Ultrasound Evidence of Altered Lumbar Connective Tissue Structure in Human Subjects with Chronic Low Back Pain

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BACKGROUND: Although the connective tissues forming the fascial planes of the back have been hypothesized to play a role in the pathogenesis of chronic LBP, there have been no previous studies quantitatively evaluating connective tissue structure in this condition. The aim of this study was to perform an ultrasound-based comparison of subcutaneous and perimuscular connective tissues in the lumbar region in a group of human subjects with chronic or recurrent low back pain (LBP) for more than one year, compared with a group of subjects without LBP.

METHODS: In each of 107 human subjects (60 with LBP and 47 without LBP), parasagittal ultrasound images of the subcutaneous and perimuscular connective tissues forming the superficial and deep (thoracolumbar) fasciae of the back were acquired bilaterally, centered on a point 2 cm lateral to the midpoint of the L2-3 interspinous ligament. The outcome measures based on these images were subcutaneous.Perimuscular connective tissue thickness and echogenicity were measured by ultrasound.

RESULTS: There were no significant differences in age, sex, body mass index (BMI) or activity levels between LBP and No-LBP groups. Perimuscular connective tissue thickness and echogenicity were not correlated with age but were positively correlated with BMI. The LBP group had ~25% greater perimuscular connective tissue thickness and echogenicity compared with the No-LBP group (ANCOVA adjusted for BMI, $p<0.01$ and $p<0.001$ respectively).

CONCLUSION: This is the first report of abnormal connective tissue structure in the lumbar region in a group of subjects with chronic or recurrent LBP. This finding was not attributable to differences in age, sex, BMI or activity level between groups. Possible causes include genetic factors, abnormal movement patterns, and chronic inflammation.

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