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Clinical and Radiological Evaluation of TLIF for Degenerative Disc Disease Using a Novel Modular Cage

Mohamed Elmekaty, MD^{1,2}; Emad El Mehy, MD,PhD²; Yohan Robinson, MD,PhD¹

1. Department of Surgical Sciences, Uppsala University Hospital, Uppsala, Sweden
2. Orthopedic Surgery Department, Tanta University, Tanta, Egypt





INTRODUCTION

- **TLIF** is widely utilized as an efficient surgical procedure for Degenerative disc disease (DDD)
- It is **challenging** to insert a large footprint TLIF cage to enhance the union rate and minimize cage subsidence associated with conventional small TLIF cages especially in osteoporotic persons
- Biomechanical and clinical studies reported improvement of the construct stability with **expansion of the interbody cage footprint** which allows the cage to be based on the strong peripheral endplate ring



TLIF WITH A LARGE FOOTPRINT CAGE

- Consequently, achieving posteriorly instrumented TLIF with a large footprint cage through the TLIF narrow access is both **significant** and **technically demanding**
- Recently, an innovative modular **Interfuse S™** cage has been introduced to overcome the obstacles with inserting a large TLIF cage





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PATIENTS

- Retrospective cohort study
- 20 patients were included in the study (37 lumbar levels)
- 16 females-4 males
- Mean age 66 ± 10 years and BMI 28 ± 5 kg/m²
- 14 cases degenerative spondylosis and 6 cases degenerative scoliosis
- One- year minimum follow-up



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METHODS OF EVALUATION

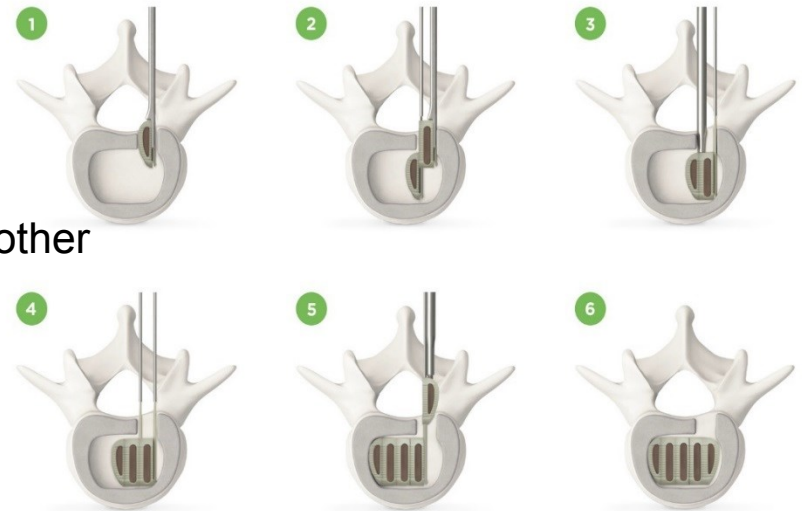
- Change of disc height (Anterior-Middle-Posterior) (A,M,P/DH)
- Changes of lumbar lordosis angle(LLA)
- Changes of segmental disc angle(SDA)
- % of endplate coverage by the cage
- Cage Subsidence >3mm of endplate settling
- Fusion rate
- Loosening of screws
- ODI for function and VAS for pain
- Postoperative complications



