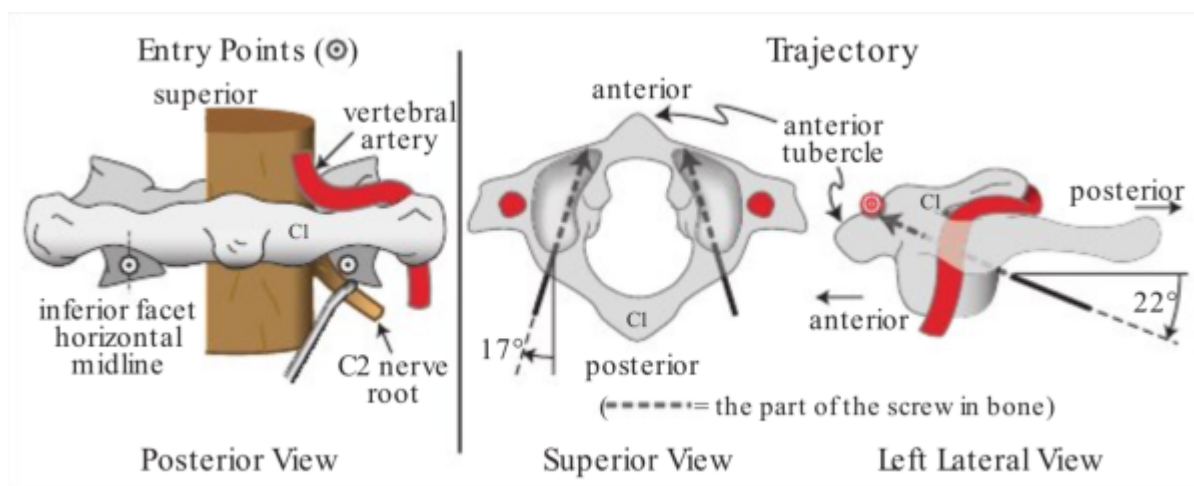


C1 lateral mass screw placement

- Translaminar Screw Fixation for Giant C1 Lateral Mass Metastasis From Hepatocellular Carcinoma
- Morphometric analysis of the lateral mass of atlas and its clinical significance in craniocervical junction surgeries
- Influence of variations of craniocervical junction anatomy on safe C1 lateral mass and C2 pedicle screw insertion: a cadaveric and radiologic study
- C1 Posterior Arch Screws for the Additional Reinforcement of Upper Cervical Spine Fixation: Surgical Technique and Preliminary Case Series
- Determining anatomically-safe corridors for placement of lateral mass screws in the first cervical vertebra of the Emirati population - a CT study
- Feasibility and Safety of the C1 "Zero Angle" Screw: A Novel "In-Out-In" Technique for Atlantoaxial Dislocation
- Navigated Osteosynthesis for Unstable Atlas Fractures: Technical Note and Case Series
- Robotic assistance for upper cervical instrumentation: report on accuracy and safety

see [Harms technique](#).



1. NB: if fusion is to accompany screw placement (i.e., permanent screw placement), strong consideration should be given to supplemental interspinous fusion, if not contraindicated to prevent fatigue breakage of C1 screws where they penetrate the lateral mass.

2. completely expose the C1-2 joint complex. Dissect over the superior surface of the C2 pars interarticularis to expose the C1-2 joint to accurately locate the entry point for the C1 lateral mass screws. Bleeding is controlled with bipolar cautery and/or Gelfoam-thrombin. Complete exposure of the posterior face of the inferior C1 facet also mobilizes the C2 root from the underlying attachments and facilitates its inferior mobilization.

3. C1 lateral mass screws ENTRY visualization commonly requires caudal retraction of the C2 dorsal root ganglion (occasionally this may not be feasible; sacrificing the C2 root may be required but this can lead to post-op pain and numbness; the technique is to divide the preganglionic nerve fibers and to close the dural defect). The screw entry point is the midpoint of the inferior part of the C1 lateral mass (for both mediolateral and craniocaudal directions). An awl or a 1- to 2- mm high-speed drill is used to mark the position to prevent slippage while drilling the hole. Drilling a portion of the inferior arch of C1 is sometimes needed to allow screw placement (✖ CAUTION: the thickness of the arch in the craniocaudal dimension varies widely, and the horizontal segment of the VA lies immediately

above—use pre-op CT for planning)

4. TRAJ averages $\approx 17^\circ$ medially, $\approx 22^\circ$ rostrally, TARGET the superior aspect of the anterior tubercle of C1 on lateral fluoro

5. C1 SCREWS 3.5 or 4 mm diameter, length is determined from pre-op fine-cut CT to obtain bicortical purchase (✗ CAUTION: the ICA may be as close as 1 mm to the ideal exit site of the screw $\therefore$ some authors use only unicortical purchase). The screw needs to be proud to bring it up to the level of the C2 screw (it may actually be necessary to have the C1 screw protruding 1–2 mm more than the C2 screw in order to allow rod attachment), and it should have an ≈ 8 mm unthreaded superficial portion to minimize irritation of the C2 nerve, which could produce [occipital neuralgia](#).

6. C2 pedicle (pars) screws are placed as usual (see C2 pedicle (pars) screws)

7. if fusion is to be performed: the posterior arch of C1 and the C2 lamina are decorticated with a drill. Onlay fusion substrate is then placed, taking care not to compress the dura. Optional adjunct: intra-articular decortication and packing bone within the C1–2 joint

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