

ALIF System

Surgical Technique Manual

Step by Step
Guide

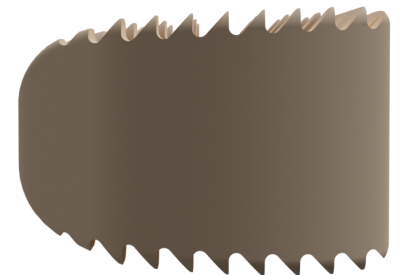
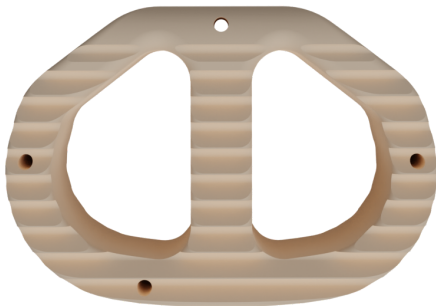
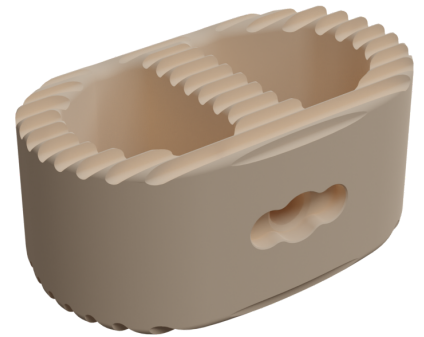
Tray Description

Product Sizes

ALIF Implant Profile

Description:

- Aggressive teeth to resist migration
- Tapered nose, lordosis and rounded edges allows for ease of insertion
- Large central opening for maximum bone graft material
- 3 Delivery Options:
 - Tantalum Beads
 - Tantalum Pins
 - No Markers
- 3 Material Options:
 - PEEK Optima
 - Machined Titanium
 - 3D Printed Titanium* coming April 2021



ALIF Implant Profiles

Width x Depth	Height (2mm)	Lordosis
30 x 22mm	10-20mm	6 & 12 Degrees
34 x 24mm	10-20mm	6 & 12 Degrees
38 x 26mm	10-20mm	6 & 12 Degrees
40 x 27mm	10-20mm	6 & 12 Degrees
42 x 28mm	10-20mm	6 & 12 Degrees

Step 1 : Patient Positioning

Place the patient in a supine position. A bump can be placed in the lower back for increased lordosis of the spine. Expose the midline of the correct inter-vertebral disc. (Figure 1)

Figure 1



a. Use a scalpel to incise the annulus and make a rectangular window to outline the disc for resection. (Figure 4)

Figure 4



Step 2 : Perform Discectomy

A complete discectomy prep set is available. (Figure 2, 3)

Figure 2



Figure 3

b. Separate the disc from the endplate with a Cobb endplate elevator. (Figure 5)

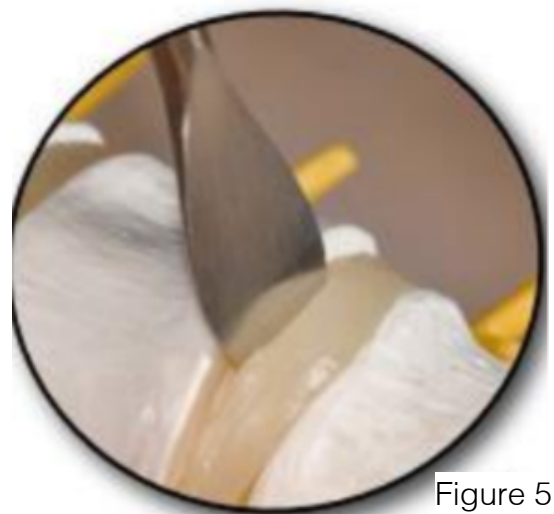


Figure 5

c. Use pituitary rongeurs to remove disc material. (Figure 6)

Figure 6



Figure 8

d. Use ring curettes (Figure 7), cup curettes (Figure 8), and tear drop curettes (Figure 9) to remove further disc and the cartilaginous layer of the endplates.



