

# A novel minimally invasive presacral approach and instrumentation technique for anterior L5–S1 intervertebral discectomy and fusion

Technical note and case presentations

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*Object.* The authors describe a new paracoccygeal approach to the L5–S1 junction for interbody fusion with transsacral instrumentation. The purpose of this technical note is to demonstrate a novel surgical approach, technique, and instrumentation system for the treatment of L5–S1 instability in degenerative disc disease and spondylolisthesis.

*Methods.* This technical note highlights the AxiaLif (TranS1) transsacral system as an alternative method to transforaminal lumbar interbody fusion or posterior lumbar interbody fusion. Via a novel presacral approach corridor, a truly percutaneous L5–S1 discectomy, interbody distraction, and fixation are achieved, and retroperitoneal viscera and dorsal neural elements are avoided. Percutaneous pedicle screw fixation is then used to provide additional stabilization at the treated level.

*Conclusions.* This novel technique of interbody distraction and fusion via a truly percutaneous approach corridor allows for circumferential treatment of the lower lumbar segments with minimal risk to the anterior organs and dorsal neural elements.

**KEY WORDS • instrumentation • interbody fusion • paracoccygeal approach • transsacral instrumentation**

Symptomatic instability and stenosis of the lower L5–S1 and L4–5 vertebral segments are very common. Generally, anterior and posterior approaches are chosen for direct exposure of the lumbosacral spine. These kinds of open approaches are often poorly tolerated by patients because they require muscular and ligamentous dissection, neural retraction, and anular disruption, sometimes with mobilization of vascular and visceral structures. In addition to these potential problems, vascular injury, sympathetic dysfunction, bowel injury, and neurological deficit often also complicate the perioperative and surgical course.<sup>15,16</sup>

More recently, technological advances in which small incisions and portals are used have allowed surgeons to perform L5–S1 fusion via posterolateral or anterior approaches through less invasive techniques.<sup>1,3–13,17,19</sup> The AxiaLif system (TranS1, Inc., Wilmington, NC) combines the advantages of minimally invasive spinal surgical techniques with a novel corridor of approach. Via a small para-

coccygeal incision, a presacral approach corridor is percutaneously developed for access to the anterior lumbosacral body and, subsequently, to the L5–S1 intervertebral space, while preserving the integrity of the muscles, ligaments, and disc anulus.<sup>2,3</sup> In this technical note, we describe the minimally invasive surgical technique of this presacral approach to the anterior lumbosacral body for L5–S1 interbody fusion.

*Abbreviations used in this paper:* AP = anteroposterior; MR = magnetic resonance; VB = vertebral body; 3D = three-dimensional.