EFFECTS OF LAMINECTOMY AND FACETECTOMY ON THE STABILITY OF THE LUMBAR MOTION SEGMENT

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Abstract

A ligamentous, nonlinear, sliding contact, three-dimensional finite element (FE) model of L2-L3 complex was developed to investigate the biomechanical effect of laminectomy with and without facetectomy. The L2-L3 FE model was validated against experimental study under various physiological loadings and found to match well with the experimental data. Four iatrogenic models (unilateral laminectomy, unilateral laminectomy with unilateral facetectomy, unilateral laminectomy with bilateral facetectomy and total bilateral laminectomy) were evaluated under flexion, extension, torsion, lateral-bending, anterior and posterior shear load vectors to determine alterations in kinematics and annulus stress. Results show that total laminectomy with facetectomy induces considerable increase in motion and annulus stress, except for lateral bending, whereas unilateral laminectomy shows the least increases.

Keyword: Finite element method, Lumbar spine, Laminectomy, Facetectomy, Stability