Figure 7



Figure 9

Step 3 : ALIF Shavers

Use the disc shavers in a controlled manner to distract the disc space (Figure 10, 11) and to clean the lateral portion of the disc. (Figure 12)

Multiple fluted sizes are available. (Figure 13) The shavers are in one piece and do not allow for "play" between the T-handle and the shaft. (Figure 14)

Figure 10



Figure 12

Figure 11

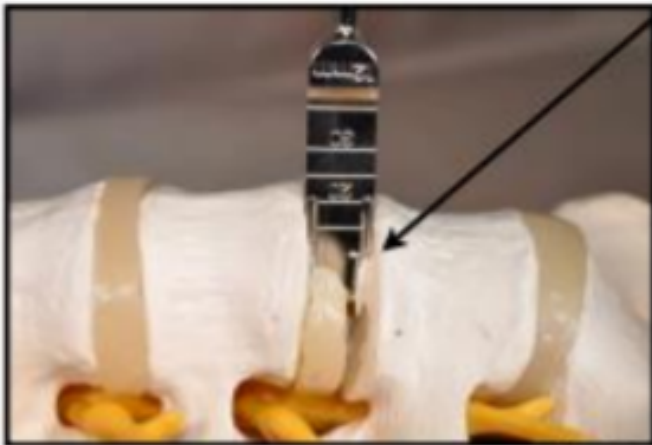


Figure 13

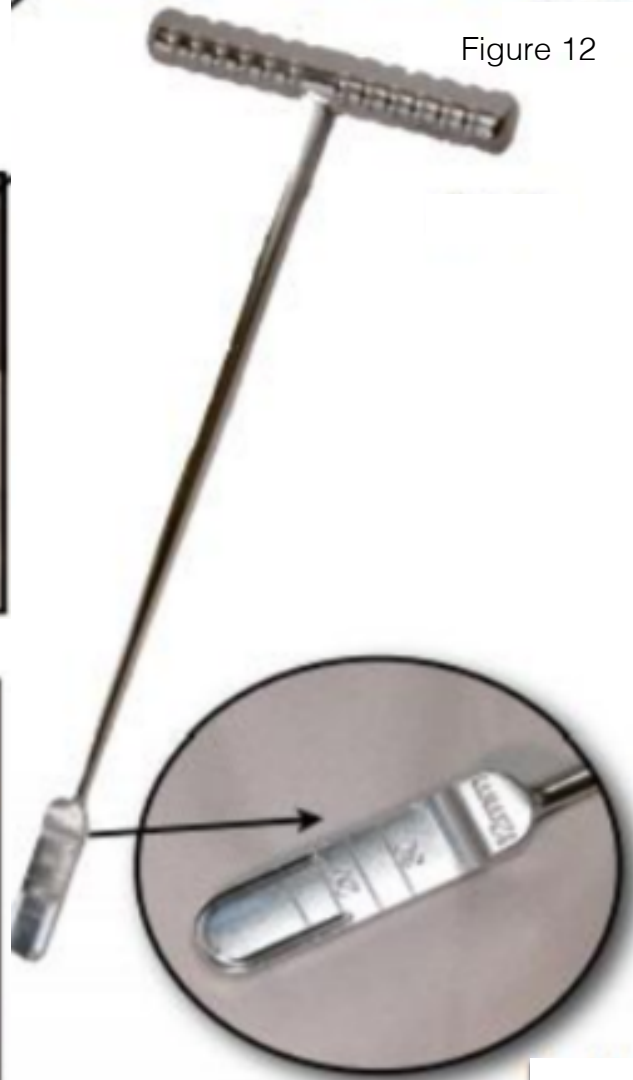


Figure 14

Step 4 : ALIF Spacers & Rasps

Use a trial ALIF spacer to properly reconstitute the desired disc space height. (Figure 15) Correct size is critical for the most secure fit. Fluoroscopy can assist in selecting the proper size of implant. Use the ALIF rasp to prepare bleeding subchondral bone. (Figure 16, 17)

Do not remove excessive subchondral bone; segmental instability could result if too much is removed. ALIF trial spacers & rasps (10-20mm with 6 & 12 degree lordosis) are available. (Figure 18, 19)

