LUMBAR ARTIFICIAL DISC

Recommendations

- It is very important to carefully position the patient to get a straight AP and ML view of the affected level under fluoroscopy for an accurate assessment of implant position.

- During pre-operative planning use a scanner to measure the size of the inferior vertebral endplate at the affected level in order to approximate the corresponding implant size. This AP dimension of the vertebral endplate will be confirmed during surgery by direct measurement with the Depth Gauge.

- To get the most accurate depth measurement, completely remove all anterior and posterior osteophytes.

- Surgical approach: retroperitoneal or transperitoneal

- Exposed disc: by special retractor or Steinman pins and flexible blades.
Locate the center

**Step 1**

**Insertion of the centering pin**
- Assembly of the centering pin: Screw the pin holder to the extended centering pin, then slide the pin sleeve holder over the assembled shaft to create a stop on the vertebra during impaction.
- Locate the mid-point of the adjacent vertebra superior to the affected disc.
- Mallet the centering pin in, until the safety stop engages.

*Note: Take care to place the pin at least 8 mm from the inferior vertebral endplate to avoid any collision with other instruments.*

**Verify centering pin location**
- Verification of the pin’s midline placement with fluoroscopy.
- Removal of the pin holder and the pin sleeve holder once midline position is confirmed.

**Width measurement, discectomy and opening the intersomatic space**

**Step 2**

**Width measurement**
- Selection of a width gauge (T4, T6 ou T8).
- The width gauge, centered on the centering pin helps ensure a symmetrical dissection and then to select the maximum available prosthesis width.
Discectomy and opening the intersomatic space

**Step 3**

### Discectomy

- Disc incision with a scalpel as in a traditional ALIF procedure.
- Use of a *end plate rugine* to detach the disc from the superior and inferior vertebral endplates.
- Begin the resection with the rongeur and then the *Mobidisc rasp* for removal of nearly all of the disc tissue corresponding to passage of the prosthesis.

*Note: The width gauge can be used to verify that disc resection is satisfactory on each side.*

**Step 4**

### Opening the intersomatic space

- Assembly of the *distraction forceps* to the *unilateral distractor tips*.
- Placement of the distractor on one side of the intervertebral space for desired distraction and maintaining of the position with the locking knob.
- Complete the discectomy on the exposed side.*
  Take care to remove any anterior or posterior osteophytes and prepare the inferior and superior endplates with the *Mobidisc Rasp*.
- The discectomy continues like this, alternately placing the distractor right and left until the discectomy is completed.

*Note: Continue the posterior discectomy until the posterior longitudinal ligament is exposed.*
Depth measurement and prosthesis depth selection

Step 5

Depth measurement and prosthesis depth selection

- Keeping the unilateral distractor in place, place the hook of the depth gauge just over the posterior edge of the vertebra.**

- To get the most accurate reading:
  - Completely clean the anterior edge of the vertebral endplate (osteophytes and fibrous tissues) so as not to falsify the measurement.
  - Take care to measure the most central part of the vertebral body.

- Once the measurement is taken, turn over the depth gauge to view in the windows the antero-posterior measurement of the vertebral body and the corresponding prosthesis depth size.*
  - T4/T6 small, medium, or large
  - T8 small, medium, or large

Important: If the measurement falls between 2 depth sizes, choose the smaller of the two.

*Note: The width (T4/T6/T8) was determined by the width gauge in Step 2. The S, M and L indicate the depth in 3mm increments.

**Note: While taking a direct measurement with the depth gauge, a 4mm sizing variation larger than the pre-operative measurement performed under fluoroscopy can occur due to the presence of soft tissues.
**Height restoration**

**Step 6**

**Parallel distraction**

- Replace the unilateral distractor with the **bilateral distractor**. Insert the distractor into the intersomatic space until it is flush against the anterior face of the vertebral body, distract, and secure this position with the locking knob. This bilateral distraction makes it possible to complete the disc resection and preparation of the posterior space until the posterior longitudinal ligament is exposed.

- Insert the 10mm **parallel distractor** between the blades of the bilateral distractor and with successive impactions distract the disc space posteriorly to obtain a parallel opening of the inter-vertebral space without exceeding the height of the adjacent discs.

**Note:** If needed, a 12mm **parallel distractor can be used.**

**Note:** Stop insertion of the parallel distractor when the anterior faces of the distraction forceps blades and the parallel distractor are perfectly aligned.
Height selection

- Maintain the distraction with either the unilateral or bilateral distraction tips for positioning the different height measurers in the axis of the centering pin up to the posterior edges of the vertebral bodies.

