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Analysis of Adjacent Segment Re-operation Following Lumbar Total Disc Replacement

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Introduction: Arthrodesis has long been used for treating axial back pain. However, development of adjacent segment disease requiring re-operation has become a concern. Lumbar total disc arthroplasty (TDR) has been proposed as a method for addressing back pain and preventing or reducing adjacent segment disease. The purpose of this study was to determine the re-operation rate of at the level adjacent to a level implanted with a TDR and to analyze the pre-operative condition of that segment.

Methods: A consecutive series of 1000 patients from one center, beginning with first case experience, who underwent TDR were reviewed and those who underwent re-operation at the level adjacent to the TDR were analyzed. Pre-TDR radiographs, including plain film flexion/extension X-rays, MRI, and CT were evaluated to assess preexisting pathology. MRI evaluation of the adjacent disc was performed using a classification system of normal, moderate, or severe. CT evaluation of the facet joints was performed using a 0 to 4 grading system (Pathria et al).

Results: Twenty one (2.1%) of the 1000 arthroplasty patients underwent re-operation due to adjacent segment disease. The mean length of time from TDR to re-operation was 28.3 months. Of the adjacent segments evaluated on pre-operative MRI, 38.8% were normal, 38.8% were moderately diseased, and four 22.2% had evidence of advanced degeneration. Pre-operative CT was available for 15 patients with a total of 21 facet levels assessed. Twelve (57%) facet levels were normal (grade 0), seven (33.3%) grade 1, and two (9.5%) grade 2. There were no levels graded 3 or 4 (severe).

Conclusions: The rate of adjacent segment disease requiring reoperation (2.1%) compared favorably to that reported secondary to fusion. Further evaluation of those undergoing reoperation indicated many patients had some indications of degeneration at the re-operated adjacent segment prior to the original arthroplasty procedure.