Figure 15



Figure 16



Figure 17

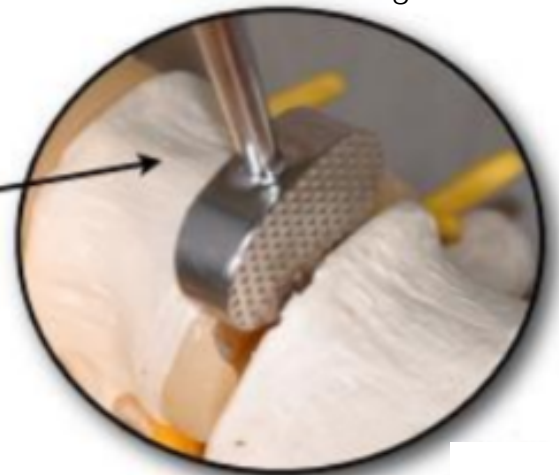


Figure 18

Figure 19

Step 5 : Inserter

Assemble the male portion of the inserter into the female portion of the implant. (Figure 20) The tabs of the inserter resist it from stripping out of the implant, and provides rotational stability while inserting the implant.

Figure 20



Surgical Pearl - "Remove the superior & inferior osteophytes with a 5mm straight pituitary or a 4mm kerrison (Figure 24) in order to open up the orifice of the disc space. This allows the bullet nose of the implant to easily insert into the disc space and for the appropriate size implant to be inserted. The implant will self-distract when it is being impacted."

Figure 24



Step 6: Packing the Final Implant

After the correct size has been determined, use the ALIF Graft Packing Block to fill the implant with the desired bone or bone replacement material. (Figure 21, 22) Utilize a bone tamp to fill the chambers. (Figure 23)

Figure 23

Figure 21



Figure 22



Step 7 : Implant Positioning

Use the implant impactor for the final positioning. Obtain AP (Figure 25, 26, 27) & Lateral (Figure 28, 29, 30) x-rays. Make sure that the implant is not too far posterior or lateral. The implant should not impinge on any neural structure.



