



**VEO<sup>®</sup>** Surgical Technique  
Lateral Access Interbody Fusion System

## Step 1: Patient Positioning & Operating Room Setup

- Place the patient in a lateral decubitus position on a radiolucent breaking table.
- Stabilize and secure the patient to the table (Fig. 1) with surgical tape in the following places:
  - A. Just below the iliac crest
  - B. Over the thoracic region
  - C. From the iliac crest to the knee, then secured to the table
  - D. From the table to the knee, past the ankle, then secured back to the table

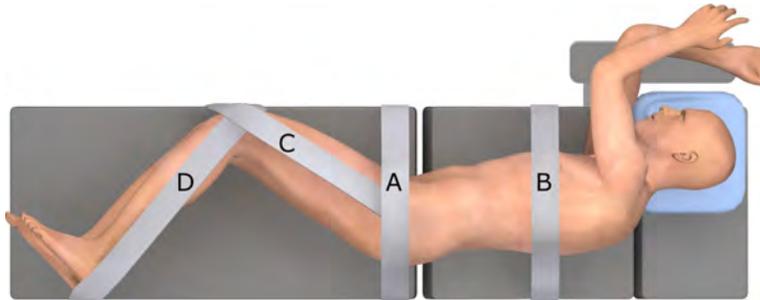


Fig. 1

**NOTE:** When targeting the L1/L2 or L2/L3 disc space, the table break should be placed above the iliac crest. When targeting the L3/L4 or L4/L5, the table break should be placed at the iliac crest.

## Step 2: Anatomy Identification & Marking

- Obtain true A/P and lateral images of the targeted disc (Fig 2 & 3).



Fig. 2



Fig. 3

**NOTE:** Adjust the patient's position, taking into account spinal pathology and spinal positioning, so that lateral images can be taken with the c-arm positioned at approximately 90°. The exact position of the c-arm should be noted for subsequent imaging.

- Locate the middle of the targeted disc space and draw an anterior-to-posterior line on the skin (Fig. 4) to represent the centerline of the disc space.
- Add hash marks to the anterior-to-posterior line to indicate the front, back, and midline of the disc space.

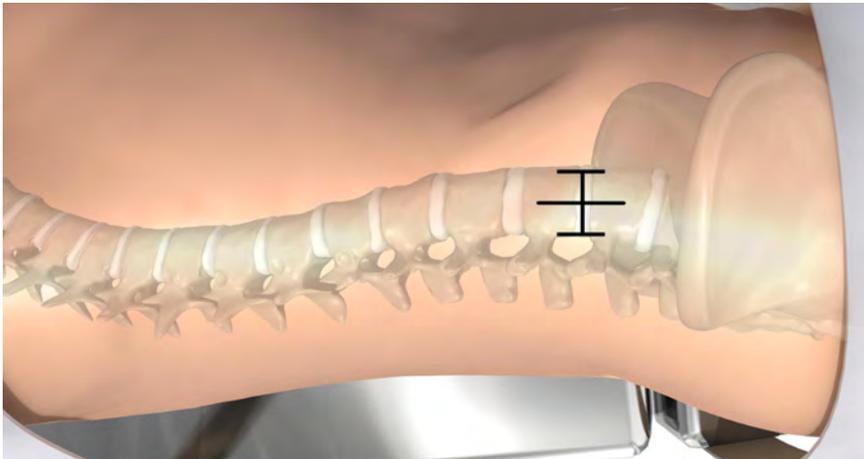


Fig. 4

- Fixate the radial table clamp (Fig. 5) to the bed rail on the anterior side of the patient prior to draping.
- Drape and prepare the surgical site in typical fashion.
- Attach the table mounted retractor arm (Fig. 6) to the table after the patient is draped.



Fig. 5



Fig. 6

### Step 3: Access

- Make a 35-40mm anterior-to-posterior incision over the center marking of the disc space.
- Using finger or blunt dissection, open the incision down to the fascia over the external oblique muscles (Fig. 7).
- Incise fascia in line with the muscle fibers.
- Continue blunt or finger dissection through the muscle layers in the retroperitoneal space to the psoas muscle.



Fig. 7

#### NOTE:

A transverse, vertical, or oblique skin incision can be made depending on preference.

- Dissect carefully to avoid perforation of the peritoneum.
- If possible, palpate the psoas muscle with finger.

### Step 4: Dilation

- Insert dilator 1 into the incision and advance it down to the surface of the psoas muscle.
- Dilate the soft tissue with dilator 2 by placing it over dilator 1 (Fig. 8) and working it down the incision to the surface of the psoas muscle.
- Confirm placement of the tip of the dilators with a lateral and A/P fluoroscopic image, if desired.
- Use the three markings (100mm, 120mm, and 140mm) on the side of dilator 2 to select the appropriate length cannula.
- The value of the marking (100mm, 120mm, and 140mm) closest to the skin corresponds to the length of the cannula that should be selected.

#### NOTE:

- Dilator 2 should rest on the surface of the psoas muscle.
- The flat side of dilator 2 should be orientated to face cephalad/caudal.
- Dilator 1 & 2 can be snap-fitted together to create one solid dilator.



