

DEVELOPMENT AND VALIDATION OF A LUMBAR VERTEBRAL SEGMENT MECHANICAL ANALOGUE

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ABSTRACT

This research attempted to develop and validate a mechanical analogue of the lumbar vertebral segment. The major features of the lumbar vertebral segment considered in this research were the design and development of the Anterior Longitudinal Ligament, Posterior Longitudinal Ligament, inter-vertebral disc and the fixtures/jigs necessary for mechanical validation of the lumbar segment mechanical analogue. Anatomically correct composite lumbar vertebrae models, on which the ligaments and inter-vertebral disc were attached, were obtained from an outside vendor.

Rigidity test of two analogue segments and one calf spine were performed. Results of various modes of testing showed good reproducibility between the two analogues. The rigidity, in all modes of loading, of the calf spine was within a factor of 3 of the analogues. These results reveal that the analogue segment is a reproducible and appropriate biomechanical model of the human lumbar spine.