Figure 28



Figure 29



Figure 30

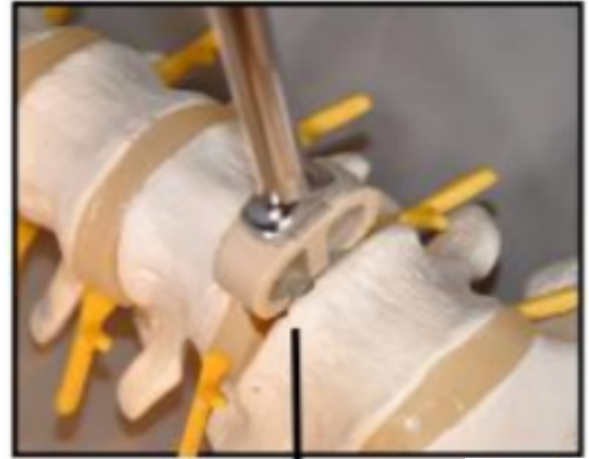


Figure 25



Figure 26

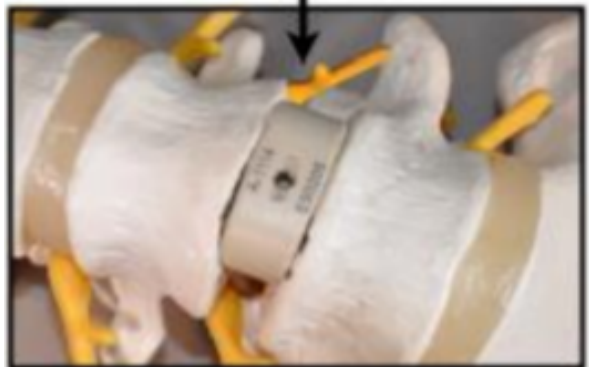
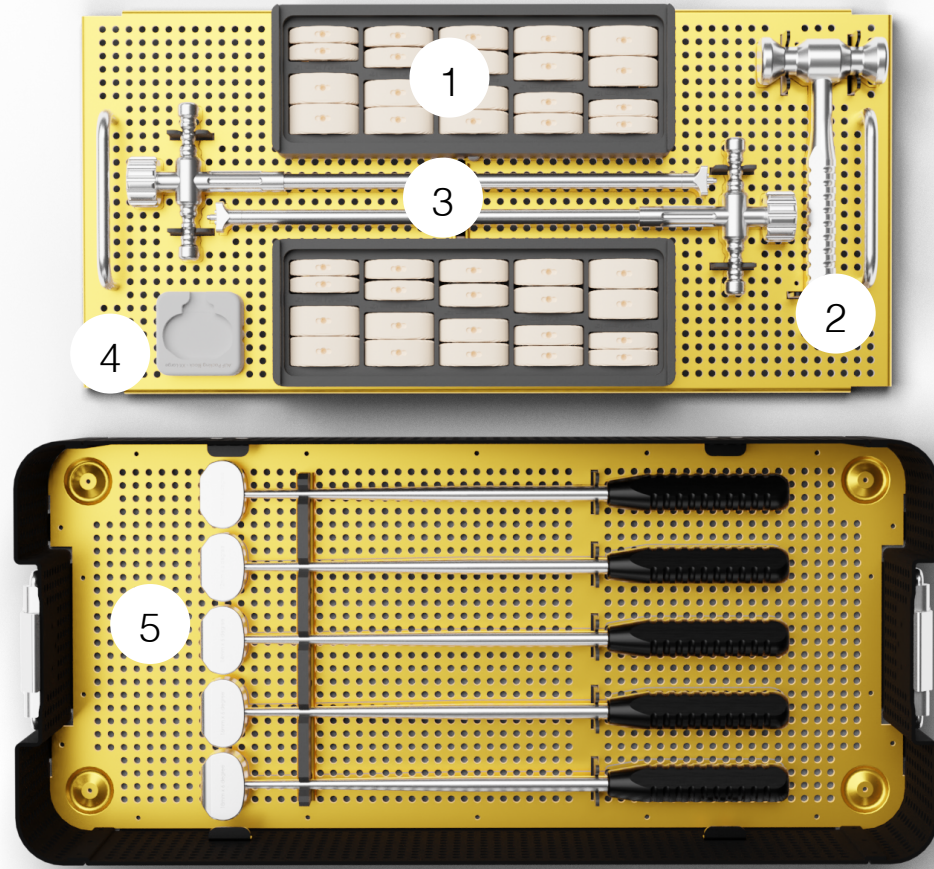


Figure 27

ALIF System Tray



LAYOUT:

1. Implant Caddy
2. Mallet
3. T-Handle Insertter
4. Graft Packing Block
5. Sizers

ALIF System

Product Sizes

REV A

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Width and Depth	Height (2 mm)	Lordosis
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Eminent Spine LLC Lumbar Interbody Fusion
Systems:
ALIF, LLIF, OLIF, PLIF, TLIF and TPLIF



Eminent Spine LLC
2004 Ventura Drive STE 100
Plano, TX 75093

System Contents:



Non-Sterile Implants – Single Use Only
Non-Sterile Instruments - Reusable

Caution: Federal (U.S.A.) law restricts this device to sale by or on the order of a physician. Carefully read all instructions and be familiar with the surgical technique(s) prior to using this product.

DESCRIPTION and INTENDED USE:

The Eminent Spine LLC Lumbar Interbody Fusion Systems (ALIF, LLIF, OLIF, PLIF, TLIF and TPLIF) are comprised of various sizes and configurations to accommodate individual patient anatomy. The configurations are designed to provide the surgeon with different surgical approach options. The ALIF implants are cylinder shaped blocks, which are available in a parallel or lordotic configuration of various heights. The hollow cylinders allow for placement of bone graft and facilitate fusion. The superior and inferior surfaces of the devices have a pattern of teeth to provide increased stability and inhibit movement of the implants. ALIF is intended to be implanted singularly via an anterior approach.

