



## DIRECT LATERAL APPROACH TO THE SPINE

### *OMURGAYA DİREKT LATERAL YAKLAŞIM*

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#### SUMMARY

Extreme or direct lateral interbody fusion is a new surgical approach that allows spinal access from the side, as opposed to standard posterior or anterior intervertebral approaches. With this technique, it is possible to reach all the intervertebral levels up to the mid-thoracic disc levels, except for the L5–S1 disc space. This technique not only provides anterior fusion, but also indirect neural decompression and sagittal and coronal restoration of the vertebral column. When compared with standard anterior and posterior approaches, this technique has the advantages of less surgical trauma, and a better and faster healing process.

**Key words:** Spine surgery, direct lateral approach, fusion, XLIF, DLIF.

**Level of Evidence:** Review article, Level V

#### ÖZET

Ekstrem ya da direkt lateral interbody füzyon, omurgaya klasik posterior ya da anterior yaklaşımın aksine direk yan丹 yaklaşılmasını olanak veren yeni bir cerrahi yaklaşım tekniğidir. Bu yöntemle omurgaya L5-S1 disc aralığı hariç orta torasik seviyelere kadar yaklaşılabilmesi mümkündür. Bu cerrahi yöntemler anterior füzyon sağlanabildiği gibi, indirekt nöral dekompreşyon ve sagital – koronal planda restorasyon da sağlanabilmektedir. Lateral interbody füzyon yaklaşımı, standart anterior ve posterior yaklaşımlarla kıyaslandığında; daha az cerrahi travma içeren ve hastanın daha hızlı iyileşmesine olanak veren bir cerrahi yaklaşımıdır.

**Anahtar Kelimeler:** Omurga cerrahi, direkt lateral yaklaşım, füzyon, XLIF, DLIF.

**Kanıt Düzey:** Derleme, Düzey V

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## INTRODUCTION

Extreme or direct lateral interbody fusion is a new surgical approach that allows spinal access from the side, as opposed to the standard posterior or anterior intervertebral approaches. This technique has been popularized under different names, such as extreme lateral interbody fusion (XLIF) and direct lateral interbody fusion (DLIF). With this technique, it is possible to reach all the intervertebral levels up to the mid-thoracic disc levels. This technique not only provides anterior fusion, but also indirect neural decompression and sagittal and coronal restoration<sup>1-4</sup>.

One of the most important advantages of this method is the absence of muscle injury and the absence of intervention to any bone structure.

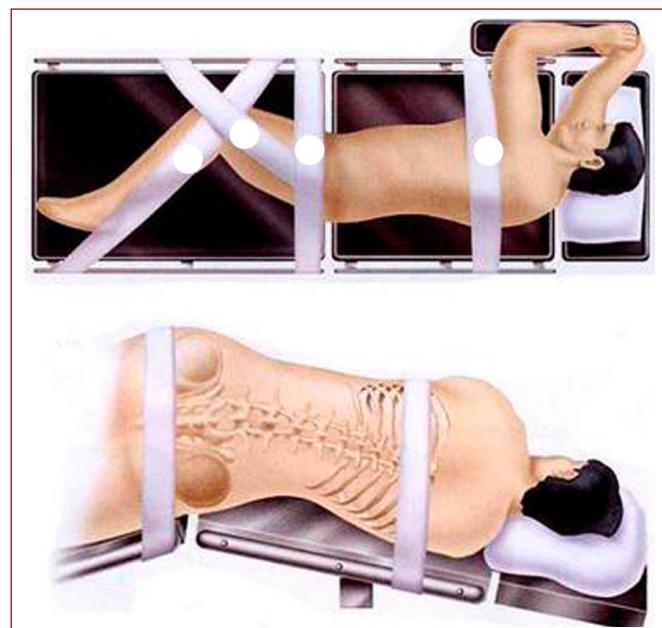
Therefore, less postoperative pain and an earlier return to work is possible. There is no risk of damage to abdominal structures with the direct lateral approach, as there is with a direct anterior approach. When compared with other approaches, minimal muscle dissection and bone processes, and a need for smaller incisions, lead to less blood loss, a shorter operation period and less postoperative pain, making this technique superior to the classic posterior and anterior approaches.