Fig. 8

## Step 5: Cannula Insertion

- Insert the selected cannula over dilator 2 and advance it down to the psoas muscle with the connecting arm pointing toward the table mounted retractor arm (Fig. 9).
- Secure the cannula with the table mounted retractor arm.
- Remove dilators 1 & 2 from the cannula.
- Take a lateral fluoroscopic image to confirm placement of the cannula.
- The cannula should be centered over the targeted disc space. If it is not centered, adjust the cannula so that it is directly over the disc space.
- Plug the fiber optic cable into a light source (see manufacturers instructions for light source).
- Attach the stadium mount light to the fiber optic cable.
- Attach the stadium mount light to the cannula (Fig. 10) and visualize the surface of the psoas muscle.
- While visualizing the psoas muscle and associated nerves, the surgeon may opt to utilize the neuroprobe (see manufacturers instructions).

### NOTE:

- The top of the cannula offers four separate places to attach the stadium mount light.
- A Frazier Suction Tube is provided in the VEO access tray.
- Neuromonitoring is not required to be performed with the VEO procedure, but can be done so under the discretion of the surgeon. Neuromonitoring instruments and equipment must be used within the confines of their respective labeling.



Fig. 9



Fig. 10

- Using direct visualization, gently split the psoas muscle using the penfield dissector or cobb dissector (Fig. 11) identifying and protecting nerves as needed.
- Markings on the cobb and penfield dissectors may be used to measure the depth to the disc space in order to choose the appropriate psoas retractor blades (Fig. 12).
- Gently insert a 90° nerve retractor (Fig. 13) alongside the dissector to maintain the psoas muscle split.
- Insert the K-wire through the split 5-10mm into the disc space.
- Remove the nerve retractor from the incision.
- Take a lateral image to verify that the K-wire is in the center (anterior to posterior) of the disc space.
- Take an A/P fluoroscopic image and verify the cannula is centered over the K-wire.
- Carefully remove the K-wire.
- If needed, loosen the table mounted retractor arm and adjust the cannula.



Fig. 11



Fig. 12

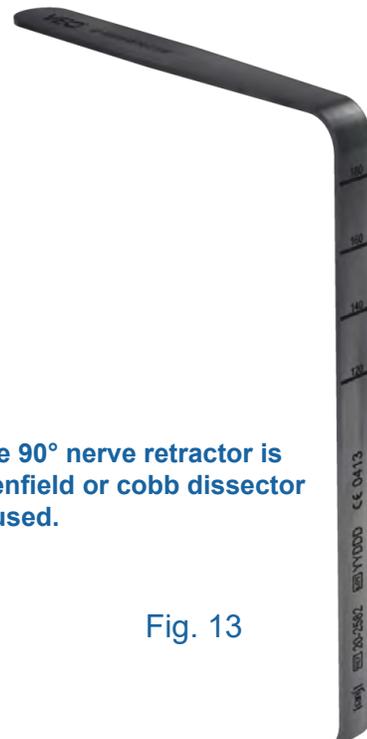


Fig. 13

**NOTE:**

- The use of the 90° nerve retractor is optional. A penfield or cobb dissector may also be used.



Fig. 14

### Step 6: Psoas Blade Insertion

- Insert a 90° nerve retractor through the split and retract the psoas muscle posteriorly (Fig. 14).
- Choose the length of the psoas retractor blade based on graduations from the 90° nerve retractor or Cobb/Penfield, and attach the handle to the corresponding psoas retractor blade by sliding it firmly into the slot on the blade (Fig. 15).
- Insert the first psoas retractor blade through the split and retract the psoas muscle anteriorly.
- While the psoas muscle is retracted, maintain contact with the annulus and vertebral body.
- Insert the inner half sleeve into the cannula to secure the psoas retractor blade (Fig. 16).



Fig. 15



Fig. 16



Fig. 17

- Maintain gentle downward pressure on the psoas retractor blade and remove the 90° nerve retractor (Fig. 18).
- Use a second psoas retractor blade to retract the psoas posteriorly while maintaining the tip of the retractor in contact with the annulus (Fig. 19).
- Insert a second inner half sleeve into the cannula to secure the psoas retractor blade (Fig. 20).
- Take an A/P and a lateral fluoroscopic image to confirm psoas retractor blade placement.
- Remove the blade handles (Fig. 21).



Fig. 18



Fig. 19



Fig. 20



Fig. 21



Fig. 22



Fig. 23

**NOTE: The U-shaped inner sleeve can also be used to retract both blades at the same time (Fig. 23)**

## Step 7: Discectomy & Endplate Preparation

- Incise the annulus and perform an annulotomy with a scalpel or bovie.
- Use a rongeur or other instrumentation to start the discectomy.
- Connect the paddle shaver to the quick-connect T-handle by pulling the T-handle collar up toward the handle (Fig. 24). With the collar up, insert the shaver and release the collar. Ensure the instrument is fully seated before use by gently pulling down on it.
- Under A/P fluoroscopy, insert a paddle shaver or Cobb elevator across the disc space, parallel to the endplates.
- Gently release the contralateral annulus.
- Perform the discectomy and endplate preparation. A variety of instruments, which includes cup curettes, ring curettes, rongeurs, osteotome, rasps or other appropriate discectomy tools, may be used (Fig. 25).
- Use the laser etched lines along with the green, yellow, and red markings to maintain consistent depth throughout the procedure.

