

# Anterior Retropharyngeal Titanium Cage Distraction Of The Atlantoaxial Joints For Reducing Basilar Invagination: A First Report In The Literature

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## Abstract

An adult male presented with spasticity in all 4 limbs and difficulty in walking of recent onset. No trauma was reported. He had no other systemic symptoms. Lateral X-ray and computerised axial tomography CT scan revealed atlanto-axial dislocation with basilar invagination. We describe the surgical procedure and outcome of this case.

## CASE REPORT

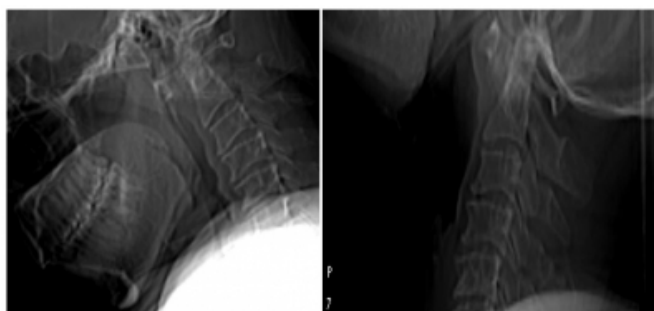
### Clinical summary

An adult male presented with spasticity in all 4 limbs and difficulty in walking of recent onset. No trauma was reported. He had no other systemic symptoms.

Lateral X-ray and computerised axial tomography CT scan revealed atlanto-axial dislocation with basilar invagination (Figure 1 and Figure 2).

### Figure 1

Plain X-rays lateral view flexion and extension showing basilar invagination with irreducible atlanto-axial dislocation.



### Figure 2

CT scan with sagittal view showing basilar invagination with atlanto-axial dislocation.



**Procedure:** The atlanto-axial joints were exposed under general anaesthesia in supine position by an anterior extrapharyngeal approach. Joint cartilage was curetted and endplates were abraded. Special wedge titanium cages of 5 mm in height (Jayon Surgical Co India) were filled with bone substitute and impacted into the joints on both sides. Additionally, the lateral mass of the atlas (C1) was fixed to

the body of the axis ( C2) using titanium plates and screws (Figure 3).

**Figure 3**

Implants: Wedge shaped cages of different heights, titanium plates 2 mm thickness and titanium screws 3.5 mm in diameter and 18 mm in length.



Postoperative CT scan and X-ray showed reduction of the basilar invagination and fixation of the atlantoaxial dislocation. (Figure 4, Figure 5, and Figure 6).

**Figure 4**

Postoperative CT scan showing downward migration of dens and reduction and fixation of the atlanto-axial dislocation.



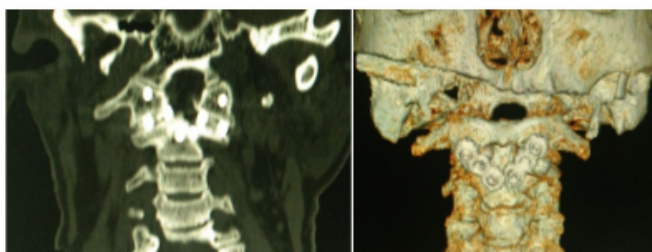
**Figure 5**

Post-operative dynamic X-rays showing reduction of the basilar invagination and reduction with fixation of the atlanto-axial dislocation.



**Figure 6**

Post-operative coronal CT scans showing position of cages and plate screw construct.



**DISCUSSION:**

Basilar invagination can be reduced by spacer insertion into the atlantoaxial joint<sup>1</sup>. Recently this technique has been recommended for syringomyelia and Chiari malformation<sup>2</sup>. However, posterior surgery has inherent difficulties such as risk vertebral artery injury, paravertebral venous plexus hemorrhage and necessity of sacrificing the C2 ganglion in most cases<sup>3</sup>.

The anterior extrapharyngeal approach offers a safe corridor to achieve all the aims of the posterior operation without all the problems of the posterior approach<sup>4</sup>. The surgery is performed in supine position with extension resulting in reduction of the atlanto-axial dislocation in most cases.

The anterior approach is using through muscle planes unlike the posterior approach which disrupts the suboccipital and C2 spinous process muscle attachments which are so very essential for craniovertebral stability<sup>6</sup>.

A wedge shaped cage distracts the joint and reduces the atlantoaxial dislocation. The large bone mass of the atlas and body of axis allow ample opportunity for easy, safe and rigid fixation of the atlanto-axial joint<sup>6</sup>.

This is the first report of a clinical case of basilar invagination reduced and fixed by anterior surgery.

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