (Figure 1). This result created a pain-free environment for rehabilitation. Graduated flexion exercises were recommended to maintain the new range of movement. Patient received five FFT treatments, which involved assessing, reassessing and modifying the tape as a result of altered symptoms (Figure 2). Clinical Pilates was commenced at 3 weeks. Patient was discharged at 6 weeks with full
flexion. At 6 months and 3 years follow-ups, the patient remained fully functional and pain free and was able to exercise whilst sustaining muscle strength in the lumbar area. She had returned to work and had managed a full term pregnancy, which was pain free in the lumbar region.

Conclusion

In this case study, FFT reduced pain, increased ROM, encouraged normal movement patterns and created a pain-free environment for rehabilitation of a female with chronic lower back pain. The long duration of symptoms prior to treatment did not affect the outcome. This study suggested that FFT has beneficial affects for chronic lower back pain, however a large random controlled study is warranted to establish consistent effect in sample size.

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