The LLIF implants are rectangular shaped blocks with bowed sides in a parallel configuration of various heights. Large bone graft windows are located through the body of the device to allow for placement of bone graft and facilitate fusion. The superior and inferior surfaces of the devices have a pattern of teeth to provide increased stability and inhibit movement of the implants. LLIF implants are designed to be implanted singularly via a lateral approach.

The OLIF implants are rectangular shaped blocks with parallel sides, tapered bullet tip cannulated nose for insertion and offered only in a parallel configuration of various lengths and heights. Large bone graft windows are located through the body of the device to allow for placement of bone graft and facilitate fusion. The superior and inferior surfaces of the devices have a pattern of teeth to provide increased stability and inhibit movement of the implants. OLIF implants are designed to be implanted singularly via a transforaminal approach.

The PLIF implant consists of conical shaped blocks in a parallel configuration of various heights. Large bone graft windows are located through the body of the device to allow for placement of bone graft and facilitate fusion. The superior and inferior surfaces of the devices have a pattern of teeth to provide increased stability and inhibit movement of the implants. PLIF may be implanted singularly or in pairs via a posterior approach.

The TLIF implant consists of banana shaped blocks in a parallel configuration of various heights. Large bone graft windows are located through the body of the device to allow for placement of bone graft and facilitate fusion. The superior and inferior surfaces of the devices have a pattern of teeth to provide increased stability and inhibit movement of the implants. TLIF may be implanted singularly via a transforaminal approach.

The TPLIF implants are rectangular shaped blocks with parallel sides, tapered bullet tip nose for insertion and offered in a parallel and lordotic configuration of various lengths and heights. Large bone graft windows are located through the body of the device to allow for placement of bone graft and facilitate fusion. The superior and inferior surfaces of the devices have a diagonal pattern of teeth to provide increased stability and inhibit movement of the implants. TPLIF implants are designed to be implanted singularly via an oblique approach.

INDICATIONS:

When used as an intervertebral body fusion device, the implants (ALIF, LLIF, OLIF, PLIF, TLIF and TPLIF) are indicated for intervertebral body fusion of the lumbar spine, from L2 to S1, in skeletally mature patients who have had six months of non-operative treatment. The device is intended for use at either one level or two contiguous levels for the treatment of degenerative disc disease (DDD) with up to Grade I spondylolisthesis. DDD is defined as back pain of discogenic origin with degeneration of the disc confirmed by history and radiographic studies. The device system is designed for use with supplemental fixation and autograft to facilitate fusion.

When used as a vertebral body replacement device, the implants (ALIF, LLIF, OLIF, PLIF, TLIF and TPLIF) are indicated for use to replace a vertebral body that has been resected or excised (i.e. partial or total vertebrectomy) due to tumor or trauma/fracture. The implant is intended for use in the thoracolumbar spine (from T1 to L5) and is intended for use with supplemental internal fixation and autograft or allograft bone. These devices are designed to restore the biomechanical integrity of the anterior, middle and posterior spinal column even in the absence of fusion for a prolonged period.

CONTRAINDICATIONS:

1. Active systemic infection or infections localized to the site of the proposed implantation are contraindications to implantation.
2. Known sensitivity to PEEK or Titanium alloy 6Al-4V material.
3. Severe osteoporosis is a relative contraindication because it may result in implant subsidence and loss of fixation.
4. Any condition that significantly affects the likelihood of fusion may be a relative contraindication (e.g. cancer, diabetes, osteomalacia, heavy smoker, morbid obesity) and the surgeon must evaluate the relative risks and benefits individually with each patient.
5. Other relative contraindication may include mental illness, drug abuse or alcoholism as these may cause the patient to be noncompliant with post-operative guidance (e.g. bracing and physical therapy).
6. Prior fusion at the levels to be treated.
7. Any condition not described in the indications for use.

MATERIALS:

Eminent Spine LLC implants are manufactured from either PEEK (Optima LT1 or VESTAKEEP i4R) with Tantalum pins or entirely of Titanium alloy 6Al-4V with no pins. Surgical instruments provided with the implants are manufactured from stainless steel.

