Thoracic Pedicle Screw

Insertion Technique
INTRODUCTION

Placement of Thoracic Pedicle Screws

Pedicle screws have proven to be an excellent bony anchor in the posterior instrumentation of the spine. Correct placement within the pedicle is important for a successful procedure, particularly in the deformed thoracic spine.

The technique to be presented and illustrated was developed at Miami Children’s Hospital. The technique is manual fluoroscopically assisted. Over 10,000 thoracic screws have been successfully placed using the technique.

Approximately 5 seconds of fluoro time is required per screw. Using an average of 20 screws per case and performing approximately 100 deformity cases a year, over 85 years of surgical experience would be required to exceed the recommended maximum accumulative radiation dosage.

The authors are pleased to present this technique for the placement of pedicle screws in deformity.

Harry Shufflebarger MD
The first key step of the technique is to obtain a true AP image of the vertebra that will be instrumented.

An AP of the patient does not result in a true AP image of the vertebra.

The true AP image of the vertebra is obtained after adjusting the C-arm for kyphosis (lordosis) and rotation.
The second key step is to know the length of the flutes of the drill bit that will be used.

The length of the flutes on this drill bit measures 35 mm.

Clinical Example
The image shows the correct starting point at the lateral aspect of the pedicle. The starting point for the pedicle screw is marked with an awl.

Notice that approximately 20 mm of the drill bit has advanced. At this length, if the image shows the tip of the drill to be at the medial wall of the pedicle, it represents the fact that the drill bit is entering the vertebral body.

The drill is then advanced into the pedicle. Fluoroscopic “spot-checks” are done during the advancement of the drill. The correct path of the drill bit is reflected by the combination of the length of the drill bit inserted and the fluoroscopic image of the tip of the drill bit at the medial wall of the pedicle.
PEDICLE SCREW INSERTION TECHNIQUE

5.5 System

PEDICLE SCREW DRILLING (CONT.)

Clinical Example
The drill bit tip at the starting point.

The drill has advanced approximately 20 mm. As the image shows, the drill tip is at the medial wall of the pedicle, signifying that the drill is safely past the length of the pedicle and entering the vertebral body.

However, if the image shows the drill bit to be at the medial pedicle wall, but the drill has not advanced 20 mm, it reflects that the drill is proceeding too medially.

The drill should be repositioned so that the image shows the tip is at the medial pedicle after the drill has advanced at least 20 mm.
PEDICLE SCREW INSERTION TECHNIQUE

A ball tip probe is then inserted to the anterior cortex of the vertebral body. A distinctive change will be felt as cancellous bone is passed and cortical bone is encountered. This step measures the length of the screw and allows for palpation of the drill track.

With the ball tip probe at the anterior cortex, the image will show the tip of the probe to be at the center of the vertebra.

The probe is grasped with a clamp, and the length of the screw is determined.
The screw length for our model is 35 mm.

As the screw is inserted approximately 20mm, the image should show the tip of the screw to be at the medial wall of the pedicle.

When the screw has been fully inserted, the image should show the tip of the screw to be at the center of the vertebral body.

Clinical Example
After all the screws have been inserted, a lateral image is obtained.
INDICATIONS:
The EXPEDIUM® Spine System is intended to provide immobilisation and stabilisation of spinal segments in skeletally mature patients as an adjunct to fusion in the treatment of acute and chronic instabilities or deformities of the thoracic, lumbar and sacral spine. The EXPEDIUM® Spine System metallic components are intended for noncervical pedicle fixation and nonpedicle fixation for fusion for the following indications: degenerative disc disease (defined as back pain of discogenic origin with degeneration of the disc confirmed by history and radiographic studies); spondylolisthesis; trauma (i.e., fracture or dislocation); spinal stenosis; curvatures (i.e., scoliosis, kyphosis, and/or lordosis); tumour, pseudoarthrosis; and failed previous fusion in skeletally mature patients. The EXPEDIUM® PEEK rods are only indicated for fusion procedures for spinal stenosis with instability (no greater than Grade I spondylolisthesis) from L1-S1 in skeletally mature patients.

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