Lumbar intervertebral fusion procedure can be performed by anterior (ALIF), posterior (TLIF, PLIF), direct lateral (DLIF) or extreme lateral (XLIF) approaches.

The contraindications of anterior lumbar interbody fusion are presence of severe co-morbidities, morbid obesity, retropertoneal scar due to previous abdominal surgery, aorta aneurysm, aorta and inferior vena cava anomalies, history of iliofemoral vein thrombosis, burn scar, previous abdominal radiotherapy and related retropertoneal fibrosis. The major complications of anterior lumbar interbody fusion are major vessel injuries, impotence, retrograde ejaculation, graft problems, incisional hernia and dural tears.\(^{1,6-8}\)

TLIF approach is usually contraindicated in the presence of severe osteoporosis, requirement of fusion in more than three levels and presence of wedged intervertebral disc. The main disadvantages of this approach are neural injuries and insufficient disc resection. Increased incisional hernia rate, the necessity of thoracoabdominal approach at levels between Th11 and L2 segments, presence of wedge discs at some levels, the necessity of fusion in more than three levels and advanced age give rise to the development of direct lateral or extreme lateral interbody fusion techniques.\(^{5-7}\)

With direct lateral or extreme lateral approach, it is possible to perform indirect neural decompression, restoration in coronal and sagittal planes and anterior fusion. With this approach, it is possible to perform fusion to segment above intercristal line to upto Th12. This technique is applicable in lumbar coronal deformities less than 30 degrees, grade 1-2 degenerative spondylolisthesis, lateral listhesis and retrolisthesis. However, this technique is contraindicated in levels below intercristal line (L5-S1, and sometimes L4-L5), lumbar coronal deformities more than 30 degrees, grade 3 or more degenerative spondylolisthesis and presence of bilateral retropertoneal scar.\(^{2,3}\)

Direct lateral or extreme lateral interbody fusion is a minimal invasive surgical technique and can be combined specially designed neuromonitorization systems. This approach can also be used for single level discectomy or corpectomy in dorsal spine.\(^{5}\)

In surgical technique, patient is placed in a bendable table on a lateral decubitus position. If one wants to correct deformity, convex side must be up. The true lateral position of the patient is very important and should be controlled by flouroscopy before starting operation. After confirming the position of the patient, he should be stabilized by belts. The anterior and posterior borders of vertebral body should be marked by the help of flouroscopy. With 5-8 cm. posterolateral incision and subcutaneous dissection, retropertoneal space is reached. After retraction of peritoneum anteriorly, psoas muscle is exposed. At this stage, relation to neural structures should be controlled by neuromonitorization. Then, a K-wire is placed to intervertebral disc. And with serial dilators, route is dilated. Neuromonitorization and flouroscopy should be used at every step of the procedure. Then, working apparatus is placed and controlled its position. Ideal position should show the center of disc space. Classical discectomy is performed. The contralateral annulus should be excised
completely. After discectomy and preparation of end plates, PEEK cages are implanted.

The main disadvantage of this approach is neuropraxia of lumbar plexus. To overcome this problem, we retract psoas posteriorly instead of using transpsoas approach.\textsuperscript{4,6}

In conclusion, direct lateral or extreme lateral interbody fusion techniques are effective surgical techniques to perform both fusion and deformity correction in levels between T12 and L5 having degenerative scoliosis less than 30 degrees. To perform 2-3 levels with single incision is possible. And also, another positive side of this technique is the shape of cages that sits on the strongest peripheric end plate. It should be in mind that, transpsoas route can be with high rates of lumbar plexus neuropraxia.

References