

The Relationship Between Chronic Low Back Pain and Functional Movement

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ABSTRACT

Movements of the spine are different in those who have chronic low back pain (CLBP) compared to those who do not. By using inertial measurement units (IMUs), we assessed the angular acceleration of L5 and the sacrum in both healthy and CLBP individuals. **PURPOSE:** To determine if there is a difference in the movement patterns of L5 and the sacrum during spinal flexion in those with CLBP compared to those without. **METHODS:** Movement acceleration patterns were evaluated in 10 individuals between the ages of 35-65 years of age. 5 of the individuals reported having CLBP so they were categorized into the CLBP group and the other 5 were used as controls since they reported having no LBP. While the subjects were in the standing position, the IMUs were placed on the spinous process of L5 and S1. Participants were then asked to do forward flexion for 6 repetitions as quickly as they were able to. Angular acceleration was determined by using the output given by the gyroscope feature of the IMU. This feature measures changes in angular velocity. Changes in angular velocity were taken over changes in time to calculate angular acceleration ($\alpha = \frac{\Delta\omega}{\Delta t}$). **RESULTS:** Data showed that there was no statistical difference between the CLBP group and controls for both lumbar ($p = 0.90$) and sacral ($p = 0.68$) angular acceleration. **CONCLUSION:** Our study found that those with CLBP did not have a difference in how their L5 and sacrum moved during spinal flexion compared to those with no LBP. However, spinal flexion was the only movement measured. This could mean there is the possibility that if more movements of the spine were to be measured a difference in movement of L5 and the sacrum could be seen. The IMUs may also not be the best at measuring spinal movement, so a different method of measuring could better help us to determine if movement of the spine is different in CLBP individuals. Further research would need to be done to determine this.