

DENIQUE PEDICLE SCREW SYSTEM

**Surgical
Technique**

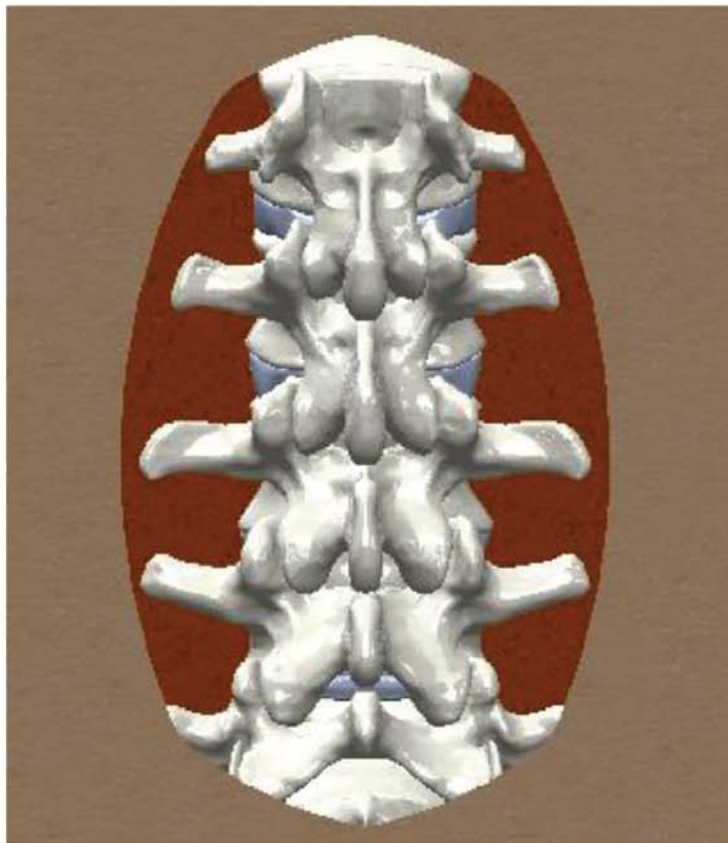


► POSITION PATIENT

Place the patient in the prone position adequate padding should be applied to all pressure points, and the abdomen should be allowed to hang free to reduce epidural venous pressure. The patient should be securely positioned to permit fluoroscopic or navigational imaging.

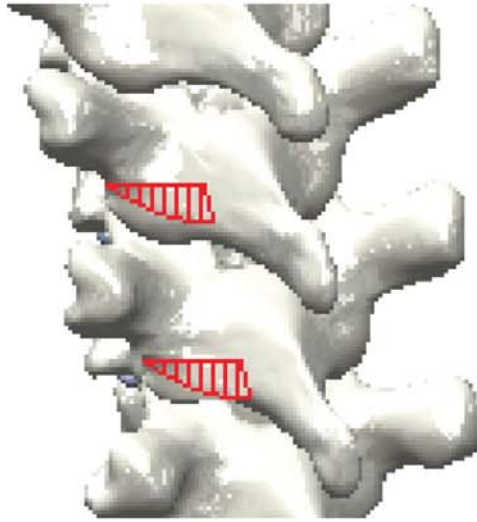
**► EXPOSURE**

Make a midline incision over target spinal levels as determined by preoperative planning and intraoperative imaging. Use subperiosteally incision to expose the spinous processes and laminae to expose the entry points for pedicle screw placement. While making the incisions, avoid vital structures, including vertebral arteries, nerve roots, and the spinal cord.



► **PEDICLE PREPARATION**

Expose and prepare the facet joints by removing 3mm - 5mm of the inferior facet and carefully denude the articular cartilage on the superior facet, except at the lowest vertebrae to be instrumented. This exposure facilitates intraoperative identification of pedicle screw entry points based on observable posterior elements intraoperatively. These elements include the transverse process, the lateral aspect of the pars interarticularis, and the base of the superior articular process. Once exposure is complete, maximize the use of anatomic landmarks by selecting a neutral, non-rotated vertebra for orientation.