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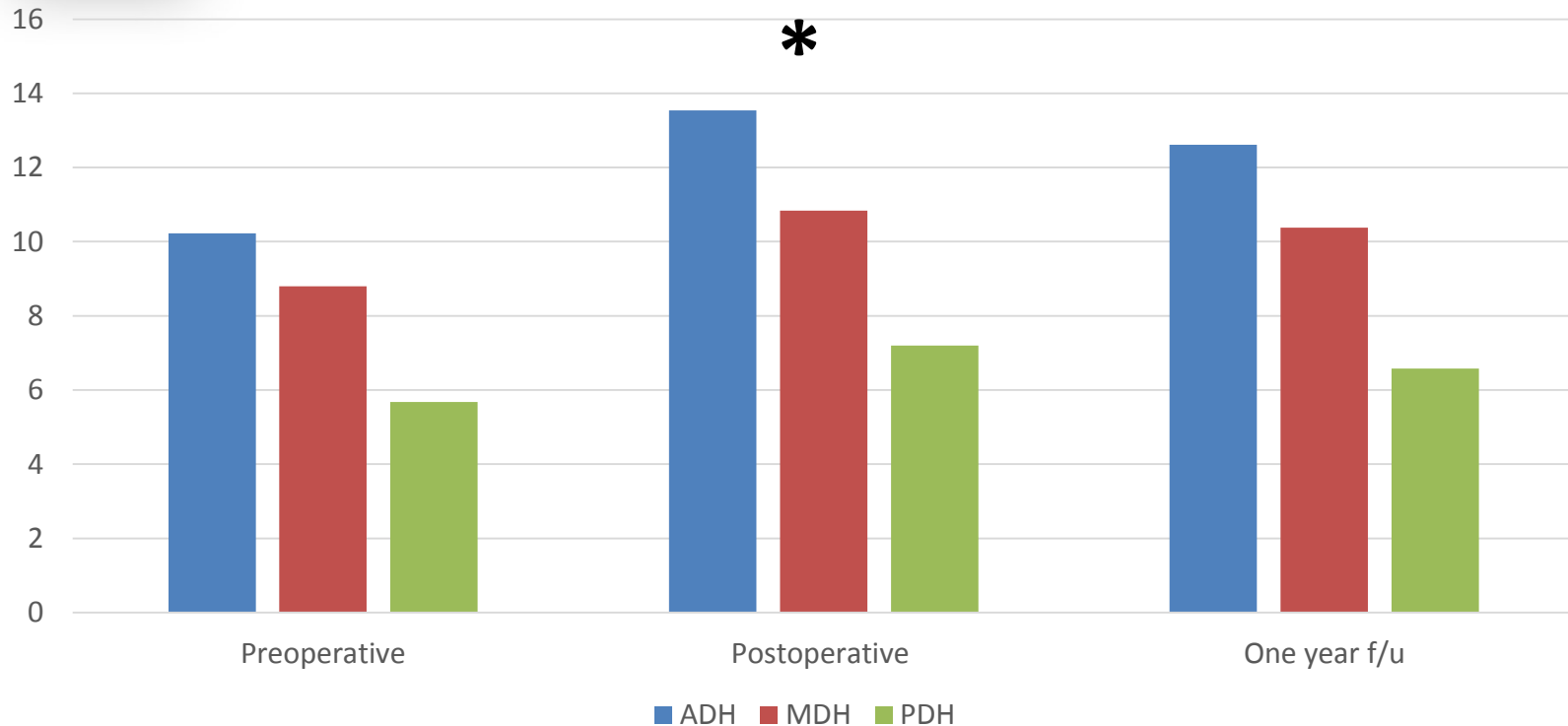
DEVICE DESCRIPTION

- Integral rail and slot multi-segmental system
- Made of PEEK (peek-optima®)
- Inserted in separate small modules
- Assembled within disc space
- The modules are designed to lock safely to each other
- Large footprint cage
- Each segment has tantalum markers
- Antero-posterior length of the cage is 20 mm
- Height 7mm: 14mm
- Transverse diameter from 20mm: 38mm according to the number of modules used per each cage (range from 3-6 modules)