It is not possible to reach the L5-S1 disc space with this surgical approach. This method is contraindicated for more than 30° of lumbar scoliosis, grade 2 spondylolisthesis, and previous abdominal surgeries<sup>2,5,6</sup>.

## THE TECHNIQUE

The procedure is performed under general anesthesia. The patient is stabilized on the operating table in a lateral position and monitored by fluoroscopy. The position of the patient on operation table is quite important, and stabilization should be done with tape so that it doesn't change during surgery. Under

fluoroscopy, the disc spaces and corpus anterior and posterior borders should be marked. The predicted incision region will be determined with these marks. According to the region to be approached, the operation table is bent at the trochanter major region of the patient, providing indirect opening of the disc to be approached. There is no need for this manipulation in the dorsal region (Figure-1,2).



**Figure-1.** The position of the patient on the operating table is quite important, and stabilization should be done with tape so that it doesn't change during surgery.

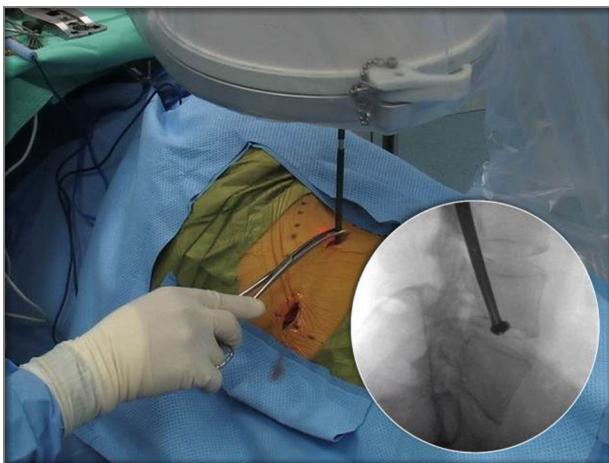
After the necessary marks have been made with fluoroscopy and before the incision is performed for the main approach, according to the technique first defined, another more dorsal incision is performed in the style shown in Figure-4 and is continued in the retroperitoneal fatty tissue by finger dissection after passing the subcutaneous tissue, and the psoas muscle is palpated with a fingertip. Then the main direct lateral incision is performed and a cannula is placed from this incision and directed towards the psoas muscle by sensing the cannula tip with a finger from the other incision (Figure-3,4).



**Figure-2.** Under fluoroscopy, disc spaces and corpus anterior and posterior borders should be marked.



**Figure-3.** It is continued in the retroperitoneal fatty tissue by finger dissection and the psoas muscle is palpated with a fingertip.

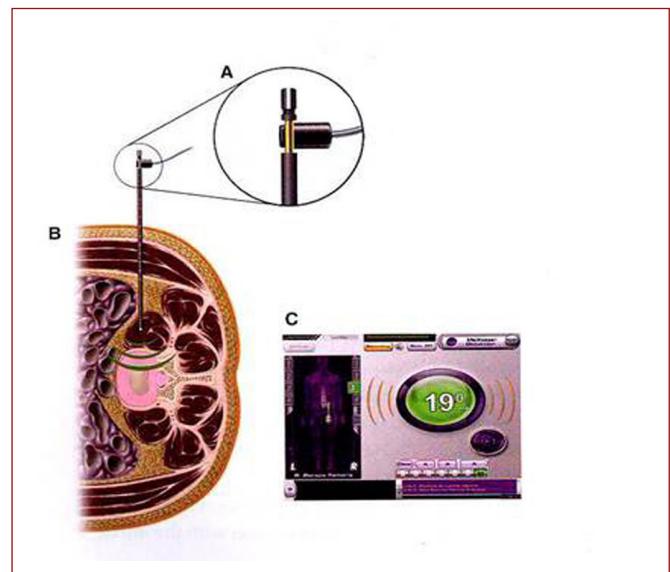


**Figure-4.** A cannula is directed toward the psoas muscle by sensing the cannula tip with a finger from the other incision

