

The Medial Window Technique as a Salvage Method to Insert C2 Pedicle Screw in the Case of a High Riding Vertebral Artery or Narrow Pedicle: a Technical Note and Case Series

Objective: The study was conducted to describe the safety and feasibility of C2 medial window screw (C2MWS) as an alternative salvage method for C2 pedicle screws in cases of high riding vertebral artery (HRVA) or narrow pedicle.

Methods: The C2MWS technique involves screw insertion by intentionally breaching the medial cortex of the pedicle to avoid vertebral artery injury. Twelve patients who underwent C2 screw insertion via the C2MWS were retrospectively reviewed. C2MWS was indicated in cases of high riding vertebral artery (HRVA) or narrow pedicle (pedicle width ≤ 4 mm). The width of the canal breach by screw, vertebral artery groove (VAG) breach, fusion, neck pain VAS score, and JOA score were assessed as outcome measurements.

Results: C2MWS was indicated due to both HRVA and narrow pedicle for 11 screws, narrow pedicle for one screw, and HRVA for two screws. No screw VAG breach or vertebral artery injury was noted postoperatively. The mean width of canal breach was 2.9 ± 1.3 mm. There were no cases demonstrating neurologic deterioration, and 11 patients (91.7%) demonstrated solid fusion at 1-year follow-up. Furthermore, neck pain VAS and JOA scores significantly improved after the surgery.

Conclusions: The C2MWS technique can provide 3-column fixation while reliably avoiding VA injury. C2MWS could be considered as a salvage alternative method when the insertion of C2 pedicle screw is complicated by HRVA or a narrow pedicle, while there is a need to provide firmer fixation strength than that provided by pars or translaminar screws.

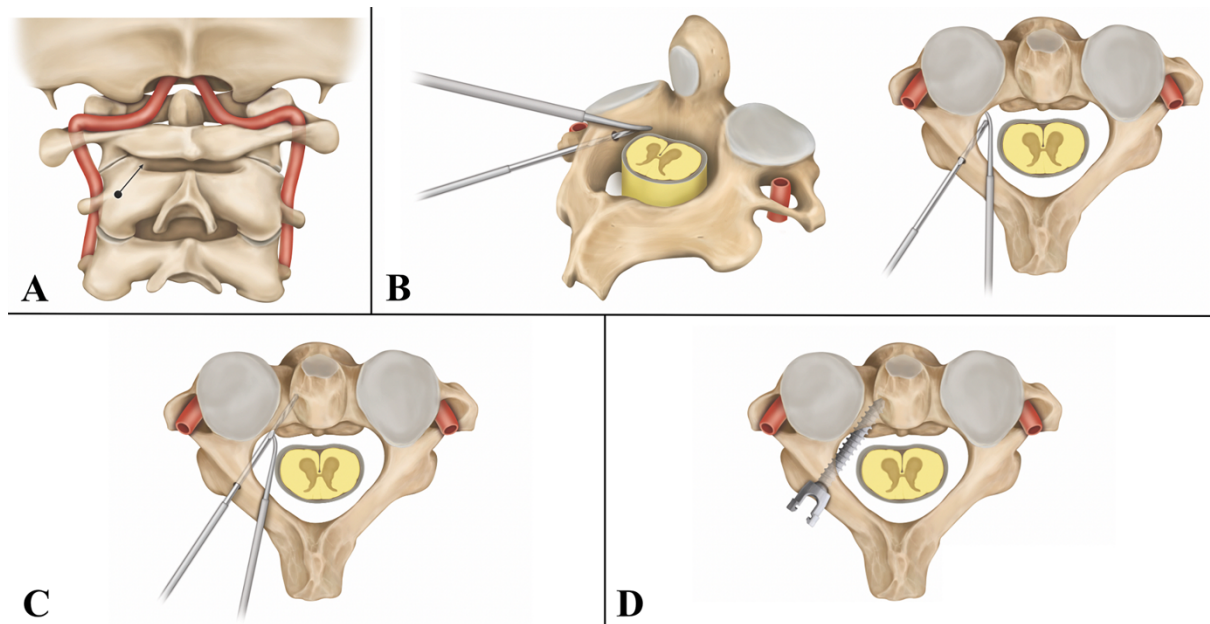


Figure 1. Description of C2 medial window technique (A) The entry point is made at the intersection between the midpoint of the C2 pars interarticularis and the superior edge of C2 lamina. The trajectory is deviated more medially in order to avoid vertebral artery injury. (B) While palpating the medial margin of the pedicle using a Penfield elevator, a screw trajectory is made using a hand drill. The trajectory is drilled so that the drill intentionally breaches the medial cortex and touches the Penfield elevator. (C) The drill is then advanced into the anterior vertebral body. (D) A screw with premeasured length is inserted into the medial window made by an intentional breach of the spinal canal.