Failed Atlantoaxial Reduction

- Revisiting the Treatment Algorithm for Atlantoaxial Dislocation after 10 Years: A Multi-center Study with Mid-to-long-term Follow-up
- Management of a 9-Month-Old Infant with Traumatic Atlanto-occipital Dislocation and Atlantoaxial Instability: A Case Report
- Surgical Treatment of Basilar Invagination: WFNS Spine Committee Recommendations
- Complex posterior atlantoaxial instability in pediatric os odontoideum: A novel stabilization strategy
- Traumatic posterior atlantoaxial dislocation without an associated fracture: a PRISMA-compliant case-based systematic review and meta-analysis
- Surgical Strategy and Decision-Making in Recurrent Atlanto-Axial Dislocations: The Role of Traction
- Analysis of Failed Posterior Fossa Decompression and an Effective Revision Surgery in Patients with Basilar Invagination and Atlantoaxial Dislocation
- Analysis of Failed Atlantoaxial Reduction: Causes of Failure and Strategies for Revision

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The craniovertebral junction (CVJ) presents intricate anatomical challenges. In severe or irreducible malformations, complications such as reduction loss and fixation failure may occur, necessitating revision surgery. The posterior facet joint distraction and fusion (PFDF) technique, offers a solely posterior revision approach. Hence, we delineate varied revision scenarios, proposing surgical strategies and technical details to enhance outcomes and mitigate risks, thereby enriching the neurosurgical community's repertoire.

Methods: This was a retrospective cohort study, that analyzed patient data from Xuanwu Hospital, between 2017 to 2023. All patients had a history of surgical treatment for CVJ malformations, and experienced failure or loss of reduction. The distance from the odontoid process tip to the Chamberlain's line (DCL), the atlantodental interval (ADI), clivus-canal angle, cervicomedullary angle, width of subarachnoid space, CVJ area, and width of syrinx were used for radiographic assessment. Japanese Orthopaedic Association (JOA) scores and SF-12 scores were used for clinical assessment. Independent sample t-tests were employed. A significance level of $p < 0.05$ indicates statistically significant differences.

Results: We analyzed data from 35 patients. For patients who underwent PFDF, the postoperative DCL, ADI, and clivus-canal angle significantly improved. For all patients, the postoperative cervicomedullary angle, width of subarachnoid space, CVJ area, and width of syrinx all demonstrated significant improvement, indicating the relief of neural compression. All patients showed significant improvement in both symptoms and clinical assessments.

Conclusion: Severe atlantoaxial joint locking or ligament contracting are the fundamental cause of reduction and fixation failure. Anterior odontoidectomy is indicated for patients with a robust bony fusion of the atlantoaxial joint in an unreduced position. The PFDF technique is safe and effective for patients with incomplete atlantoaxial bony fusion. Preoperative assessment of surgical feasibility and vertebral artery status ensures surgical safety and efficacy [1].

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Zhang B, Du Y, Zhang C, Qi M, Meng H, Jin T, Cui G, Guan J, Duan W, Chen Z. Analysis of Failed

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