Ten-year revision rate and clinical outcome in patients treated surgically for lumbar spinal stenosis

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Background: This study aimed to 1) determine the revision rate in patients treated with lumbar decompression or lumbar decompression and fusion for spinal stenosis, 2) report patient-rated outcomes (PROs) and radiographic measures, and 3) identify risk factors for revision over a 10-year postoperative period.

Methods: Patients previously referred to the London Spine Centre and surgically treated for degenerative lumbar spondylolisthesis and spinal stenosis who were enrolled in a prospective observational study, between 2006 and 2011 were included. PROs were obtained preoperatively and postoperatively at 1.5, 3, 6, 12, 24, and 36 months after surgery as part of the original study. In an extension study, all patients were contacted and invited to attend a 10-year visit. The cumulative 10-year revision rate of decompression compared to decompression and fusion groups was determined using Kaplan-Meier curves and the Log-rank test. In the cohort that completed the 10-year follow-up, PROs were compared to normative values, and longitudinal models of regression for repeated measures were used to compare PROs between patients that had a revision and those that did not. Risk factors associated with revision surgery were assessed using Cox proportional hazards model of regression.

Results: A total of 211 patients were included in the study. 82% underwent instrumented fusion and 18% underwent decompression alone. The revision rate was 22%. No difference in the cumulative incidence of revision surgery was found between the decompression-alone and decompression and fusion groups (Log-rank, p=0.820). A total of 98 patients completed the 10-year visit with a median follow-up time of 12 years (range 8 -15 years). 31 of these patients had a revision (31.6%). Patients who had a revision had worse SF-36 mental functioning (SF-36 MCS) before surgery (p=0.025). At 10 years postoperative, patients who had undergone revision had worse SF-36 physical component summary scores (SF-36 PCS), back pain scores and leg pain scores compared to those that did not have a revision surgery. Compared to normative values, patients that had surgery had worse back pain, leg pain, disability, and symptoms 10 years after surgery irrespective of revision surgery or not (p<0.001). With regard to radiographic parameters at 10 years, patients who underwent revision surgery had clinically worse pelvic incidence–lumbar lordosis mismatch (19º vs. 10º, p=0.028) and lumbar lordosis (39º vs. 48º, p=0.001) but sagittal vertical axis was similar for both groups. The hazard of revision decreased as lumbar lordosis increased (HR 0.959; 95% CI, 0.932, 0.987; p=0.004).

Conclusion: One-quarter of patients had a revision surgery within 10-years, and these patients had worse physical functioning and pain compared to patients that did not have a revision surgery. The incidence of revision surgery was similar in patients that underwent decompression-alone versus decompression and fusion. PROs improved after surgery; however, compared to the normative population, patients that had surgery had worse quality-of-life at 10-years postoperative. Preoperative mental functioning and lumbar lordosis are modifiable risk factors.

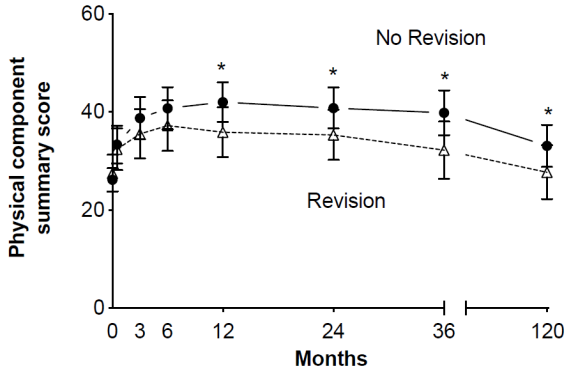

Figure 1: Comparison of Short Form-36 Physical Component Summary Scores between patients that had a revision surgery to those that did not over the 10-year postoperative period. Data are derived from a longitudinal model of regression for repeated measures. A higher score indicates a better quality of life. Error bars are 95% CI. The baseline values are actual observed values and are not derived from the model.