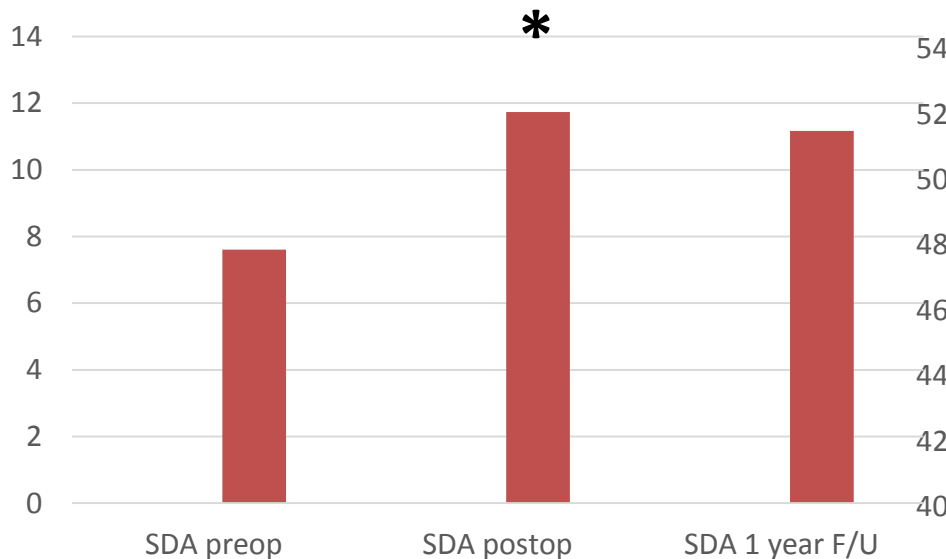
RESULTS



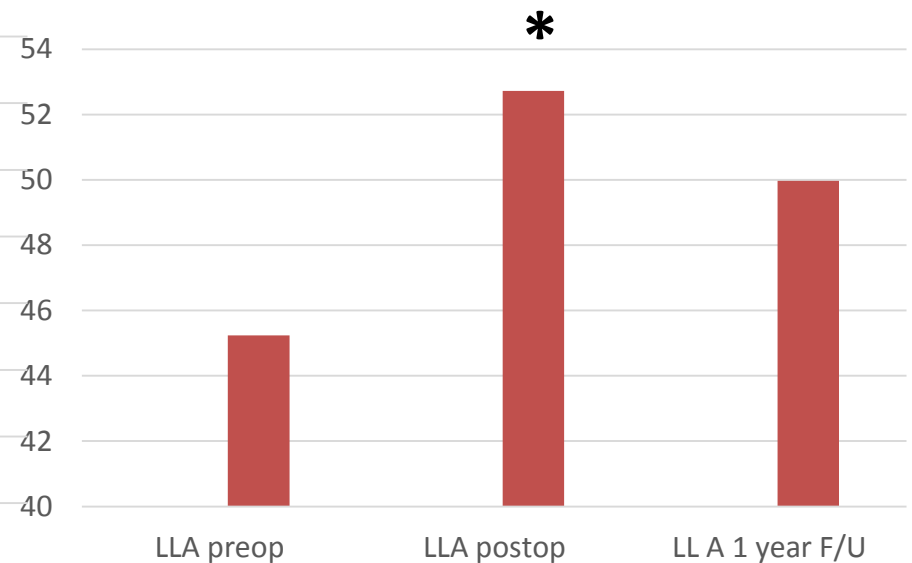
- Anterior, middle and posterior disc heights were restored by a mean of **45%, 37% and 37% ($P < 0.05$)** while loss of disc height at one-year follow-up was **0.9mm, 0.5mm, and 0.6mm** for each parameter respectively (**$P > 0.05$**)



Segmental Disc Angle



Lumbar Lordosis Angle



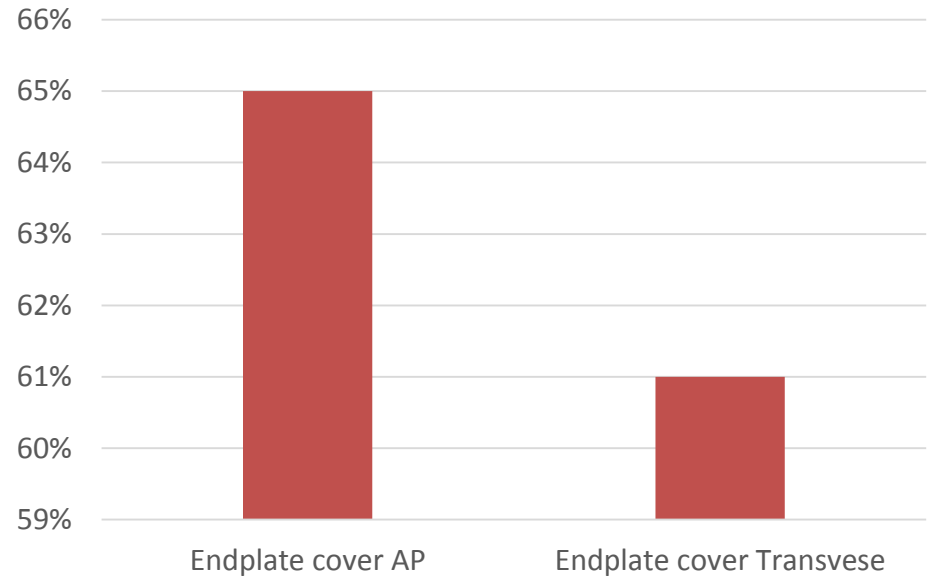
- **107%** correction of SDA postoperatively ($P < 0.05$) with **5%** loss of correction at one year follow up ($P > 0.05$)
- **28.6%** correction of LLA postoperatively ($P < 0.05$) with **5.3%** loss of correction at one year follow up ($P > 0.05$)



