MEDIAL PEDICLE WALL REFERENCING EXTRA-PEDICULAR (EP) SCREW INSERTION TECHNIQUE FOR NARROW DYSPLASTIC PEDICLES IN ADOLESCENT IDIOPATHIC SCOLIOSIS (AIS) PATIENTS

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Background:

The conventional EP screw technique has a high medial convergence angle, which increases the risk of anterior and lateral perforations. The lateral entry point requires extensive lateral dissection, and proximity to the ribcage may result in deviation from the intended trajectory of the screw.

Objectives:

To describe a novel technique of medial pedicle wall referencing EP screw insertion method that is inserted along the pedicle axis. To compare the EP chord length of this technique with the conventional method and report the accuracy of the technique based on computed tomography (CT) assessment.

Materials and methods:

Retrospective study in which 103 AIS patients underwent posterior spinal fusion (PSF) from 2018 to 2023 were recruited. 2472 thoracic pedicles were analysed and classified based on the Chiu *et al* grading. The EP chord length of both techniques was measured. Post-operative CT scans were used to assess medial perforations using the Gertzbein and Robbins classification modified by Rao *et al* Anterior perforations were classified using the Hansen-Algenstaedt *et al* grading.

Results:

The longest chord length in conventional technique was recorded in left T8 (53.7±3.5mm) and T9 (53.7±3.7mm). In contrast, when the trajectory was planned using the medial pedicle wall referencing technique, it was 38.6±3.2mm and 38.3±3.2mm, respectively ($p<0.001$). 434 EP screws were inserted. 11.3% had medial grade 1 perforations and 4.1% had anterior grade 1 perforations. There were only 0.7% grade 2 perforations (medial: 0.2%, anterior: 0.5%). None of the perforations were symptomatic and no grade 3 perforations were noted.

Conclusion:

The medial pedicle wall referencing EP screw technique is a safe alternative method, especially in narrow dysplastic pedicles. This technique has a shorter chord length and a less convergent trajectory with acceptable perforation rates.