

Comparative biomechanical testing of anterior and posterior stabilization procedures

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STUDY DESIGN: This is a comparative in vitro biomechanical study in a calf lumbar spine model. **OBJECTIVES:** The objective was to compare the primary stability of an anterior instrumentation, an intercorporeal cage in combination with an anterior instrumentation, and a posterior instrumentation for monosegmental spondylodesis. **SUMMARY OF BACKGROUND DATA:** Spondylodesis can be achieved through a posterior lumbar fusion, posterior lumbar intercorporeal fusion, or an anterior lumbar intercorporeal fusion. The posterior lumbar fusion is the gold standard, although the anterior approach offers some potential advantages to the transpedicular posterior techniques. **METHODS:** Stability testing was performed on 30 calf lumbar spine motion segments in a physiologic state ($n = 30$), with either an isolated anterior (MACS) or posterior instrumentation (SOCON), and with an anterior instrumentation augmented with an intercorporeal cage (MACS-Cage, $n = 10$, respectively). Range of motion, neutral zone, and bending stiffness were measured under pure bending to 10 Nm, and bending stiffness under axial loads of up to 1500 N. **RESULTS:** The isolated posterior instrumentation was found to be more stable than the isolated or augmented anterior instrumentation in flexion/extension, although no significant differences were observed in lateral bending or axial rotation. The results of this biomechanical study suggest that an augmented anterior instrumentation provides similar stability for bony fusion as does the golden standard posterior instrumentation, with the exception of flexion/extension. **CONCLUSION:** An augmented anterior instrumentation may provide similar stability for bony fusion as does the posterior instrumentation.

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