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Comparison of Lumbopelvic Rhythm and Flexion-Relaxation Response Between 2 Different Low Back Pain Subtypes

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Structured Abstract

Study Design. A cross-sectional study to compare the kinematics and muscle activities during trunk flexion and return task in people with and without low back pain (LBP).

Objective. To characterize the lumbopelvic rhythms during trunk flexion and return task in a group of healthy persons and two different subgroups of patients with LBP, identifying the flexion-relaxation responses in each group.

Summary of Background Data. The lumbopelvic rhythm is the coordinated movement of the lumbar spine and hip during trunk flexion and return and is a clinical sign of LBP. However, the reported patterns of lumbopelvic rhythm in LBP patients are inconsistent, possibly because previous studies have examined a heterogeneous group of patients with LBP. To clarify the lumbopelvic rhythm patterns, it is necessary to study more homogeneous subgroups of patients with LBP.

Methods. The study involved the following subjects: control group of healthy subjects (N=16); lumbar flexion with rotation syndrome (LFRS) LBP subgroup (N=17); and lumbar extension with rotation syndrome (LERS) LBP subgroup (N=14). The kinematic parameters during the trunk flexion and return task were recorded using a 3D motion-capture system, and the flexion-relaxation ratio of the erector spinae muscle was measured.

Results. The flexion angle of the lumbar spine was larger in the LFRS subgroup than in the control group and the LERS LBP subgroup, and the hip flexion angle was larger in the LERS LBP subgroup than in the control group and LFRS subgroup. The flexion-relaxation response of the erector spinae muscle disappeared in the LFRS and LERS LBP subgroups.

Conclusions. These results show that the lumbopelvic rhythms are different among healthy subjects and patients assigned to two specific LBP subgroups. These results provide information on the flexion-relaxation response of the erector spinae muscle.