Introduction: Current lumbar total disc replacement (TDR) devices require an anterior approach for implantation. The anterior approach to place lumbar TDR devices has inherent biomechanical limitations and surgical risks. Within the possible intraoperative issues are: the damage to various abdominal structures, such to the grand vessels, to bowel components and to the sympathetic neural plexus, without mentioning the long discharge and rehabilitation time. Besides the surgical risks, there is resection of the anterior longitudinal ligament (ALL). Placement of a TDR device from a true lateral (XLIF) approach allows for easier, less invasive access to the disc space, as has been shown in reports of XLIF for fusion procedures. Lateral implantation of TDR also preserves the stabilizing ligaments, which are a natural restraint to excessive rotations and translations, and thereby help to minimize facet stresses. Importantly, implantation from a lateral approach leaves greater opportunity for safer revision surgery, if necessary, by avoiding scarring of anterior vasculature. Additionally, the footprint of the lateral TDR device capitalizes on the biomechanical support of the ring apophysis.

Methods: Prospective, non randomized clinical trial to evaluate the safety and effective of the lateral total disc replacement implanted by the XLIF approach. Patients included 16 males and 20 females, average age 43 yrs (24-60). A TDR device designed for implantation through a true lateral, retroperitoneal, transpsoas approach (XLIF) was implanted in 36 patients with discography-confirmed 1- or 2-level DDD. Clinical and radiographic outcomes assessments were prospectively collected.

Results: Surgeries included 14 1-level, 3 2-level, and 19 hybrid TDR/ALIF cases. The surgery was performed through a 4cm lateral incision in an average of 134 minutes (90-300) and with an average 58cc blood loss (30-150). There was no intra-op or post-op complications. Postoperative x-rays showed good device placement, with restoration of disc height, foraminal volume, and sagittal balance. All patients were up and walking within 12 hours of surgery. VAS pain scores improved from an average of 9.3 at pre-op to 2.27 after 3 years. Oswestry Disability Index improved from an average of 57 at pre-op to 16.5 after 3 years.

Discussion and conclusion: Mid-term results of a laterally placed TDR device demonstrate maintenance of pain relief and functional improvement. The benefits of this technique -- minimal morbidity, avoiding mobilization of the great vessels, preserving the anterior longitudinal ligament, biomechanically table orientation, and broader revision options II suggest a promising new direction for TDR procedures.