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Results of Comparing X-ray Measurements Pre- and Two-years Postoperatively with DCRA Technique in a RCT between Fusion and TDR

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Study design: A comparative study on X-ray measurements in a randomized controlled trial between instrumented posterior fusion (N=72) and total disc replacement (TDR)(N=80) in patients with chronic low back pain assumed to be discogenic, correlated to clinical outcome.

Objective: To investigate whether surgical goals for the respective treatment was reached, if outcome was related to this and if differences between groups in disc height and adjacent level motion pattern occurred.

Summary of background data: Fusion is considered „gold standard“ in surgical treatment of degenerated disc disease, though the stiffness in itself might induce degeneration in adjacent segments. TDR is aiming to restore and maintain mobility by replacing a painful disc. Little is known of the in vivo degree and quality of mobility in artificial discs and whether maintained mobility reduces stress on adjacent levels.

Methods: Pre and two-years postoperative flexion-extension X-rays were measured using Distortion Compensated Roentgen Analysis (DCRA) at treated and adjacent levels, stiffness of fusions and mobility of TDR was estimated. Changes in disc height and changes in mobility pattern in adjacent segments were compared. The results were compared to clinical outcome for back pain.

Results: 74% of fused were stiff and 91% of TDR-patients were mobile, but with less than normal mobility. The fulfilling of surgical goals did not correlate to clinical outcome. Fused segments were lower and TDR-segments were higher than normal. There were small differences, i.e. more translation or flexion-extension at adjacent levels in the fusion group than in the TDR group.

Conclusions: This very accurate method of measuring (DCRA) indicates that the surgical goals were reached in most patients, but did not correlate to outcome. Differences between groups in postoperative disc height and motion pattern at adjacent segments might create differences in outcome in the long-term perspective, but was not detectable after two years.