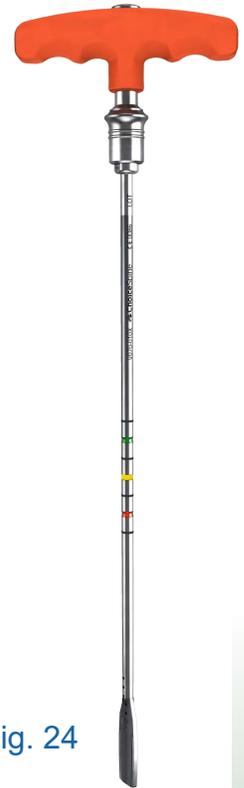


Fig. 24



Fig. 25



Fig. 26

### NOTE:

- Take care when passing sharp instrumentation through the psoas muscle.
- Discectomy and endplate preparation surgical technique will vary by surgeon.
- Paddle shavers may also be used to determine the approximate disc height and length for trial and cage placement. The holes in the shaver demarcate disc length starting at the distal end at 40mm and increase by 5mm to 60mm (Fig. 26).

## Step 8: Implant Measurement

- Interbody trials are available to measure the height, width, and length of the disc space so the appropriate interbody cage can be selected.
- Insert the interbody trial into the disc space.
- Using a mallet as needed, gently advance the interbody trial into the disc space until the tip of the interbody trial is at the contralateral edge of the vertebral body.
- Take a lateral fluoroscopic image to confirm placement of the interbody trial.
- The interbody trials contain grooves and holes to fluoroscopically determine the length of the disc space (Fig. 27). The groove and hole closest to the tip denotes the length of a 40mm long interbody cage. The remaining grooves are 10mm apart and denote the available lengths of interbody cages up to 60mm in length.
- Attach the reverse slap hammer by sliding the catch of the reverse slap hammer under the quick-connect of the interbody trial, and then remove the interbody trial.



Fig. 27

### NOTE:

- **When using the lordotic interbody trials, ensure they are inserted properly by utilizing the markings with the "A" mark facing anterior and the "P" mark facing posterior.**

## Step 9: Interbody Cage Insertion

- Select the desired interbody cage.
- Rotate the inserter knob counterclockwise and place the inserter collar in the unlocked position (Fig. 28).
- Place the interbody cage on the inserter and rotate the inserter collar into the locked position (Fig. 29).
- Rotate the inserter knob clockwise until the interbody cage is secured (Fig. 30).
- Pack graft material into the reservoir of the interbody cage and insert into the disc space.
- Take A/P and lateral fluoroscopic images to verify placement prior to releasing the cage inserter from the interbody cage.
- To release the interbody cage from the inserter, rotate the inserter knob counterclockwise until it stops.
- Rotate the inserter collar to the unlocked position and rotate the inserter knob clockwise until it stops while in the unlocked position, then remove the inserter.



Fig. 28



Fig. 29

Fig. 30

## Step 10: Psoas Retractor Removal

- Remove each inner half sleeve or the U-shaped inner sleeve then remove each psoas retractor blade from the surgical site.
- Release the connection between the table mounted retractor arm and cannula by turning the wing nut counter-clockwise.
- Remove the cannula from the incision.

### NOTE:

- VEO™ is designed to be used with supplemental fixation that is cleared for use in the lumbar spine.
- VEO™ is designed to be used with autogenous graft.

## Step 11: Closure

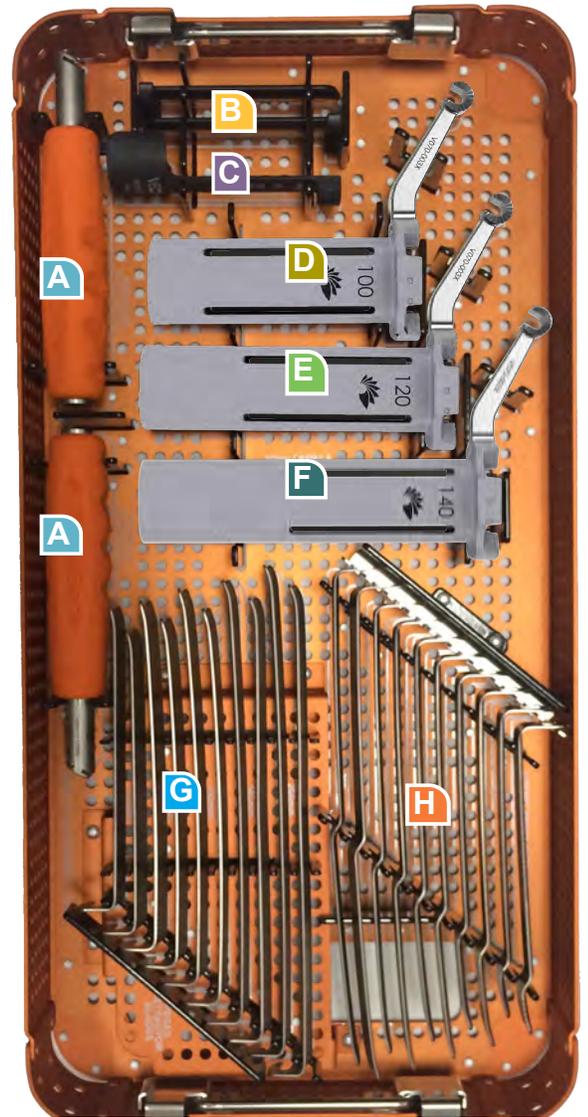
- Obtain final A/P and lateral images.
- Close the incision in the typical fashion.