- Start with the 10mm Height Measurer to determine the total implant height required to obtain stability (carry this out once the distraction has been released). The total height of the prosthesis must be compatible with the heights of the adjacent discs in order to restore natural physiological mobility.

- Using the sizing chart, determine the mobile insert height that corresponds to the inferior plate that was selected (0°, 5° or 10°).

Note: The height measurer must be centered in relation to the centering pin.
Guide selection and positioning

Step 8

Guide selection

Select the guide corresponding to the size of the prosthesis chosen (according to the width, depth and height determined in the preceding steps).

Guide Positioning

Important:

Before guide insertion:
- Check width to ensure that nothing will interfere with its insertion.
- To avoid contact between the guide holder and the height measurer, use a short height measurer or, if using the long measurer angle it in relation to the sagittal plane.
- Centering on the pin, use the guide holder to position the guide.*
  The guide must rest flush against the anterior vertebral body.
- Note: To facilitate insertion of the guide (notably if the superior endplate is very concave in the frontal plane) a height measurer superior to the guide height can be used.

Take care that the guide remains parallel to the axis of the disc in the sagittal plane, perfectly centered in the frontal plane and without rotation.

- Remove the height measurer and then the guide holder.
- Under lateral and AP fluoroscopy, confirm that the guide is centered (with the usual radiological landmarks (pedicles, spinous processes)).
Preparing the keel channels

Step 9

Preparing the keel channels

- Choose the appropriate keel cutter corresponding to the total height of the prosthesis.
- Insert the keel cutter in the channel of the guide. With successive impactions groove the vertebral endplates until the keel cutter’s safety stop engages the guide.
- Remove the keel cutter using the Mobidisc slap hammer avoiding any backward movement of the guide.
- Check that no bony remnants are likely to migrate into the canal.

Note: Under fluoroscopy, make sure that the keel cutter is parallel to the vertebral endplates.
Prosthesis assembly

Step 10

**Prosthesis assembly**

- Position one of the plates (superior or inferior) in the corresponding receptacle on the top of the assembly block with the hydroxyapatite coated side up. Use the assembly block keel groove to correctly position the keel.

- Repeat keel assembly with the second plate and keel.

- Insertion and clipping of the mobile insert into the inferior plate.

**Assembly of the prosthesis in the assembly block**

Insert the inferior plate with the insert first and then position the superior plate on the mobile insert.

*Note: Be sure to orient the anterior face of the prosthesis towards the front of the assembly block.*
Prosthesis holder and insertion

Step 11

Prosthesis holder

- Taking hold of the assembled implant with the implant holder.
- The blades of the implant holder must be parallel to the prosthesis plates.

Note: Make sure to position the implant holder flush against the keels.

Step 12

Insertion

Insertion of the prosthesis into the guide

Important: Carefully check the orientation of the prosthesis for insertion by ensuring that the inferior plate is at the bottom and that the champfers are directed towards the back.

- Release the implant and then remove the implant holder.
- The implant drops through the guide to come to rest at the anterior face of the vertebral bodies.
Prosthesis positioning

Step 13

Prosthesis positioning

- Select the prosthesis impactor corresponding to the height of the prosthesis and confirm the depth stop adjustment is set at zero.

- Position the prosthesis in the intersomatic space with the prosthesis impactor until the safety stop has engaged the guide. Take a lateral fluoroscopic image to assess prosthesis position.

Note: While under lateral fluoroscopy, millimetric adjustment of the prosthesis impactor permits safe positioning of the prosthesis as close as possible to the posterior wall.

- After doing a final check on the prosthesis' position, the impactor can be removed.
Guide removal and antero-posterior adjustment

Step 14

Guide removal

- Once the prosthesis is correctly positioned, remove the guide using the guide holder and the Mobidisc slap hammer.

Step 15

Antero-posterior adjustment

Case 1:
If one of the prosthetic plates is positioned too anterior, use the secondary impactor or the angulated impactor to adjust its position.

Case 2:
If one of the prosthetic plates is positioned too posterior, use the plate extractor and the Mobidisc slap hammer to adjust its position.

Note: It is imperative to do these adjustments under fluoroscopy.
Step 16

**Centering pin removal**

Remove the centering pin from the vertebral body using the pin holder, the pin sleeve holder and the Mobidisc slap hammer.

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**Fluoroscopic control of the prosthesis’ final position**

![Fluoroscopic control image]
Mobidisc® (Mobi-L™)

LUMBAR ARTIFICIAL DISC

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