Double Engine® Universal Spine Fixation System II
Surgical Technique Manual

Note: The surgical procedures should be performed under the guidance of qualified skilled orthopedic surgeons, and this surgical technique manual is provided for information only.

Manufactured by

DOUBLE ENGINE Medical Material Co., Ltd.
NO. 218 Houxiang Road, Haicang District, Xiamen, Fujian, PRC
Tel: +86-592-6087101 Fax: +86-592-6587078
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Indications

The Universal Spine Fixation System II is applied to the fixation of thoracic vertebra, lumbar vertebra and sacral vertebra, and also the treatment of the posterior surgery.

- Vertebral Fracture
- Spondylolisthesis
- Degenerative Lumbar Spinal Instability
- Scoliosis Deformity
- Tumor

Contraindications

Fractures and tumors resulted from deficiency of the parastyle support
Surgical Operation

1. Open the pedicle and confirm screw length

Use the Awl (110400100) to perforate the bone cortex of the pedicle, approximate 10mm deep. Open the pedicle canal, using the Straight Pedicle Probe (110400200). Displace the soft cancellous bone by advancing the probe into the pedicle canal. If the probe resists advancement, use radiographic imaging to check position and orientation. Take care to avoid perforating the walls of the pedicle.

The Pedicle Probe has marks at 30 mm, 40 mm and 50 mm for checking the depth of penetration into the pedicle/vertebral body. The anterior wall of the vertebral body should not be penetrated.

2. Check the screw channel

Palpate the walls of the pedicle using a Straight Feeler (110400400) or Curved Feeler (110400500). Use radiographic imaging to confirm position and orientation.
3. Select screw length

Place the Fixation Pin, left (110400700) and Fixation Pin, right (110403500) into the pedicle canal using the Insertion Device for Fixation Pin (110400600). Confirm the orientation and inserted depth of the pedicle screw under the image intensification of C-arm X-ray machine.

4. Insert pedicle screw

Insert the appropriate pedicle screw using relevant screwdrivers (110412600, 11041270, 110412800, and 110412900). Align the screws for the convenience of placing the rod.

Note: It is optimally to use one group of variable axis pedicle screws when more than two groups of posterior fixation are applied during surgery.
5. Insert rod

A

Use Trial Rod (110401700) to confirm the shape and length of the rod which need to be bent. Generally, it’s not necessary to accomplish precise bending for the head of the variable axis pedicle screw.

B

Bend the rod using the Bending Pliers with Rolls (110401800) according to the pre-bending arc.

Note: The rod should not be bent repeatedly, or it will lead to the reduction of the strength. Also, do not bend more than 45°. For multilevel cases, the pre-bending arc of the Trial Rod decides the angle of bending of the rod.

C

Bend the rod using the Bending Pliers with Rolls (110401800) according to the pre-bending arc.

Note: The rod should not be bent repeatedly, or it will lead to the reduction of the strength. Also, do not bend more than 45°. For multilevel cases, the pre-bending arc of the Trial Rod decides the angle of bending of the rod.
6. Press rod

Push the rod into the head end of the pedicle screw by Rod Pusher (110412100). For the long level, push starting from the screw in-between.

Alternative: Use the Running Forceps for USS Rods (110411100).

7. Assemble and lock the nut

Pick up the nut using the Short Holding Set for Screws (110410100) and place it onto the groove of the screw head end. Screw the nut clockwise and leave it loose for further adjustment.

7.1 Run connecting rod

Pick up the nut using the Short Holding Set for Screws (110410100) and place it onto the groove of the screw head end. Screw the nut clockwise and leave it loose for further adjustment.
7.2 Restore the lordosis

Mount the Spreader Sleeve on the end of the pedicle screws and close them up to restore the spinal lordosis. This helps to spread part of the anterior column.

7.3 Spread or compress

When the pedicle screw and fixed rod are unlocked, use the Spreader Sleeve to restore the spinal lordosis. Spread the pedicle screws using the Spreader Forceps (110402500) so to restore the height of the posterior column. Tighten the nuts up if the vertebra is restored as required. In need of compression, repeat the similar operation as described above by Compression Forceps (110402600).

7.4 Deal with spondylolysis

For patients with spondylolysis, perform proper reduction using Reduction Forceps (110411300). Fix the pedicle screws by locking the nuts with the Long Wrench (110413000) and T-Handle with Quick Coupling (110400800) after required reduction.
8. Lock nuts

When each component is fully placed, lock the nut with combined use of the Long Wrench (110413000) and Anti-rotation Sleeve, for Pedicle Screw (110411900). Assemble the Anti-rotation Sleeve, for Screw Cutter (110413600) on the pedicle screws and rods. Cut the end of the long arm pedicle screw by Screw Cutter Set, for long arm pedicle screw (110413700) or Screw Cutter, long arm pedicle screw (110403100). Hold the handle of the Anti-rotation Sleeve firmly to protect and support the whole fixation structure.

9. Assemble transconnector

Choose the transconnector of proper length. Ensure that the pedicle screws for locking the rod are unlocked. Position the transconnector on the rod and lock the pedicle screws after correct adjustment.

Use the transconnector I to fix the rod by passing through the interspinal ligament if the spinous process is preserved. When the transconnector II is applied, part of the spinous process and interspinal ligament should be removed, and its angle is adjustable.