## VEO Access: Top



- A** 90° Nerve Retractor
- B** Dilator Holder
- C** Cannula Holder
- D** Dilator 1
- E** Dilator 2
- F** Angled Penfield Dissector
- G** Angled Cobb Dissector
- H** Frazier Suction Tube
- I** Straight Cobb Dissector
- J** Straight Penfield Dissector
- K** K-wires

## VEO Access: Middle



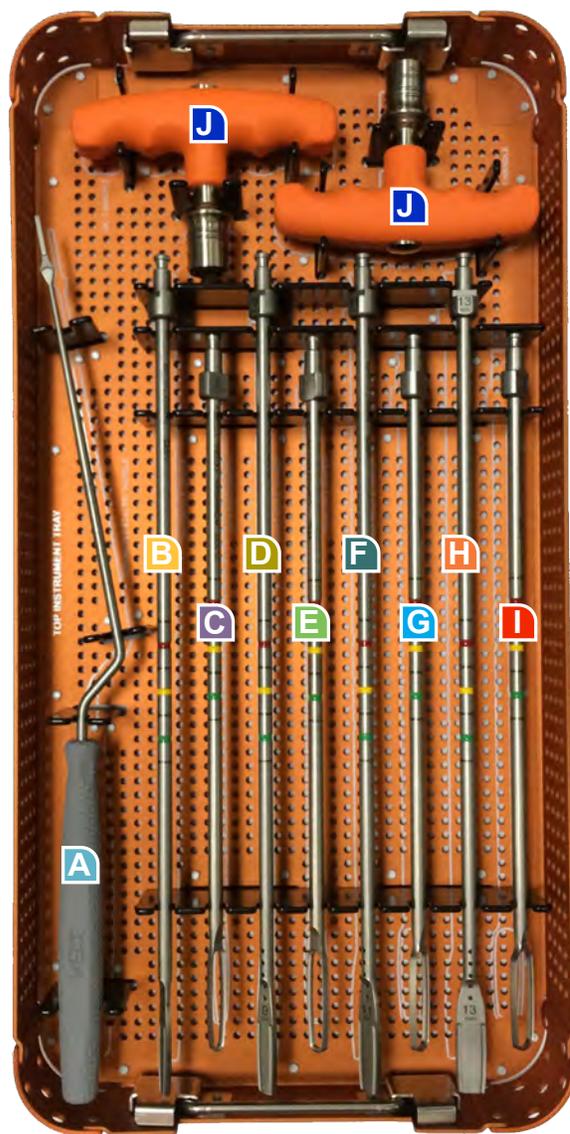
- A** Retractor Blade Handles
- B** Inner Half Sleeves
- C** U-Shaped Inner Sleeve
- D** 100mm Cannula
- E** 120mm Cannula
- F** 140mm Cannula
- G** Psoas Retractor Blades
- H** Offset Psoas Retractor Blades

## VEO Access: Bottom



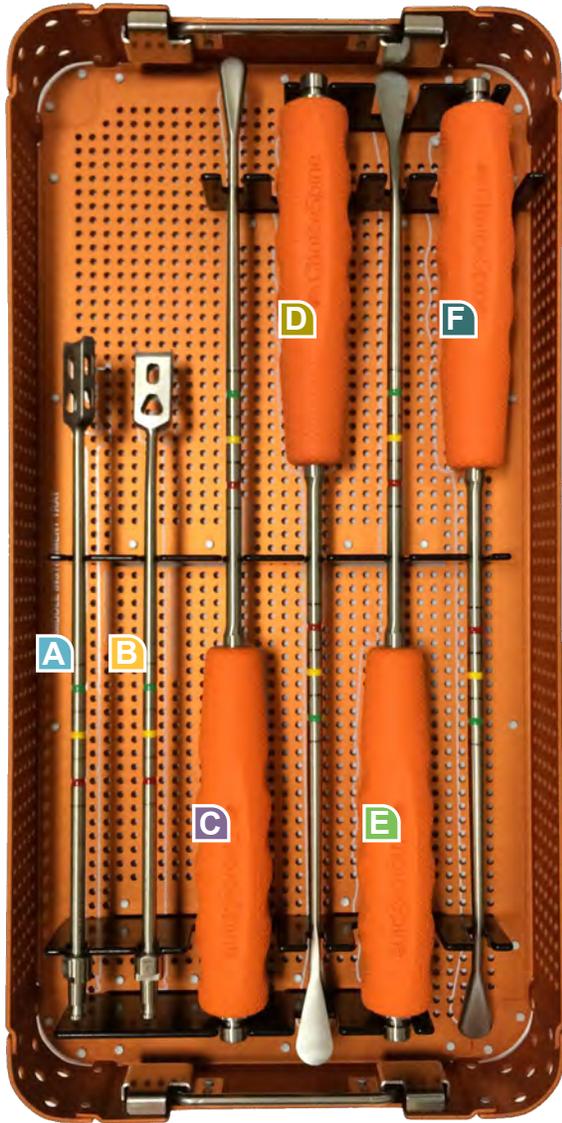
- A** Fiber Optic Cable
- B** Radial Table Clamp
- C** Table Mounted Retractor Arm
- D** Stadium Mount Light

