

Thesis Title	Comparison of 3D Spinal Kinematics between Female Subjects with and without Low Back Pain
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ABSTRACT

This study compared 3D spinal kinematics between two groups of female subjects with and without low back pain (LBP) whose age matched. Each group contained 20 subjects. Mean ages of LBP and without LBP groups were 45.45 ± 5.13 and 44.85 ± 5.03 years respectively. Spinal kinematics data were collected by using a six camera Motion Analysis ExpertVision™ system. The parameters investigated at the preferred and fast speeds of motion were as follows: 1) angular displacements for flexion, extension, lateral flexion and rotation, 2) average angular velocities for flexion/extension, lateral flexion, and rotation, 3) peak angular velocities for flexion/extension, lateral flexion, and rotation.

The results showed no statistically significant differences of angular displacements compared between preferred and fast speeds of motion for both with and without LBP groups. Average and peak angular velocities for flexion/extension, lateral flexion, and rotation increased significantly with increasing speed of motion from preferred to fast speed for both subject groups ($p < 0.001$).

Comparison of angular displacements between with and without LBP groups did not show any statistically significant differences either in preferred or fast speed of motion. Average angular velocities for flexion/extension in LBP group were significantly less than those in without LBP group for both speeds of motion ($p < 0.05$). Peak angular velocities for lateral flexion in LBP group were significantly less than

those in without LBP group for both preferred ($p<0.05$) and fast speeds of motion ($p<0.005$).

The results of this study provided quantitative database related to the differences in spinal kinematics between with and without LBP groups. The results indicated that the angular velocity revealed more dramatic different than angular displacement. And the velocity was only parameter that was capable of distinguishing the spinal kinematic between with and without LBP groups. Thus, it is suggested that trunk velocity should be used to monitor before and after treatments in LBP patients. In addition, the 3D kinematic analysis method in this study could be used as an evaluation technique for analyzing spinal movement in LBP patients which is more precise than only routine clinical examination.