


The Nuances of Occipitocervical Instability and Stenosis in Patients With Basilar Invagination and Atlantoaxial Dislocation



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The craniovertebral junction (CVJ) is a complex region with potential for instability and stenosis. The etiology of basilar invagination (BI) and atlantoaxial dislocation (AAD) may include congenital, traumatic, or rheumatoid arthritis related degeneration.¹

The established, traditional treatment for dens related compressive stenosis in BI with AAD is transoral odontoidectomy plus posterior occipital-cervical fusion.²⁻⁴ Although the surgical results are excellent with odontoidectomy, it has some disadvantages including wound dehiscence, infection, velopharyngeal insufficiency, cerebral spinal fluid leak (with meningitis), and dysphagia.

Recently, posterior surgery has gained in popularity for occipitocervical reduction and fixation done in a single stage prone position while avoiding the complications from odontoidectomy.⁵ Chandra et al.⁶ demonstrate a single stage posterior surgery for reduction and re-alignment using the DCER (distraction, compression, extension, and reduction) technique which combines usage of C1-2 spacers and occipitocervical fusion with custom instrumentation. They reported a series of 148 patients and reported that 93.2% patients improved their nurick scale by a mean of 1.24 points.

One major concern of this single stage posterior surgery is that the AAD and BI are frequently accompanied by osseous or vascular anomalies. The bony structure and vascular anatomy should be well studied before surgery using thin slice computed tomography (CT) with sagittal and coronal reconstruction views. In addition, a 3-dimensional printed model may also help to evaluate the bony structure preoperatively. Patients with BI and AAD have a reported higher incidence of vertebral artery (VA) anomalies than the normal population.⁷ Preoperative CT-angiogram is helpful to identify the course and dominant side of the VA. During surgery, instrumentation should be placed on the side with the nondominant VA first. If the nondominant VA is injured, the dominant side should not be instrumented and immediate angiogram for stenting or sacrifice is suggested. The authors did report four VA injuries in their series with a very high mortality rate (50%).

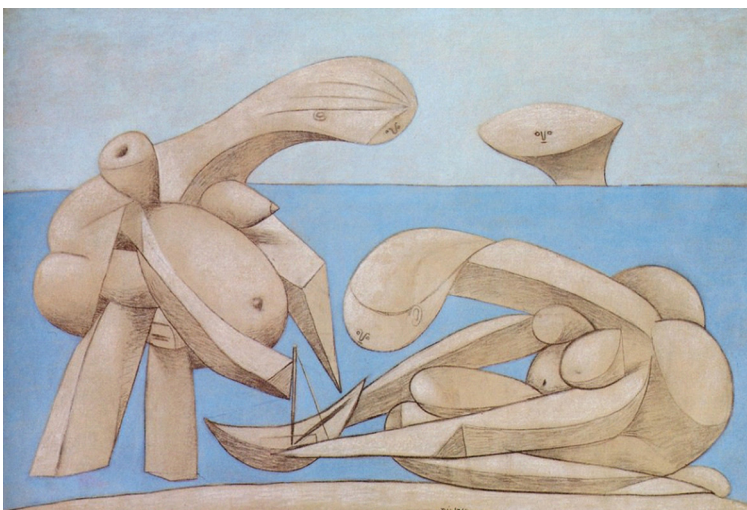
In addition, it is not uncommon for BI/AAD patients to have coincidental osteoporosis (especially in rheumatoid arthritis patients who have had long-term steroid treatment). Preoperative dual-energy X-ray absorptiometry is helpful to evaluate for osteoporosis in these patients. To achieve adequate reduction, a solid purchase of the fixation screws is essential. In osteoporotic patients, pretreatment with teriparatide is suggested to prevent screw pull-out, screw loosening and pseudarthrosis. In patients who have significant untreated osteoporosis, odontoidectomy plus *in situ* occipital-cervical fusion with multiple anchor points

is a viable option since a reduction maneuver may lead to hardware pullout.

The key points of doing a successful single stage posterior reduction and fixation include appropriate patient selection, identification of osseous and vascular anomalies, and use of gentle reduction and solid fixation. We congratulate Dr. P. Sarat Chandra on the excellent clinical results for these patients. These patients need to be followed for 1–2 years to ensure the bone graft heals.

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Title: On the Beach
Artist: Pablo Picasso
Year: 1937

On the Beach also draws upon aspects of Surrealism, here we are once more confronted with two female forms constructed from an assemblage of peculiar biomorphic forms. The figures appear to be at the edge of the sea and one lowers a small toy boat into the water. Another, similar form rises above the horizon, as if watching the activity of the foreground figures. However, as this figure is represented as approximately the same scale as the foreground figures, its presence on the horizon implies that it is a gigantic and threatening being.

More information: <https://www.pablocicasso.org/on-the-beach.jsp>
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