## VEO Disc Prep: Top



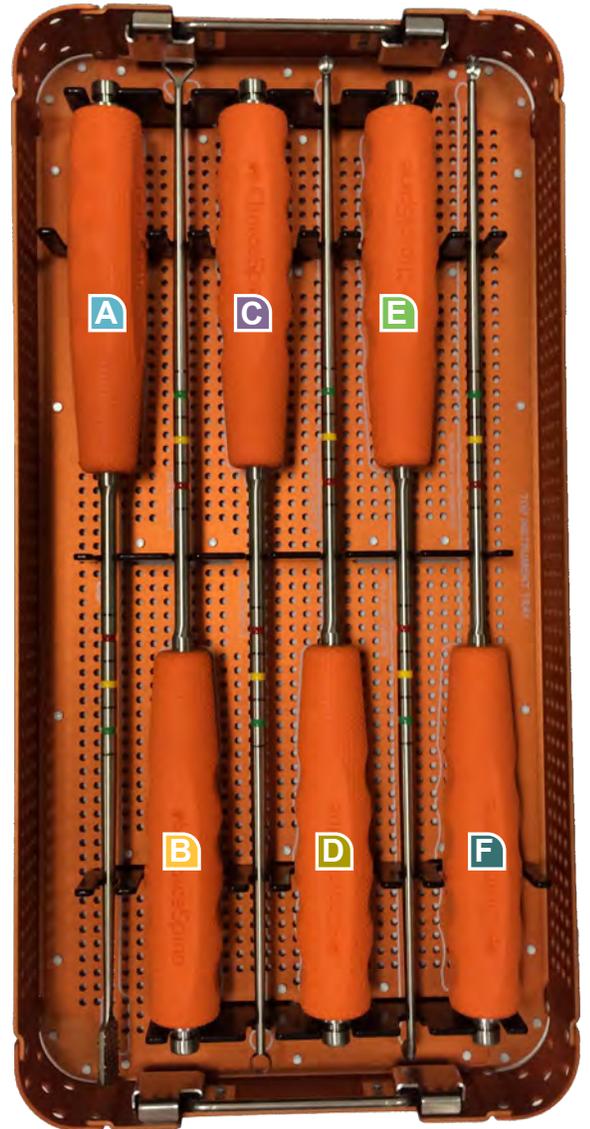
- A** Bayoneted Scalpel Handle
- B** 7mm Paddle Shaver
- C** 8mm Ring Shaver
- D** 9mm Paddle Shaver
- E** 10mm Ring Shaver
- F** 11mm Paddle Shaver
- G** 12mm Ring Shaver
- H** 13mm Paddle Shaver
- I** 14mm Ring Shaver
- J** QC T-Handles

## VEO Disc Prep: Middle



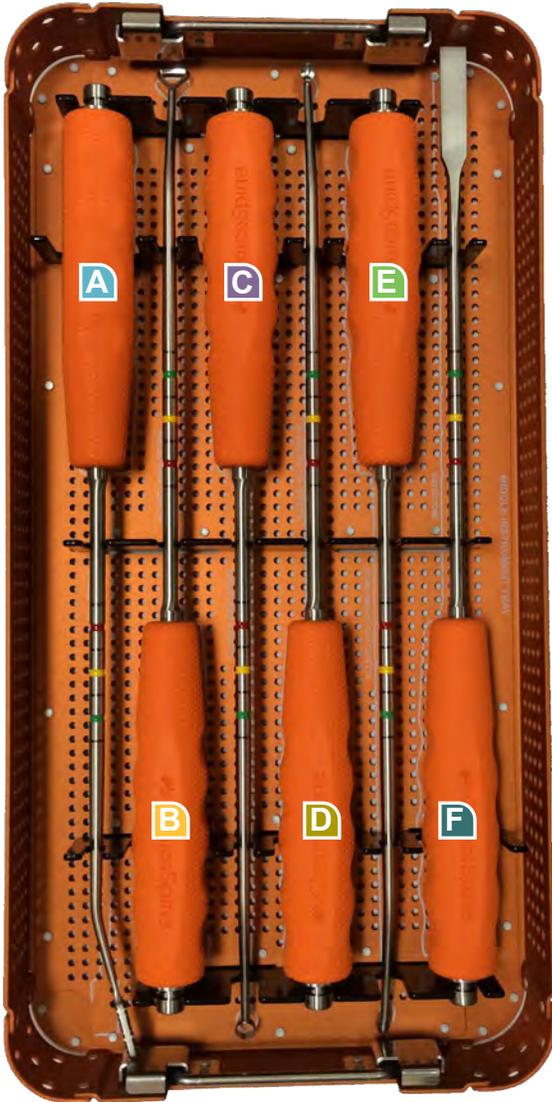
- A** 7mm Box Cutter
- B** 7mm Angled Box Cutter
- C** 13mm Cobb
- D** 16mm Cobb
- E** 16 mm Down Angled Cobb
- F** 16mm Up Angled Cobb

