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The Extreme Lateral Interbody Fusion (XLIF): Its Today and Tomorrow

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The extreme lateral interbody fusion (XLIF) was first introduced by Pimenta in 2001 [1] and developed in 2003. It is a minimally invasive, lateral, transpsoas approach for lumbar interbody fusion and is an alternative approach to anterior lumbar interbody fusion (ALIF) [2]. The XLIF approach minimizes anterior approach related complications such as vascular and visceral injury, without the need for an access surgeon [3], furthermore, it bears the several advantages to this approach, including less tissue dissection, smaller incisions, decreased operative time, blood loss, shorter hospital stay, reduced postoperative pain, enhanced fusion rates, and the ability to place instrumentation through the same incision [4].

XLIF was used to treat degenerative disease, deformity, trauma, tumor and infection, total disk replacement has also been achieved via this technique [5].

Nerve injury is the most common and the most devastating complication of the XLIF procedure. Anatomical studies have shown that the majority of the lumbar plexus travels within the posterior part of the psoas major muscle and migrates in a ventral direction as it travels caudally [6]. Further, it was shown that the average distance between the nerves to the lateral mid-point of the disc decreases from cranial to caudal levels [6]. Therefore, it has been theorized that the risk of iatrogenic neurologic injury varies at each level. Several authors defined safe zones for each level, the relative safe zones is at ventral three-quarters of the vertebral body (VB) in L1,2 and L2,3 intervertebral space, but it decreases at ventral two-quarters of VB in that of L3,4 and L4,5 , thus, L4–5 is at greater risk if dilator or retractor is placed in a posterior position [7]. Therefore a real-time evoked electromyography (EMG) during surgery is mandatory to preventing neural injury during the XLIF [8,9]. Two hundred thirty five patients were included to identify the incidence and nature of neurological deficits following XLIF. At 12 months' follow-up, the prevalence of sensory deficits was 1.6%, psoas mechanical deficit was 1.6% and lumbar plexus related deficits 2.9% [10]. These symptoms were generally resolved in about 6 weeks.

The clinical symptoms may be alleviated indirectly by XLIF, through increment of intervertebral and foraminal height and correction of spinal alignment. Substantial dimensional improvement was evidenced in all radiographic parameters, with increases of 41.9% in average disc height, 13.5% in foraminal height, 24.7% in foraminal area, and 33.1% in central canal diameter [11]. Indirect decompression may be limited in cases of congenital stenosis and/or locked facets. Its effect may also be reduced by postoperative subsidence and/or loss of correction.

The XLIF procedure has gained more popular in recent years. Indications for its use have expanded to trauma, infection as well as total disc arthroplasty. Successful XLIF is built upon proper patient selection, thorough knowledge of the anatomy, attention to detail regarding surgical technique, and appropriate preoperative planning [4].

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