INFLUENCE OF SCREW CEMENT ENHANCEMENT ON THE STABILITY OF ANTERIOR THORACOLUMBAR FRACTURE STABILIZATION IN THE PRESENCE OF DORSAL STRUCTURE INJURIES

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INTRODUCTION

The influence of additional dorsal structural damage on anterior stabilization of thoracolumbar fracture is still unknown. Screw cement enhancement is a possibility to reinforce the stability of anterior instrumentation. Is this enhancement strong enough to enable a single anterior procedure, like thoracoscopic technique and still compensate for dorsal instability?

The aim of the study is to evaluate the biomechanical characterisation of anterior stabilization while increasing dorsal instability with and without cement enhancement.

METHODS

An increasing dorsal defect (laminectomy, facetectomy) model was performed to simulate additional dorsal defect situations together with a ventral corpectomy of T12, which was stabilizied by strut grafting and instrumentation with 1) a MACS TL system with and without screw cement enhancement using the Twin screw or additional cementable Polyaxialscrew XL, 2) a single dorsal USS system and 3) a combined procedure. Biomechanical tests were performed on six human cadaveric T10-L2 spine specimens (mean BMD 145±40 mg/ccm, mean age 77±18 years) in a spine tester with pure moments of 3.75 Nm; Range of Motion and Neutral Zone were measured.

RESULTS AND DISCUSSION

With anterior strut grafting and stabilization in the class of MACS TL and Polyaxialscrew XL system with screw cement enhancement, the increasing dorsal defect had no significant influence ($p < 0,05$) on the stability of the instrumented segments in comparison to MACS TL system without cement enhancement and intact dorsal structures.

SUMMARY

Even in the prescence of dorsal instability a single endoscopic procedure is biomechanically sufficient when systems in the MACS TL class are stabilized with screw cement enhancement.