

ATLAS LATERAL MASS SCREW ENTRY POINT USING THE NOVEL INTERSECTION BETWEEN LATERAL MASS AND INFEROMEDIAL EDGE OF THE ATLAS POSTERIOR ARCH TECHNIQUE

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Background:

Atlas lateral mass screw placement is a very challenge for Atlas osteosynthesis or combined with atlantoaxial fixation.

Objectives:

To compare the Atlas lateral mass screw placement using the intersection between the lateral mass and inferomedial edge of the posterior arch, as an isolated medial reference, between screw trajectory 0-degree and 15-degree angulation when performing Atlas lateral mass screw fixation.

Materials and methods:

Twenty-four Atlas in fresh cadavers were prepared for inserting the 4.0-mm lateral mass screws. They were divided into two groups: Group 1, screws inserted at 3 mm lateral to the reference entry point with trajectory 0-degree angulation, and Group 2, those inserted with trajectory 15-degree angulation. CT scan was performed before and after inserting Atlas lateral mass screws for evaluating atlas anatomy and screw breach grading.

Results:

All parameters between Group 1 and Group 2 were found statistically different by bilateral intraosseous screw lengths. Twenty-two screws (91.67%) using the 0-degree medial angulation and nineteen screws (79.17%) using the 15-degree medial angulation had no cortical violation (Grade 0). However, two screws (8.33%) with 0-degree medial angulation and five screws (20.83%) with 15-degree medial angulation had breach less than 2 mm (Grade 1) without screw pullout. There was no screw breach distance between 2-4 mm (Grade 2) or breach distance more than 4 mm (Grade 3).

Conclusion:

Bilateral lateral mass screw length in Group 2 was longer than Group 1. Using 3-mm lateral to an intersection between the lateral mass and inferomedial border of the Atlas posterior arch can be used to be an easily-identifiable entry point to insert the lateral mass screw with trajectory 0-degree and 15-degree medial angulation in Atlas fixation.