## Anterolateral Disc Prep: Top



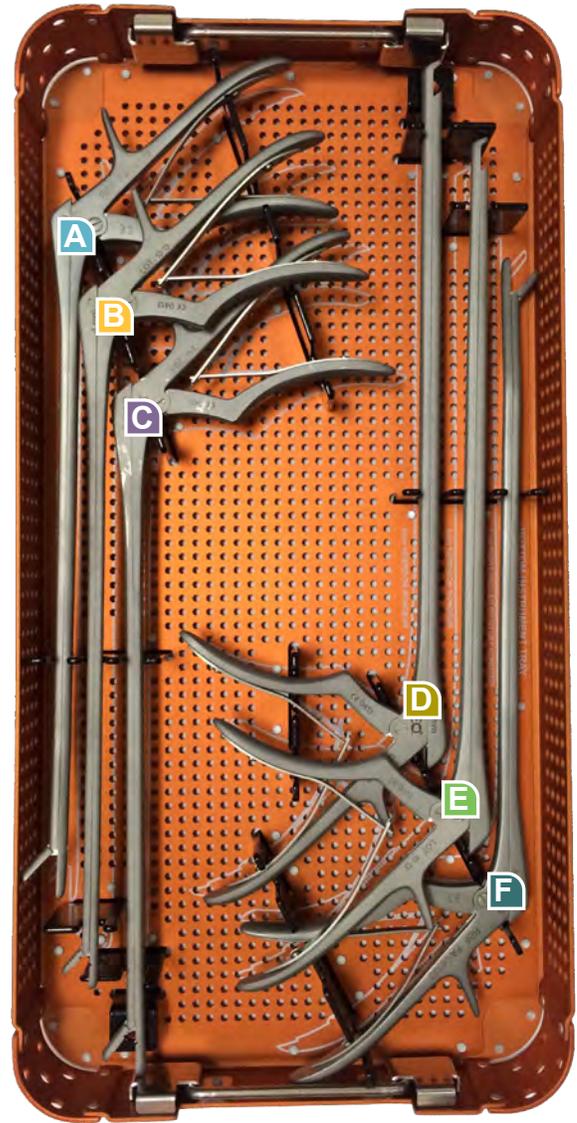
- A** Rasp
- B** Rake Curette
- C** Ring Curette
- D** Push Cup Curette
- E** Pull Cup Curette
- F** Straight Cup Curette

## Anterolateral Disc Prep: Middle



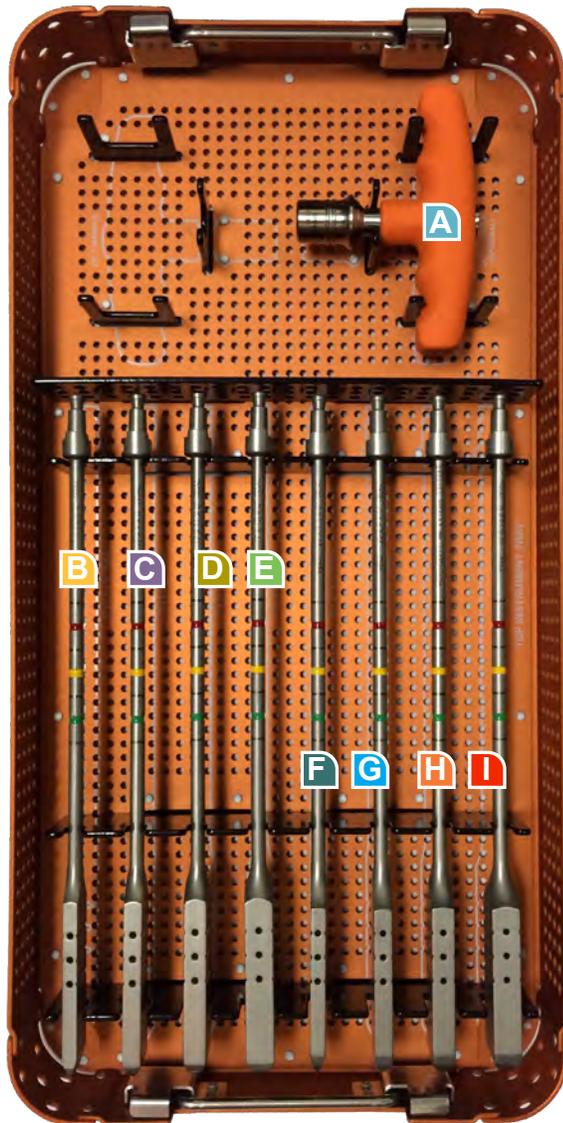
- A** Angled Rasp
- B** Angled Rake Curette
- C** Angled Ring Curette
- D** Up Angled Cup Curette
- E** Down Angled Cup Curette
- F** Osteotome

