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## **The immediate effect of a single treatment of neuromuscular electrical stimulation with the StimaWELL 120MTRS system on multifidus stiffness in patients with chronic low back pain**

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### **Objectives**

Individuals with chronic low back pain (CLBP) have greater difficulty activating the lumbar multifidus muscle than healthy controls. Neuromuscular electrical stimulation (NMES) was previously reported to elicit multifidus activation in LBP patients, but its immediate effect on resting multifidus muscle stiffness has never been investigated. The aim of this study was to examine the effect of a single treatment with the StimaWELL 120MTRS system (a medium-frequency electrotherapy device) on prone resting lumbar multifidus stiffness. We hypothesized that a single NMES treatment would facilitate neural drive to the multifidus and lead to an acute/temporary increase in prone resting multifidus stiffness at L4 and L5.

### **Method**

28 participants (16 women, 12 men, 42.9±12.6 yrs old) with CLBP were recruited from a broader RCT examining the effect of a 10-week intervention with the StimaWELL 120MTRS system on multifidus morphology and function. During participants' third visit, shear-wave elastography (SWE) measurements of the multifidus in prone at L4 and L5 spinal levels were taken prior to, and 15 minutes after, a 20-minute NMES treatment. Three images were acquired per-side, per-level, and the average stiffness (in kPA) was calculated. Paired t-tests and Wilcoxon Signed Rank tests were used to compare the change in resting stiffness from pre- to post-treatment.

### **Results**

Wilcoxon Signed Rank tests revealed a significant increase in multifidus stiffness on the right (MD = 1.79 (7.47),  $p = 0.033$ ) and left side (MD = 2.27 (6.25),  $p = 0.035$ ) at the L5 level. Paired t-tests revealed no significant changes in stiffness at the L4 level on the right (MD = 1.89 (5.78),  $p = 0.094$ ) and left side (MD = 0.83 (7.93),  $p = 0.588$ ).

### **Conclusions**

This study provides preliminary evidence that a single NMES treatment with the StimaWELL 120MTRS system acutely increases lumbar multifidus stiffness at L5 in CLBP patients. NMES treatment with the StimaWELL 120MTRS may have a priming effect on the lumbar multifidus at L5. We plan to continue our investigation to expand our findings.