Lateral Prepsoas (Oblique) Approach Nuances

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KEYWORDS

• Lumbar fusion • Interbody fusion • Prepsoas • Lumbar spine

KEY POINTS

- The prepsoas oblique approach to the lumbar spine provides many of the same benefits as the transpsoas lateral approach. This approach may decrease some of the complications seen with traversing the psoas muscle, such as femoral nerve traction.
- The oblique angle of this approach does not allow for perpendicular access to the spine. This can be challenging for surgeon orientation and navigation may help to orient the surgeon.
- This approach typically cannot be performed from the right side due to the position of the vena cava.
- A high-riding iliac crest is not a contraindication to this approach.
- This approach is a valuable tool for the surgeon in treating lumbar degenerative disease, low-grade spondylolisthesis, and coronal scoliosis.

INTRODUCTION

Interbody fusion can be an important tool to address lumbar spine pathology. In patients undergoing lumbar fusion, the addition of an interbody graft is suggested by the American Association of Neurological Surgeons (AANS) and Congress of Neurological Surgeons (CNS) guidelines on lumbar fusion.[1] There are many surgical approaches to interbody grafting of the lumbar spine including anterior, posterior, and lateral. Each approach has unique advantages and disadvantages.

A lateral approach allows for insertion of an interbody graft that spans the apophyseal ring. This approach also lends itself to significant correction of coronal deformity.

Traversing the psoas muscle, however, has been associated with complications, such as muscle trauma, and damage to the lumbar plexus, genitofemoral, iliohypogastric, or ilioinguinal nerves. These complications can lead to sensory or motor changes to the thigh and leg.[2–5] In some patients, these changes can be permanent and debilitating. In addition, access to the L4-5 level can be challenging, and occasionally impossible, if a patient has a high-riding iliac crest.

The prepsoas, retroperitoneal approach, first described by Mayer in 1997,[6] provides an

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alternate lateral approach without traversing the psoas. By accessing the spine anteriorly to the psoas, it offers many of the benefits of the transpsoas approach while eliminating some of the associated risks. The prepsoas approach, also known as the oblique lateral interbody fusion (OLIF), allows access to L5-S1 with the assistance of an approach surgeon. See Fig. 1 for a depiction of the access corridor in the prepsoas approach.

The approach can be done using fluoroscopy or CT-guided navigation. One potential advantage of navigation allows the surgeon to correct for the unfamiliar oblique trajectory and to decrease radiation exposure to the operative team.[7–9]

INDICATIONS/CONTRAINDICATIONS

Indications

Patients who meet the indications for lumbar interbody fusion may be considered for the prepsoas approach. These include 1 to 2 levels of degenerative spondylolisthesis refractory to conservative management. L5-S1 may also be considered for this approach with the assistance of a vascular surgeon given the risk of vascular injury is much greater at this level.

Patients with coronal plane scoliosis with stenosis are also candidates for this approach. The prepsoas approach allows for indirect foraminal decompression by increasing the disk space height.

Contraindications

Due to the location of the vena cava, the risk of vascular injury precludes a right-sided approach for this procedure. Thus, patients with a concave coronal deformity on the right are not suited for a right-sided prepsoas approach. Lack of an operative corridor (as assessed on preoperative imaging showing vascular or visceral structures impeding access) is also a contraindication for this procedure.[10] A space must exist between the psoas and the aorta at the level of interest.

See Table 1 for a summary.

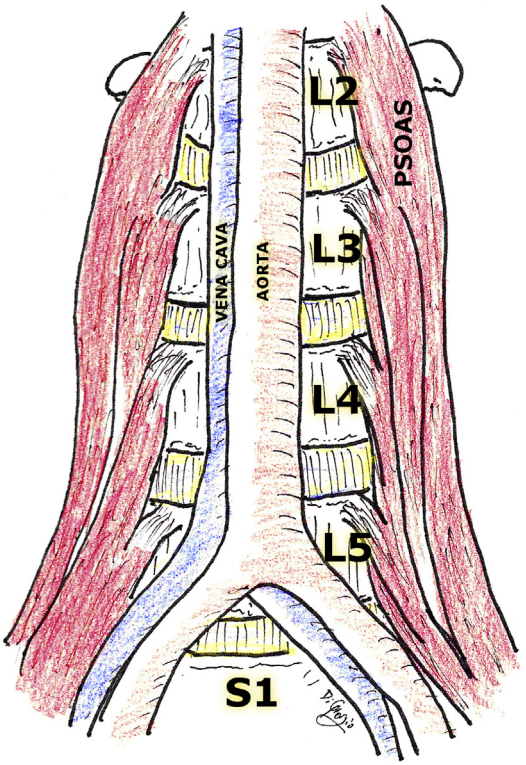

Fig. 1. Artist depiction of the prepsoas corridor. Note the position of the vena cava on the right side. This illustrates why the approach cannot be used from that side. The disk spaces are highlighted in yellow. (*Courtesy of* Anthony M. DiGiorgio, DO, MHA, New Orleans, LA.)

SURGICAL TECHNIQUE/PROCEDURE

Preoperative Planning

- MRI is used to evaluate disks, neural elements and soft tissue. The corridor between the vena cava/iliac veins and the disk space needs to be evaluated.
  - See Table 2 for the average size of that corridor as measured in an anatomic study by Davis and colleagues.[10]
- CT can be used to evaluate bony anatomy or in patients who cannot undergo an MRI.
- Three-ft standing radiographs to evaluate spinopelvic alignment and the position of the iliac crest
- Flexion/extension radiographs to evaluate for abnormal movement

Table 1
Typical indications and contraindications of the prepsoas approach

Indications	Contraindications
1–2 levels of degenerative low-grade spondylolisthesis	Right-sided concave coronal deformity
Coronal plane scoliosis with stenosis	Lack of an operative corridor due to iliac vessel position seen on imaging

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