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- No cage subsidence or migration
- No postoperative infection
- 100% fusion rate
- No screw loosening was found
- Postoperative improvement of

ODI & VAS

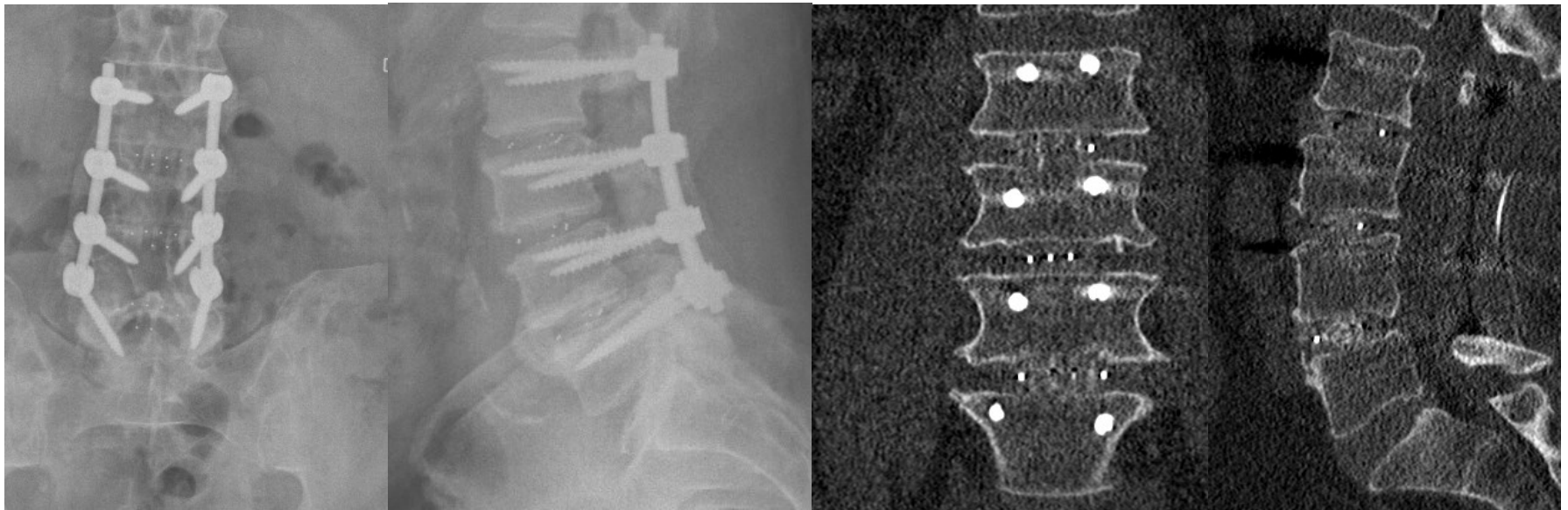


% endplate coverage by cage surface was **65%** and **61%** along anteroposterior and transverse diameters respectively



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68yrs Male ,Degenerative Scoliosis \TLIF L2:L5





DISCUSSION

- Interfuse STM cage segments were inserted through a minimally invasive access and turned into a large footprint interbody spacer after complete set-up within the disc space
- Using a large foot print cage distributed stresses to a wide area of the potent endplate periphery and provided a large surface for fusion in addition to reducing loads on posterior instrumentation
- The ability to keep this stability of spinal segment reflected positively on the patients' clinical outcome



CONCLUSION

- TLIF using modular cages demonstrated no incidence of cage subsidence or migration, high fusion rate, and no screw loosening. Also, it was effective in restoring lumbar lordosis angle, segmental disc angle and disc height and maintaining this correction, which is attributed to the larger footprint of the modular cage
- The modular TLIF-cage seems to be a safe method for interbody fusion in patients with risk of subsidence
- **Conflict of interest:** ME received a travel grant by Vertebral Technologies International. EEM had no conflicts of interest. YR was a paid lecturer for Medtronic Inc. and DePuy Synthes (Johnson&Johnson)