

**ARTICLE LINKS:**[Fulltext](#)**Pedicle Instrumentation in the Thoracic Spine: A Morphometric and Cadaveric Study for Placement of Screws.****Anatomy**

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**Abstract:**

**Study Design.** In part 1 of the study, the morphometry of thoracic pedicles and bony landmarks for pedicle screw placement were evaluated. In part 2, pedicle screws were inserted in fresh cadavers, using a different entry point in the left and right pedicles.

**Objectives.** To identify the safest entry point and screw orientation for pedicle screws in the thoracic spine.

**Summary of Background Data.** A few morphometric investigations have been performed on thoracic vertebrae, but the safest technique for screw insertion in thoracic pedicles has not been analyzed.

**Methods.** Mean, range, and standard deviations of pedicle transverse diameter and pedicle orientation were measured in 99 dried thoracic vertebrae. We evaluated the position of the bottom of the superior facet and that of the superior border of the transverse process in relation to the center of the pedicle. The relation between the pedicle axis and the superior facet in the frontal plane was also assessed. In part 2 of the study, pedicle screws were inserted in fresh cadavers at the intersection between the superior border of the transverse process and the middle of the superior facet (entry point A) and between the former and the lateral two thirds of the facet (entry point B).

**Results.** The smallest transverse diameter was found at T6 (mean 4.3 mm) where pedicles measured less than 5 mm in 68% of the specimens. In the frontal plane, the pedicle axis intersected the middle of the superior facet in 15% of specimens, the lateral two-thirds in 62%, and the lateral border of the facet in 23%. Of the 126 screws inserted in fresh human cadavers, 15 (24%) of the screws inserted using entry point A and 10 (16%) of those inserted using entry point B violated the pedicle cortex ( $P > 0.05$ ). Six (10%) of the screws inserted using entry point A compared with no screw inserted using entry point B penetrated the anterior vertebral cortex ( $P = 0.03$ ).

Conclusions. Pedicles between T4 and T8 may not be wide enough for screw fixation. An entry point for pedicle screws located at the intersection between the superior border of the transverse process and the lateral two thirds of the superior facet seems more likely to be in line with the pedicle axis than do other entry points. In the lower thoracic vertebrae this entry point, in combination with insertion of the screws more medially oriented than the pedicle axis, significantly reduces the risk of violating the anterior vertebral cortex.

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