Abstract: 471
Total Lumbar Disc Replacement: Comparison of Clinical and Radiological Outcomes between L4L5 and L5S1 Levels

1University Hospital, Nantes, France, 2University Hospital, Creteil Paris, France, 3University Hospital, Strasbourg, France, 4University Hospital, Dijon, France, 5Hospital, Orléans, France, 6Clinique du Parc, St Etienne, France, 7Clinique, Besançon, France, 8LDR Medical, Troyes, France, 9University Hospital, Nantes, France

Purpose: The goal of total disc replacement (TDR) is to restore physiologic segmental motion at the operative levels (mainly L4-L5 and L5-S1). However, physiologically, L5-S1 and L4-L5 discs have different kinematics. Consequently, the ability of TDR to mimic natural disc motion could be unequal between these 2 levels. Mobile-core prosthesis could allow different translation of the core adapted to the kinematic differences between L4-L5 and L5-S1 levels. The aim of our study was to compare clinical and radiological outcomes following single-level TDR at L4-L5 versus L5-S1 level.

Methods: Prospective, observational and multicenter study analyzing clinical and radiological outcomes following single-level TDR (Mobidisc) at either L4-L5 or L5-S1 level. Clinical outcomes included Oswestry Disability Index (ODI), Visual Analog Scale (VAS) for lumbar and leg pain, and SF-36 score. Range of Motion (ROM), intervertebral translation (VT) and core translation (CT) were measured from flexion/extension lateral X-rays. Evaluation was performed pre-operatively, and at 6 weeks, 3, 6, 12 and 24 months. Comparison between the 2 groups for each follow-up was performed using the Wilcoxon test.

Results: 53 patients were analyzed in the L4-L5 group and 175 in the L5-S1 group. Demographics were similar in L4-L5 and L5-S1 groups (mean age 42.4±6.9 versus 42.6±6.8; and sex ratio 37.7% men versus 28% men). In order to avoid bias in outcomes, analyzed patients had no previous lumbar surgery. In the L4-L5 group, 31 patients have achieved the 24 months follow-up evaluation, and 108 in the L5-S1 group. Pre-operative scores (VAS, ODI, SF-36) did not differ significantly between both groups. Following surgery, ODI, VAS, and SF-36 scores improved significantly in both groups at all time-points compared to pre-operative values. Furthermore, results were better in the case of L5-S1 procedures compared to L4-L5 for all the clinical scores at all time-points (significantly for leg pain VAS, ODI and SF-36). Analgesic use decreased strongly after surgery in both groups with a most marked decrease in the L5-S1 group. Pre-operatively 4.3% and 7.4% of the patients did not use any analgesic in the L4-L5 and L5-S1 groups respectively. At 24 months 46.7% of the patients in the L4-L5 group versus 62.0% in the L5-S1 group did not use any analgesic. Patient satisfaction at 24 months reflected clinical results: in the L4-L5 group 69% of the patients assumed that they would undergo the surgery again, versus 93% in the L5-S1 group. Radiographic comparison between L4-L5 and L5-S1 levels has shown an opposite combination between VT and CT, e.g a higher VT (1.1 mm vs. 0.7 mm) and a lower CT (0.9 mm vs.1.2 mm) at L4-L5 level compared to L5S1 level, suggesting an adaptation to the level linked to the difference of range of CT. No significant difference between ROM values was observed between the 2 levels at 2 years follow-up (7.2° and 7.9° at L4-L5 and L5-S1 levels respectively). This represents an increase in ROM compared to baseline (4.8° at L4L5 and 3.4° at L5S1).

Conclusion: TDR provided good clinical outcomes for both levels but better for L5-S1 procedures, despite the paradox that biomechanical behavior of L5-S1 segments may be more difficult to mimic.