Using a Pedicle Marker in conjunction with a Pedicle marker Inserter, mark the entry points of pedicle screws.



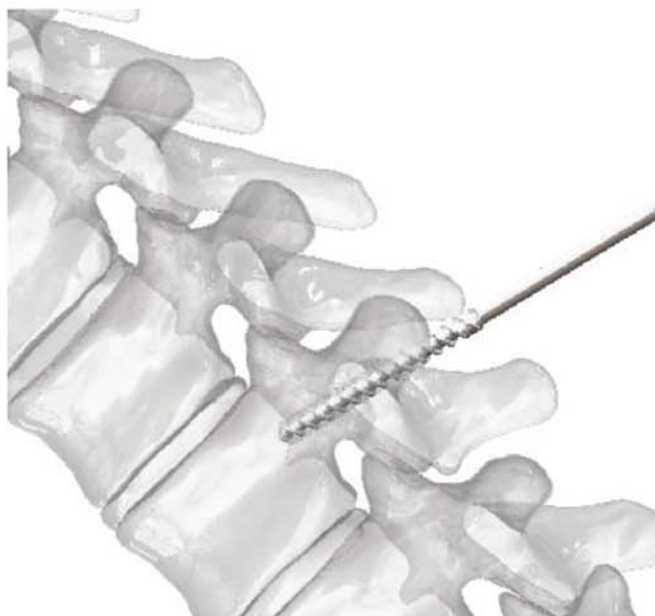
Then with a Round Awl Trocar Tip with Stopper to prepare the entry point. The stop is at 14mm to prevent over plunging.



Next continue creating a pathway into the pedicle using the Lumbar Bone Probe Curved, the Thoracic Bone Probe Taper Tip Curved, the Lenke Style Bone Probe Straight, or the Solid Ball tip Probe. Follow the path of least resistance to the desired depth, without compromising the pedicle walls. After the initial pathway is created, use the Ball Tip Probe Feeler Curved or the Ball Tip Probe Straight to confirm cortical and wall integrity, and to receive tactful feedback.



Next, select a screw based on preoperational measurements and intraoperative observations and use an appropriate diameter tap inserted into the pedicle to increase bone purchase.

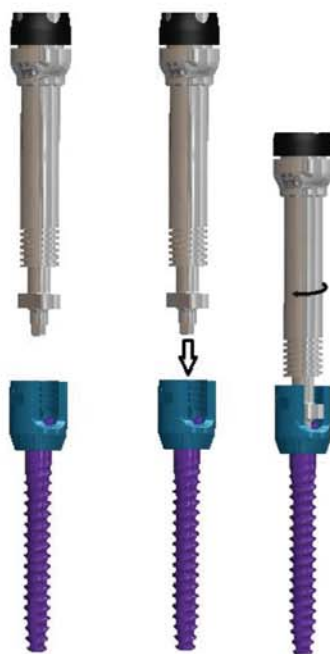


► SCREW INSERTION

With the proper screw diameter and length determined the screw can be inserted into the pedicle with the appropriate screwdriver.

- Monoaxial screws are inserted using the monoaxial screwdriver
- Polyaxial and Uniplanar screws are inserted using the polyaxial screwdriver
- Reduction screws are inserted using the Reduction screwdriver.

Hold the screw by the threads and engage the Screwdriver Inner Shaft into the saddle of the screw head. When using a polyaxial or uniplanar screws ensure the hex at the end of the inner shaft is engaged in the screws hexalobe socket. Lock the screw by turning the driver sleeve on the screwdriver counterclockwise until the thread on the outer shaft fully engages the tulip and prevents premature release of the screw.

