IS "HYPERMOBILITY" A VALID INTERPRETATION FOR EARLY DEGENERATION OF MOTION SEGMENTS NEXT TO SPINAL FUSION ?

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INTRODUCTION

In the thoracolumbar and lumbar spine, fusion due to degenerative or traumatic disease is presumed to induce increase in motion in the adjacent segments. This abnormal motion or loads on these segments are believed to lead to degenerative changes, like disc degeneration or facet joint arthrodesis. No investigation has examined the effects of different anterior, posterior and combined stabilization systems performing a physiological alignment while stabilizing the spine on this adjacent segments

METHODS

Biomechanical tests series were performed on 6 human cadaveric T10-L2 spine specimens for each different hardware components: Fixateur interne (Synthes™), Ventrofix (Synthes™), Kaneda SR (AcroMed™) and MACS TL (Aesculap™).

T10 and L2 were potted in polymethylmethacrylate for fixation in the spine tester after BMD measurement by pQCT. After corpectomy of the T12 vertebral body and adjacent discs, the resulting defect was replaced by a spacer representing a bone strut graft; stabilization was performed anterior, posterior and combined. Range of motion (ROM), Neutral Zone (NZ) were measured under pure moments of 3.75 Nm applied in a spine tester in the three primary directions using a six-DOF Zebris™ ultrasound motion measurement system between all motion segments.

RESULTS AND DISCUSSION

No significant changes of motion ($p < 0.05$) were measured in the adjacent segments in the three primary directions independently the kind of stabilization before and after fusion.

SUMMARY

Creating a correct spinal alignement while fracture treatment by implants in class of the prementioned, hypermobility in adjacent segments is biomechanical not demonstrable.