

Video Abstract

Operative video of Goel-Harms C1-C2 fusion for atlanto-axial instability secondary to odontoid fracture (Anderson-D'Alonzo II)

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ABSTRACT

Background: Type II odontoid fractures are the most common unstable injuries of the upper cervical spine. They are associated with high non-union rates, particularly when accompanied by ligamentous disruption and/or fracture displacement. Posterior C1-C2 fixation using the Goel-Harms technique provides immediate biomechanical stability, high fusion rates, and reduces the risk of a neurovascular injury when compared with transarticular fixation.

Case Description: A 33-year-old male sustained polytrauma after a fall from >3 m. The initial evaluation revealed a severe traumatic subarachnoid hemorrhage with additional complex craniovertebral junction instability. The cervical computed tomography and magnetic resonance imaging scans demonstrated an unstable Anderson-D'Alonzo type II odontoid fracture accompanied by posterior displacement of the dens up to 5 mm into the spinal canal, occipitocervical dissociation, and rupture of the transverse and alar ligaments. Despite severe radiographic instability, no spinal cord injury was identified. Anterior odontoid screw fixation was contraindicated in this case due to the fracture morphology and extent of ligamentous disruption. Rather, we chose to perform the Goel-Harms atlantoaxial stabilization technique utilizing C1 lateral mass and C2 transpedicular screw fixation. Adequate intraoperative reduction and restoration of alignment were achieved without neurovascular complications. Postoperatively, the patient remained neurologically intact, pain significantly improved, and stable fixation was achieved as documented on appropriate postoperative imaging.

Conclusion: In this surgical video, the authors successfully performed Goel-Harms C1 lateral mass and C2 transpedicular screw fixation to stabilize a type II odontoid fracture associated with ligamentous injury and craniovertebral instability.

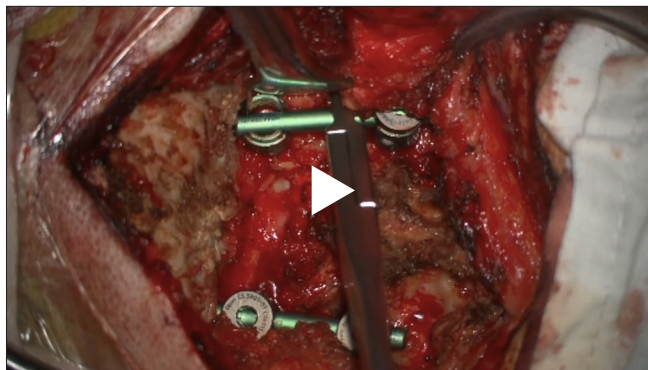
Keywords: Cervical instability, Goel-Harms, Lateral mass fixation, Odontoid fracture, Transpedicular fixation

[Video 1]-Available on:

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Video 1: 2D Operative video demonstrating the Goel-Harms fusion technique for odontoid fracture (Anderson-D'Alonzo II), highlighting key surgical steps and landmarks. Video is accessible from the portal.

Annotations^[1-7]

00:20 Clinical presentation
 01:02 Imaging findings
 02:02 Rationale for the procedure
 02:34 Risks of the procedure and its potential benefits
 03:08 Necessary equipment
 03:28 Key surgical steps
 03:35 Dissection by planes
 03:51 Identification of the posterior arch of C1
 04:11 Identification and exposure of the C1-C2 junction
 04:15 Placement of the C2 pedicular screws
 05:09 Identify C1 lateral mass
 05:22 Placement of the C1 lateral mass screws
 05:51 Resection of the posterior arch of C1
 06:31 Placement of bone graft
 06:50 Postoperative imaging
 07:03 Outcome
 07:32 Surgical technique background

Ethical approval: Institutional Review Board approval is not required.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given consent for clinical information to be reported in the journal. The patient understands that the patient's names and

initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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