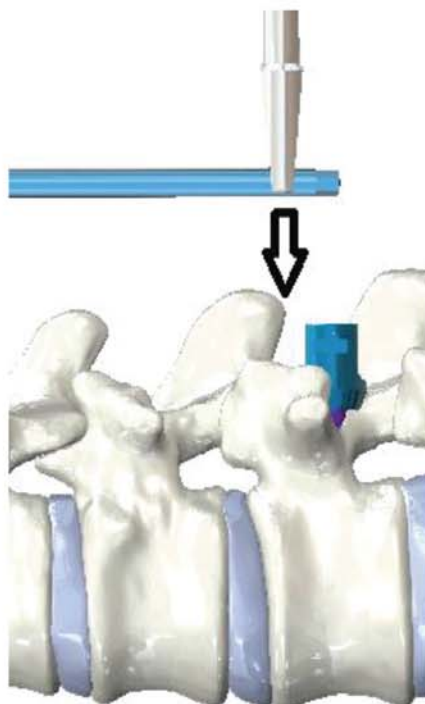


Next, insert the screw into the desired pedicle and implant to a depth that maintains full angulation for poly axial screws.



► ROD CONTOURING AND PLACEMENT

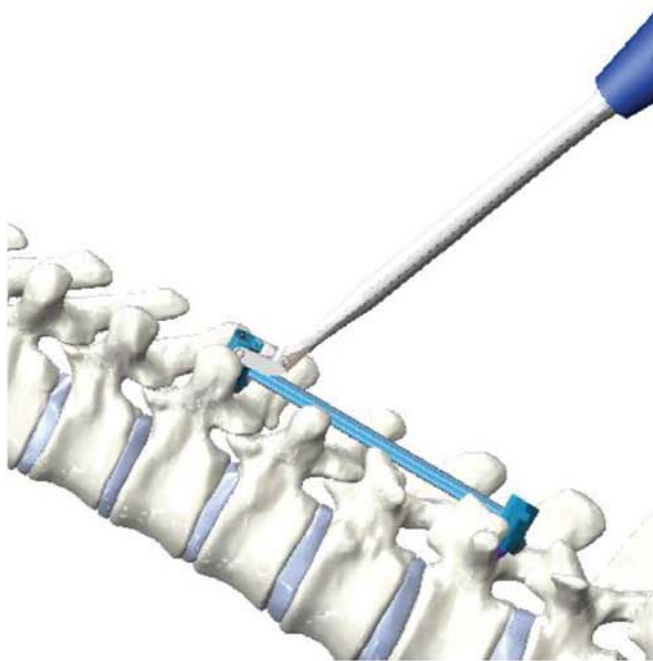
Once all screws are inserted, and correct screw placement is confirmed determine an appropriate rod length. Use the Rod Bender to bend rods to fit desired construct. Pre-bent rods are also available to save time during the surgery and to fit desired spinal contours. Use the rod holder and pusher to help place the rod into the implants.



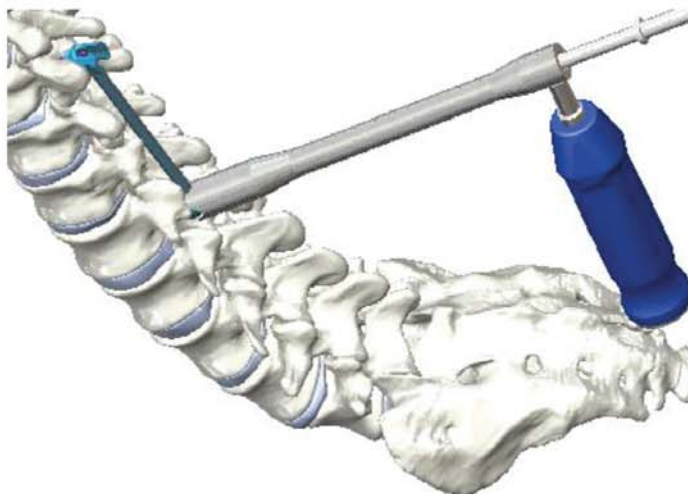
When rods are not fully seated into the bottom of the tulips rod reduction is required. Use the rod reducer or the rocker rod to fully seat the rods prior to set screw insertion. To use the rod reducer, ensure the tulip engagement feature of the inner shaft is fully exposed. Clip the tulip engagement feature over the tulip and preform the reduction by twisting the reduction nob clockwise until the rod is fully seated in the tulip.



