THE ROLE OF NEUROGENIC INFLAMMATION AND DIAGNOSTIC STRAIN ELASTOGRAPHY IN NONSPECIFIC LOW BACK PAIN

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Introduction/Background

Low back pain can be caused by a neurogenic inflammation in the posterior layer of the thoraco-lumbar- fascia and in the around the endings of the nociceptors in the endomysium causing tissue hardening. Through manual palpation the areas of hardening can be located, but is subjective, limited to the surface layers, requires a lot of experience [1] and is difficult to document. Technical devices like indentometers and pressure algometers can provide more objective data allowing a quantification of the hardness and the degree of peripheral sensitization due to the neurogenic inflammation. A drawback is that it is impossible to say in which tissue layer the hardness is located. Strain elastography makes all tissue layers visible and compares their relative hardness within the region of interest [2].

Hypothesis: To identify hard areas fascia and muscles with Strain Elastography. Hypothesis 1: In harder tissue the pressure pain threshold is lowered. Hypothesis 2: Harder tissue requires more force application with the indentometer to achieve a pre-defined indentation.

Methods

A sequential clinical protocol was applied to patients with idiopathic low back pain, in a private clinic setting [3]. Strain Elastography (Ultrasonix Tablet – Analogic USA) was performed on 30 patients at 70 sites. With ImageJ software (NIH) the hardest, yellow-red pixels were counted. – A significant difference was considered at ≥ 5%. After the Strain Elastography Pressure Algometry (Model 320.1kN –TesT GmbH Germany) was done on the test sites with a 1 cm² tip and a range from 1-1000 N. A significant difference was considered at ≥ 2 N. The Indentometer (Indentometer Pro [4]) was applied to the test sites, left and right, until pain was perceived, considering a difference of 10 Newton to be significant.

Results

Hypothesis 1 was accepted after 35 exams. Hypothesis 2 was accepted after 11 exams.

Conclusion

The findings of Strain Elastography can be validated with Pressure Algometry and Indentometry. Hard areas in the fascia and muscle identified by Strain Elastography have a significantly reduced pain threshold supporting the clinical observation. Indentometry can be used to identify hard areas in fascia- and muscle found with Strain Elastography.

References