CLEANING of INSTRUMENTS and IMPLANTS:

1. Clean all instruments and implants prior to use, and as soon as possible after use. Do not allow blood or debris to dry on the instruments that were used in surgery. If cleaning must be delayed, place instruments that were used in surgery in a covered container with neutral pH detergent or enzymatic solution to delay drying.
2. Loosen and/or disassemble instruments with removable parts. Remove implants (in caddies) from set cases.
3. Immerse the instruments and implants in a neutral pH detergent or enzymatic solution prepared in accordance with the manufacturer's instructions and soak for 15 minutes.
4. Use a soft-bristle brush and a pipe cleaner to gently clean each instrument and implant (particular attention shall be given to cannulations, holes, and other hard-to-clean areas) until all visible soil has been removed.
5. Rinse the instruments and implants in running water for at least 3 minutes. Thoroughly flush cannulations, holes, and other hard to clean areas.
6. After manual cleaning has been completed, load the parts into a suitable automated cleaner and follow the manufacturer's recommended practices. Use only neutral pH enzymatic cleaners and detergents. Avoid excessively acidic or alkaline solutions.

INSPECTION:

1. Carefully inspect each instrument to ensure all visible blood and soil has been removed.
2. Inspect instruments and instrument cases for damage. Check action of moving parts to ensure proper operation, and ensure disassembled instruments readily assemble with mating components.
3. If damage or wear is noted that may compromise the proper function of the instrument or instrument case, do not use and contact customer service or your Eminent Spine LLC representative for a replacement.
4. If corrosion is noted, do not use and contact customer service or your Eminent Spine LLC representative for a replacement.

STERILIZATION:

All implants and instruments are supplied visually clean and nonsterile and must be sterilized prior to use. The following sterilization cycle has been validated:

Method: Steam

Cycle: Pre-Vacuum

Temperature: 270°F (132°C)

Exposure Time: 4 minutes

Number of pulses: 4

Dry time: 30 minutes

Implants and instruments should be positioned to allow the steam to come into contact with all surfaces. All jointed instruments should be in the open or unlocked position with ratchets not engaged. Instruments composed of more than one part or with sliding pieces or removable parts should be disassembled. Remove all packaging material prior to sterilization. Only sterile implants and instruments should be used in surgery. Cases (including instruments and implants) used in surgery should be cleaned and re-sterilized after surgery. Implants should not be used as templates in surgery. If an unused implant entered the surgical wound it should be cleaned and re-sterilized after surgery.

- Please consider your sterilization equipment manufacturer's written instructions for the specific sterilizer and load configuration used.
- Follow current AORN "Recommended Practices for Sterilization in Perioperative Practice Settings" and ANSI/AAMI ST79: A42013 – Comprehensive guide to steam sterilization and sterility assurance in health care facilities.
- Flash sterilization is not recommended, but if used, should only be performed according to requirements of ANSI/AAMI ST79:A4 2013 – Comprehensive guide to steam sterilization and sterility assurance in health care facilities.
- For terminally sterilized devices, only FDA-cleared sterilization barriers (e.g., wraps, pouches, containers) should be used for packaging.

POSTOPERATIVE MOBILIZATION:

The surgeon should advise the patient to be careful not to place significant loads on the spine for the first three months after surgery. The surgeon may advise the patient limit their activity or wear a brace. Careful management of the load will enable the fusion mass to heal and reduce the likelihood of non-union. Radiographic confirmation of a mature fusion mass may be used as a guide in the lifting of these restrictions.

WARNINGS:

Following are specific warnings, precautions, and adverse effects that should be understood by the surgeon and explained to the patient. These warnings do not include all adverse effects that can occur with surgery in general, but are important considerations particular to spinal fixation devices. General surgical risks should be explained to the patient prior to surgery.

1. Patients with prior spinal surgery at the levels to be treated may have different clinical outcomes compared to those without a previous surgery.