To use the rod reducer, engage the tulip feature and carefully rock back in forth for rod reduction.

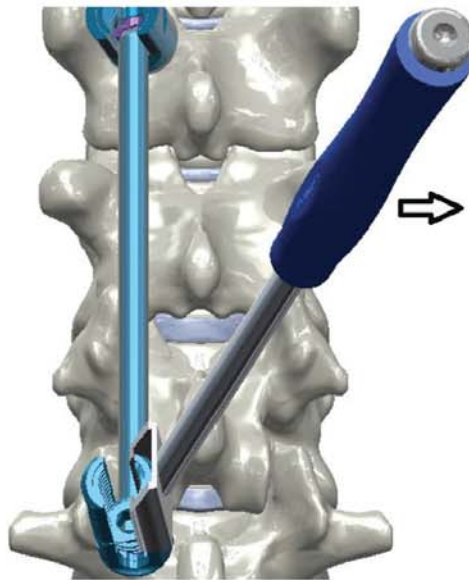


Once rod reduction is completed the Inny Tightener 4mm is used to introduce the inny set screw. The Inny Tightener 4mm can be used in conjunction with the Rod Stabilizer to increase the rigidity of the rod construct while introducing the set screw. Keep the set screws loose to allow for deformity correction.



Reduction Screws

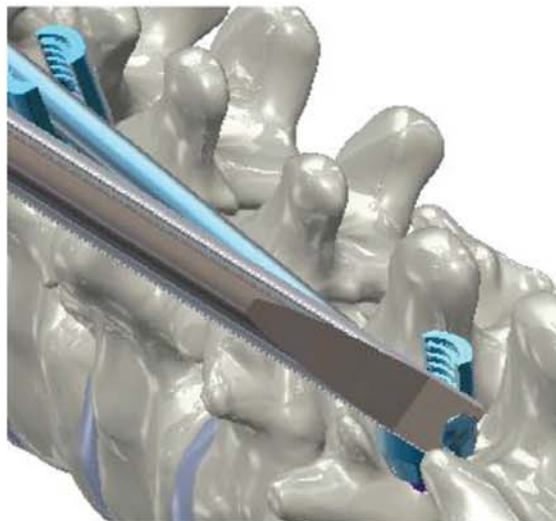
After reduction is completed, the extended tabs of reduction screws are removed using the Screw Breaker. Placing one extended tab in the Screw Breaker use a back-and-forth motion over the machined break line grooves until a clean break is performed. Repeat for the second tab.



► **DEFORMITY CORRECTION**

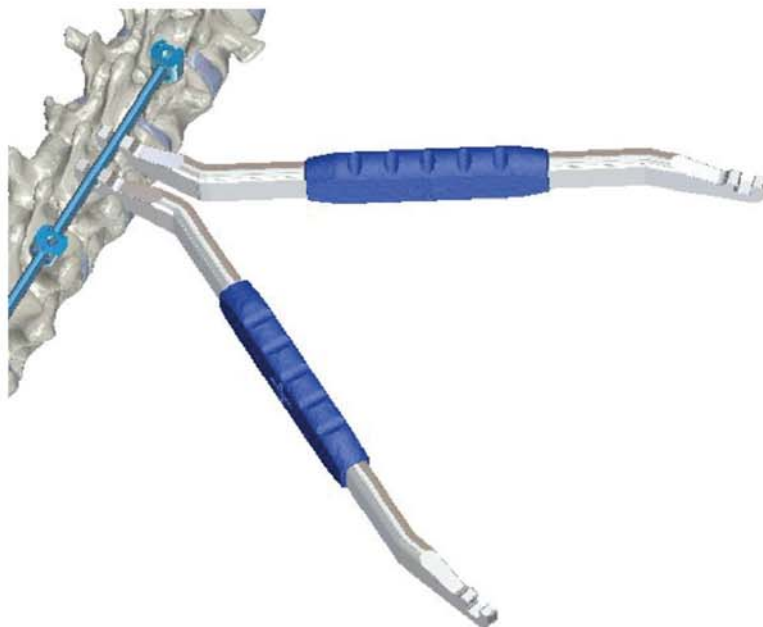
Deformity correction is done by using Rod Rotation, Distraction/Compression, and In-Situ Bending.

