

## Global spinal motion in subjects with lumbar spondylolysis and spondylolisthesis: does the grade or type of slip affect global spinal motion?

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**STUDY DESIGN:** This was a prospective pilot study to investigate the global motion characteristics of the spondylolysis and spondylolisthesis populations.

**OBJECTIVES:** The aim of this study is to determine the influence of a spondylolisthesis or a spondylolysis on global spinal motion and to establish whether this is dependent on the cause of the slip or the degree/grade of the slip.

**SUMMARY OF BACKGROUND DATA:** The condition of spondylolisthesis has been extensively discussed in the literature with respect to its etiology and management. However, the mechanics and movement of the spine in relation to pathology and the effect of this condition on function have received scant attention.

**METHODS:** The motion of the lumbar spine was investigated in 31 patients (19 men, 12 women, mean age 47.7 +/- 17.8 years) who were diagnosed as having either a lumbar spondylolysis or a spondylolisthesis. These patients were compared with a pre-existing database of 203 normal subjects (100 men, 103 women, mean age 39.8 +/- 13.4 years). Patients were graded according to the type of spondylolisthesis or spondylolysis they had, and the extent of slip was rated using Meyerding's classification (1932) and measured directly using methods of Boxall et al (1979) and Wiltse et al (1983).

**RESULTS:** Direct measurements of the extent of slip using Boxall et al (1979) and Wiltse et al (1983) methods were found to have no significant correlation with the resultant range of motion (ROM) or the speed of movement. This study suggests that motion parameters are influenced by the grade of slip in patients with spondylolisthesis, and the type of spondylolisthesis i.e., whether isthmic or degenerative. In the A-P flexion-extension plane, the results indicate that subjects with a defect only, i.e., a spondylolysis, and thus no slip present with a spinal hypermobility ( $P < 0.01$ ). Subjects with an isthmic slip tend to be either slightly hypermobile or within the anticipated range of motion, whereas those subjects with a degenerative slip tend to be hypomobile ( $P < 0.05$ ). Movements into lateral flexion were restricted in both the isthmic and degenerative spondylolisthesis patients, whereas rotation was only influenced by the level at which the defect occurred. In terms of degree of displacement, in higher grades of displacement, there was a trend towards hypermobility.

**CONCLUSIONS:** The findings of this study suggest that the grade and type of spondylolisthesis do influence global motion parameters. This information may be useful in the clinical assessment of this patient group.