2. **PATIENT SELECTION.** In selecting patients for internal fixation devices, the following factors can be of extreme importance to the eventual success of the procedure:

a) A patient may have multiple pain generators due to advanced degeneration of the spine (e.g. intervertebral disc, facets or bony stenosis). These conditions may be present at the index level or adjacent levels. Careful review of the clinical record, including radiographic studies and applicable diagnostic tests, should be performed to make the appropriate diagnosis. Concomitant conditions may reduce the effectiveness of the surgery and this should be discussed with the patient.

- b) The patient's weight. An overweight or obese patient can produce loads on the device that can lead to failure of the implant or subsidence.
- c) The patient's occupation or activity. If the patient is involved in an occupation or activity that includes substantial walking, running, lifting or muscle strain, the resultant forces can cause failure of the implant or subsidence.
- d) Patients that are non-compliant with postoperative guidance may place too much stress on the implant in the early postoperative period and compromise the maturing fusion mass.
- e) Smoking. Patients who smoke have been observed to experience higher rates of pseudarthrosis following surgical procedures where bone graft is used.
- f) Foreign body sensitivity. Where material sensitivity is suspected, appropriate tests should be made prior to material selection or implantation.

PRECAUTIONS:

1. THE IMPLANTATION OF SPINAL FIXATION DEVICES SHOULD BE PERFORMED ONLY BY EXPERIENCED SURGEONS WITH SPECIFIC TRAINING IN THE USE OF SUCH DEVICES. THIS IS A TECHNICALLY DEMANDING PROCEDURE PRESENTING A RISK OF SERIOUS INJURY TO THE PATIENT.
2. PROPER SIZING OF THE IMPLANTS IS IMPORTANT. The surgeon should use trials to determine the appropriate implant to use. The implant should be tall enough to provide segmental distraction and stability. The implant should be wide enough to maintain contact with the cortical rim of the vertebral body else the risk of subsidence may increase.
3. SURGICAL IMPLANTS MUST NEVER BE REUSED. An explanted spinal fixation device should never be re-implanted. Even though the device may appear undamaged, it may have small defects and internal stress patterns that may lead to early breakage.
4. CORRECT HANDLING OF THE IMPLANT IS EXTREMELY IMPORTANT. The operating surgeon should avoid any notching or scratching of the device during surgery. Alterations will produce defects in surface finish and internal stresses which may become the focal point for eventual breakage of the implant.
5. ADEQUATELY INSTRUCT THE PATIENT. Postoperative care and the patient's ability and willingness to follow instructions are one of the most important aspects of successful bone healing. The patient must be made aware of the body's response to the implant and how the fusion mass is expected to develop. A patient that is non-compliant with post-operative guidance is particularly at risk during the early postoperative period.
6. MAGNETIC RESONANCE ENVIRONMENT. The Eminent Spine LLC Interbody Fusion System has not been evaluated for safety and compatibility in the MR environment. The Eminent Spine LLC Interbody Fusion System has not been tested for heating or migration in the MR environment.

POSSIBLE ADVERSE EFFECTS:

1. Non-union, delayed union.
2. Bending or fracture of implant.
3. Anterior or posterior migration of the implant.
4. Allergic reaction to a foreign body.
5. Infection.
6. Decrease in bone density due to stress shielding.
7. Pain, discomfort, or abnormal sensations due to the presence of the device.
8. Loss of proper spinal curvature, correction height and/or reduction.
9. Vascular and/or nerve damage due to surgical trauma or presence of the device. Neurological difficulties including bowel and/or bladder dysfunction, impotence, retrograde ejaculation, and paresthesia.
10. Paralysis.
11. Death.
12. Erosion of blood vessels due to the proximity of the device, leading to hemorrhage and/or death.

LIMITED WARRANTY:

Eminent Spine LLC products are sold with a limited warranty to the original purchaser against defects in workmanship and materials. Any other express or implied warranties, including warranties of merchantability or fitness, are hereby disclaimed. If more than 2 years have elapsed between the date of issue/revision of this document, and the date of patient consultation, contact Eminent Spine LLC for current information.



Eminent Spine LLC
2004 Ventura Drive STE 100
Plano, TX 75093

For product information or questions pertaining to sales and service, please contact your local sales representative or Eminent Spine LLC customer service.

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