Rod Hex Manipulators are used for rod rotation allowing the rods to be inserted into the implants up to 90 degrees out of phase then rotated to place the implants into proper alignment.



Distraction is performed using the Parallel Distractor in the concavity of the deformity to further correct spinal deformities in the coronal plane. Contraction is performed using the Parallel Contractor in the convexity of the deformity.

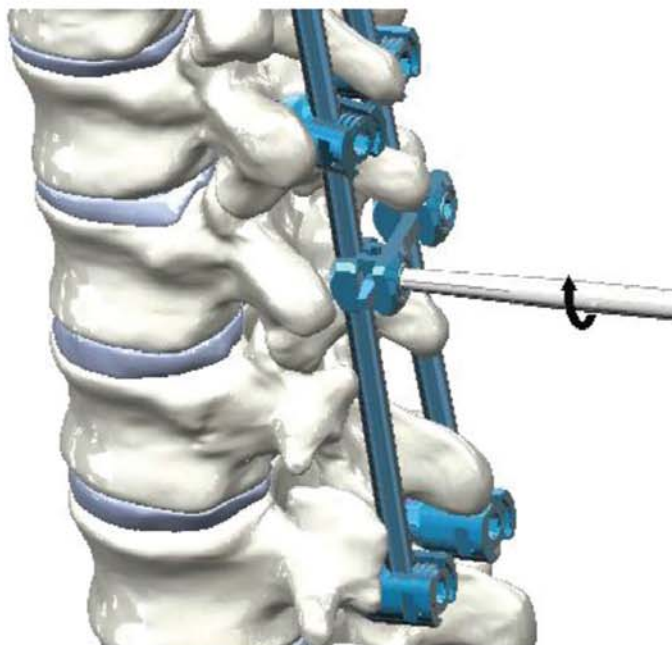
In-Situ Benders are used to straighten concave rods. With each correction of the curves, carefully watch not to compromise implant bone interface.



After Deformity correction is completed, use the Inny Tightener to perform final tightening of the set screws.

► **CROSS CONNECTORS**

Cross connectors are used to increase torsional stability in the construct. Choose an appropriate length of cross connector. While introducing cross connectors to the construct, ensure the lateral set screws are loose allowing for adjustments. Place the connector onto the rods. Using the Cross Connector Inny Inserter to tighten the lateral set screws to secure the cross connectors position on the rods and the rectangle cross connector rods.



For final tightening of the cross connectors use the Cross Connector Tightener to fully tighten the set screws.

► **ROD-TO-ROD CONNECTORS**

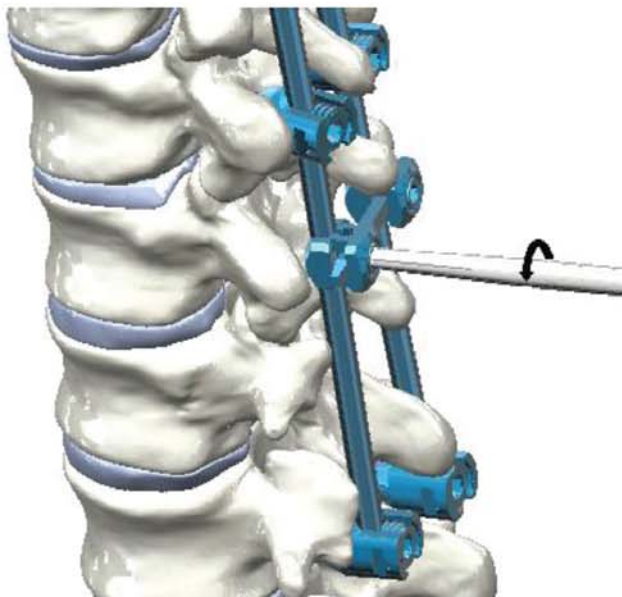
There are several options for rod-to-rod connectors.