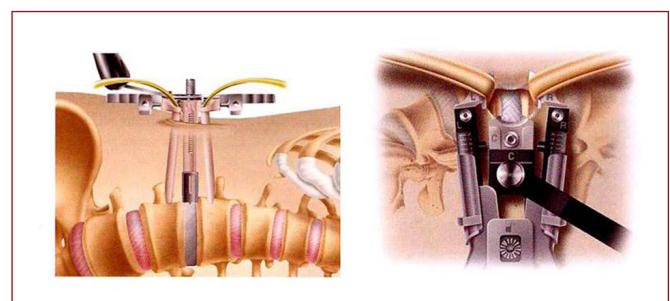
Before placement of the cannula in the target disc space from the inside of the psoas muscle, the relationship with the lumbar plexus should be considered by neuromonitorization, and the cannula is only pushed forward if it is safe (Figure-5). If the results of electrical stimulus show that it is not in a safe position, it should be placed more anteriorly

by considering the cannula passage through the anatomy of the lumbar plexus in the psoas muscle.

After completion of inlet cannula placement, the working apparatus is placed and a proper working environment is provided by distracting this apparatus in the cranio-caudal and antero-posterior axes (Figure-6). At each stage of these processes, after and before every maneuver to be performed in the psoas muscle, it should be checked with neuromonitorization whether the lumbar plexus is affected.



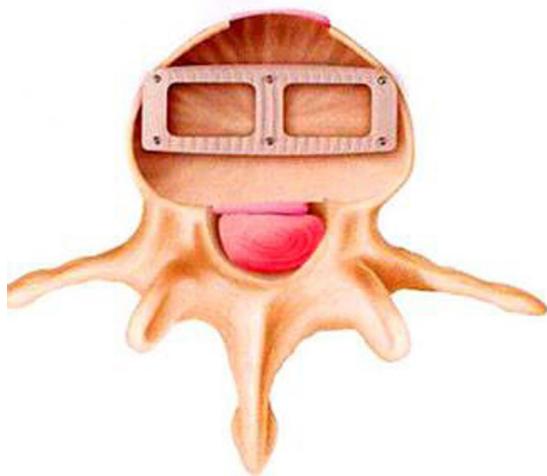
**Figure-5.** The relationship between the cannula and the lumbar plexus should be checked with neuromonitorization and only pushed forward if it is in a safe region.



**Figure-6.** A proper working environment is provided by distracting the working apparatus in the cranio-caudal and antero-posterior axes.

## ADVANTAGES

Other processes after placement of the working apparatus include a classic discectomy process. The disc is removed with specially-designed equipment. One of the most important details of the surgical technique is the obligation for removal of the opposite annulus. Intervertebral cages designed for a lateral approach fit the borders of the end plateaus. This biomechanically provides mechanical support to the strongest region of the bone, and also increases the fusion development period and rate by increasing the area necessary for fusion (Figure-7).



**Figure-7.** One of the most important details in the surgical technique is the obligation for removal of the opposite annulus.

## COMPLICATIONS

The most important complication of the direct lateral approach technique is thigh muscle weakness and paresthesia. In cases where the L4–5 disc space was included in the process, this complaint has been reported at a rate of up to 35%<sup>7,8</sup>. We apply a modified form of the classic technique in our center, to prevent this complication. Without the use of the second dorsal incision, we approach the disc by skimming the psoas muscle instead of transpsoas posteriorly, with one main incision. While we have been using this approach, we have shown success in reducing the thigh muscle weakness and numbness complication rate to 2%.

## CONCLUSION

In conclusion, the lateral interbody fusion approach is a surgical approach that involves less surgical trauma and allows faster patient healing when compared to the standard anterior and posterior approaches.

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