## Anterolateral Disc Prep: Bottom



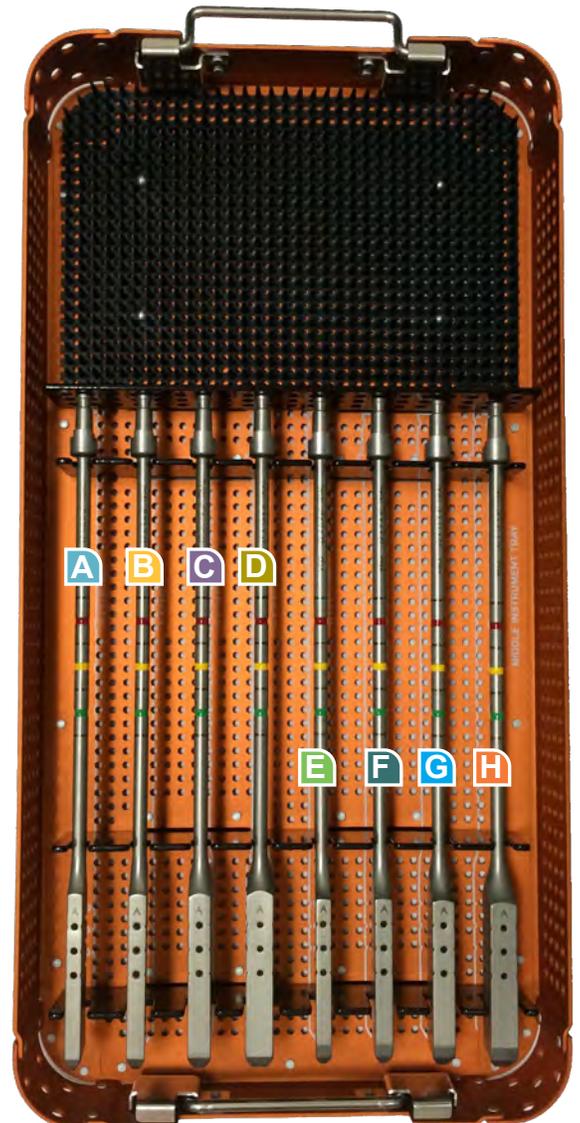
- A** 4mm Left Angled Pituitary Rongeur
- B** 4mm Pituitary Rongeur
- C** 6mm Pituitary Rongeur
- D** 6mm Kerrison Rongeur
- E** 4mm Kerrison Rongeur
- F** 4mm Right Angled Pituitary Rongeur

## VEO Trial: Top



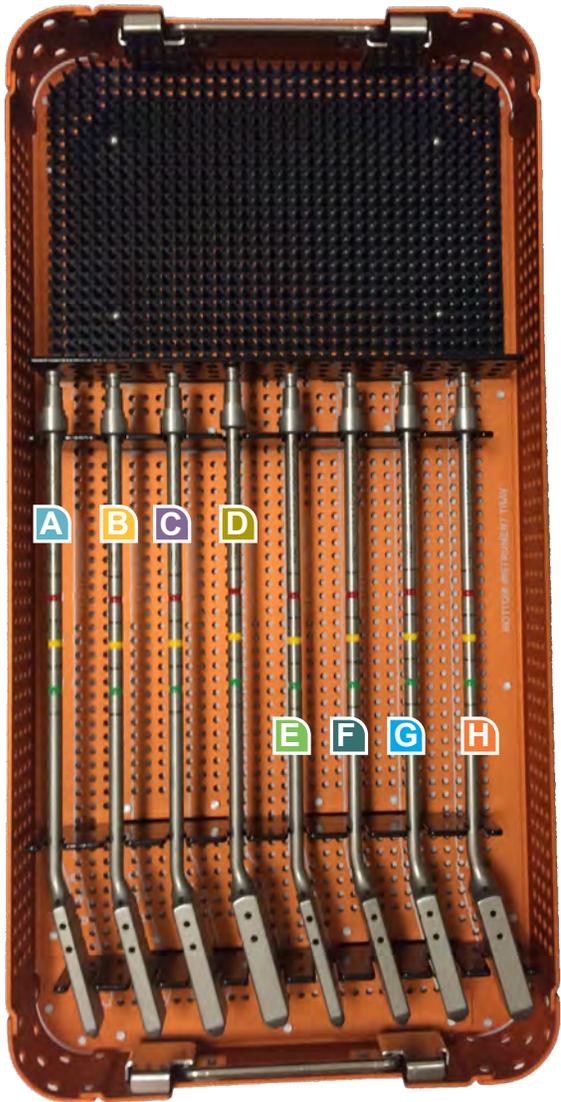
- |                                  |                                  |
|----------------------------------|----------------------------------|
| <b>A</b> QC T-Handle             | <b>F</b> 22mm x 7.5mm x 0° Trial |
| <b>B</b> 17mm x 7.5mm x 0° Trial | <b>G</b> 22mm x 9mm x 0° Trial   |
| <b>C</b> 17mm x 9mm x 0° Trial   | <b>H</b> 22mm x 11mm x 0° Trial  |
| <b>D</b> 17mm x 11mm x 0° Trial  | <b>I</b> 22mm x 13mm x 0° Trial  |
| <b>E</b> 17mm x 13mm x 0° Trial  |                                  |