- Extended Axial Connectors
- Domino Connectors
- Lateral Offset Connectors

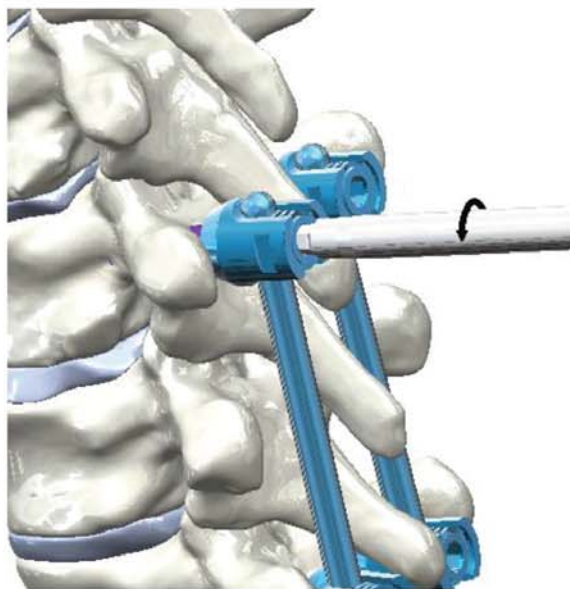
When using rod-to-rod connectors, use the Cross Connector Inny Inserter to introduce a set screw securing the rods in the connectors. Use the Cross Connector Tightener to perform the final tightening.

► IMPLANT REMOVAL

Begin by removing any crosslinks from the rod construct. Using the Cross Connector Tightener loosen the lateral set screws by turning counterclockwise until crosslink is released from the rods. Removing the crosslink from the surgical site, dispose of the crosslink and do not reuse any crosslinks retrieved from a patient.

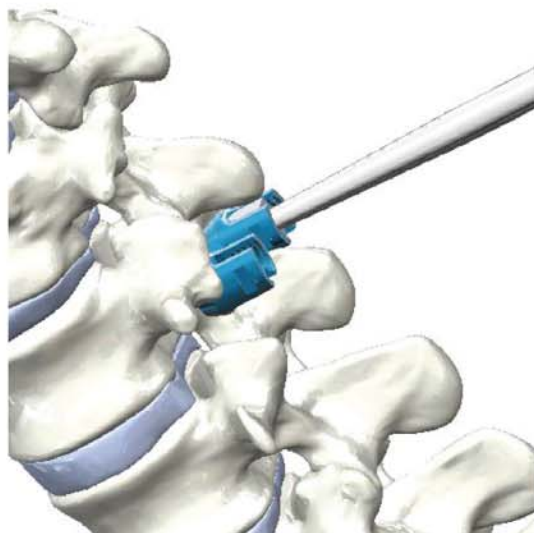


Next remove the Inny set screws from the construct using the Inny Tightener engaging the driver with the blocker screw's drive feature. Rotate the Inny Tightener counterclockwise until the blocker screws are loosened. Retrieve the loosened blocker screw and dispose of the blocker screws and do not reuse any crosslinks retrieved from the patient.



Once all blocker screws are removed, extract the rods. Do not reuse any rod that has been retrieved from a patient.

With the rods removed, the screw heads will remain locked to the screw bodies. Prior to screw removal, unlock each screw head using the Head Alignment Tool [01-09K]. Engage the tool with each screw head and toggle until it moves freely around the screw body. Repeat for all pedicle screws in the construct.



Then remove all screws by unlocking screws, then aligning the screw head using the Screw Head Aligner with the axis of the pedicle screw body. Using the appropriate screwdriver engage the inner shaft into the tulip and hexalobe of the screw. And remove the screw by turning the drive feature counterclockwise until the screw is fully removed. Dispose of all removed screws and do not reuse any pedicle screws that have been removed from a patient.



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