

# Adult occipitocervical instability

**Craniocervical instability** is a surgical disease, most commonly due to **rheumatoid arthritis**, trauma, erosive pathologies such as tumors and infection, and advanced degeneration.

## Treatment

Involves stabilization of the **craniovertebral junction** by **occipitocervical instrumentation** and fusion. However, the impact of the fixed occipitocervical angle on surgical outcomes, in particular the need for revision surgery and the incidence of dysphagia, remains unknown.

Different techniques have been described to stabilize the craniocervical junction.

Bobinski et al. present 2 cases in which tumoral destruction of the **C1** lateral mass caused **craniocervical instability**. A one-stage occipitoaxial spinal interarticular stabilization (OASIS) technique with titanium cages and posterior occipitocervical instrumentation was used to reconstruct the C-1 lateral mass and stabilize the craniocervical junction. The ipsilateral vertebral artery was preserved. The OASIS technique offers single-stage tumor resection, C-1 lateral mass reconstruction, and stabilization with a loadsharing construct. It could be an option in the treatment of select cases of C-1 lateral mass failure <sup>1)</sup>.

## Outcome

Occipitocervical fusions (OCFs) at a single institution were reviewed to evaluate the relationships between postoperative neck alignment, the need for revision surgery, and dysphagia.

A retrospective review of spinal surgery patients from January 2007 to June 2013 was conducted searching for patients who underwent an occipitocervical instrumented fusion utilizing diagnostic and procedural codes. Specifically, a current procedural code of 22590 (arthrodesis, posterior technique [craniocervical]) was queried, as well those with a description of "craniocervical" or "occipitocervical" arthrodesis. Ideal neck alignment before rod placement was judged by the attending surgeon. A review of all cases for revision surgery or evidence of dysphagia was then conducted. Results From January 2007 to June 2013, 107 patients were identified (31 male, 76 female, mean age 63). Rheumatoid arthritis causing myelopathy was the most common indication for OCF, followed by trauma. Twenty of the patients were lost to follow-up and seven died within the perioperative period. Average follow-up for the remaining 80 patients was 16.4 months. The mean posterior occipitocervical angle (POCA), defined as the angle formed by the intersection of a line drawn tangential to the posterior aspect of the occipital protuberance and a line determined by the posterior aspect of the facets of the third and fourth cervical vertebrae, calculated after stabilization, was 107.1 degrees (range, 72-140 degrees). Reoperation was required in 11 patients (11/107, 10.3%). The mean POCA for the reoperation group was 109.5 degrees (range, 72-123) and was not significantly different than patients not requiring reoperation (106.5,  $p > 0.05$ ). However, for all pathologies excluding infection as a cause for reoperation, the mean POCA was significantly higher, 115.14 degrees ( $p = 0.039$ ) (Table 1). Seven patients (6.5%) complained of dysphagia postoperatively with a significantly higher POCA of 115 degrees ( $p = 0.039$ ). Of these seven patients, six underwent posterior-only procedures. One patient underwent anterior and posterior procedures for a severe kyphotic deformity. The dysphagia resolved in six patients over a mean of 3 weeks (range, 2-4 weeks). One patient, whose

surgery was posterior only, required the insertion of a gastrostomy tube. Conclusions An elevated POCA may result in need for reoperation due to increased biomechanical stress upon adjacent segments or the construct itself due to flexion in an attempt to maintain forward gaze. Further, an elevated POCA seems to also correlate with a higher incidence of dysphagia. Further investigation is necessary to determine the ideal craniocervical angle which is likely individualized to a particular patient based on global and regional spinal alignments <sup>2)</sup>

1)

Bobinski L, Levivier M, Duff JM. Occipitoaxial spinal interarticular stabilization with vertebral artery preservation for atlantal lateral mass failure. J Neurosurg Spine. 2015 Feb;22(2):134-8. doi: 10.3171/2014.10.SPINE14131. Epub 2014 Nov 21. PubMed PMID: 25415481.

2)

Maulucci CM, Ghobrial GM, Sharan AD, Harrop JS, Jallo JI, Vaccaro AR, Prasad SK. Correlation of posterior occipitocervical angle and surgical outcomes for occipitocervical fusion. Evid Based Spine Care J. 2014 Oct;5(2):163-5. doi: 10.1055/s-0034-1386756. PubMed PMID: 25278892; PubMed Central PMCID: PMC4174182.

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