## VEO Trial: Middle



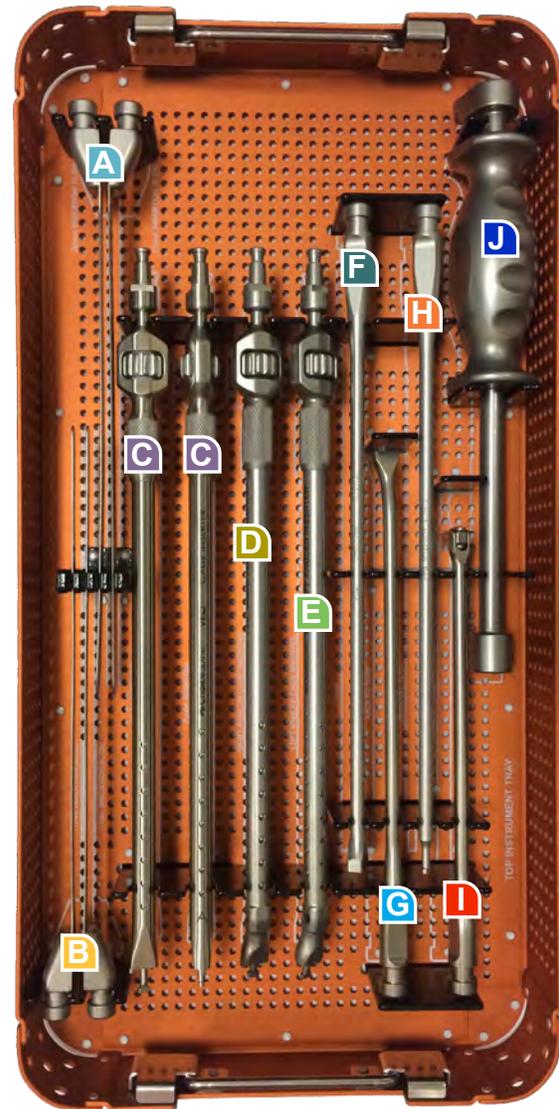
- |                                 |                                 |
|---------------------------------|---------------------------------|
| <b>A</b> 17mm x 8mm x 6° Trial  | <b>E</b> 22mm x 8mm x 6° Trial  |
| <b>B</b> 17mm x 9mm x 6° Trial  | <b>F</b> 22mm x 9mm x 6° Trial  |
| <b>C</b> 17mm x 11mm x 6° Trial | <b>G</b> 22mm x 11mm x 6° Trial |
| <b>D</b> 17mm x 13mm x 6° Trial | <b>H</b> 22mm x 13mm x 6° Trial |

## VEO Trial: Bottom



- |  |  |
|--|--|
| <b>A</b> 17mm x 7.5mm x 0°<br>Angled Trial | <b>E</b> 22mm x 7.5mm x 0°<br>Angled Trial |
| <b>B</b> 17mm x 9mm x 0°<br>Angled Trial   | <b>F</b> 22mm x 9mm x 0°<br>Angled Trial   |
| <b>C</b> 17mm x 11mm x 0°<br>Angled Trial  | <b>G</b> 22mm x 11mm x 0°<br>Angled Trial  |
| <b>D</b> 17mm x 13mm x 0°<br>Angled Trial  | <b>H</b> 22mm x 13mm x 0°<br>Angled Trial  |

## VEO Implant: Top



- |  |                              |
|--|------------------------------|
| <b>A</b> 22mm Insertion Slide          | <b>F</b> Tamp                |
| <b>B</b> 17mm Insertion<br>Slide       | <b>G</b> Angled Tamp         |
| <b>C</b> Cage Inserters                | <b>H</b> Removal Tool        |
| <b>D</b> Right Angled<br>Cage Inserter | <b>I</b> Angled Removal Tool |
| <b>E</b> Left Angled<br>Cage Inserter  | <b>J</b> Slap Hammer         |

## VEO Implant: Middle



**A** 17mm x 0° Cages

**B** 17mm x 6° Cages

## VEO Implant: Bottom



**A** 22mm x 0° Cages

**B** 22mm x 6° Cages

For Instructions for Use, please visit <https://choicespine-eifu.com/>



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