



Instrumented reduction of a fixed C1–2 subluxation using occipital and C2/C3 fixation: A case report

Clifton Meals, MD *, Rachel Harrison, MD, Warren Yu, MD, and Joseph O'Brien, MD

Department of Orthopedics, George Washington University Medical Center, Washington, DC

Abstract

Background: Different strategies exist for reduction of the cervical spine. Placement of C1 lateral mass screws is a powerful technique but may be impossible in a degenerative or revision setting. We report the open, posterior-only, and instrumented reduction of a fixed C1–2 subluxation using occipital and C2/C3 fixation. The patient had rheumatoid arthritis and had undergone previous surgery of the cervical spine.

Methods: We performed a retrospective chart review and focused appraisal of the literature.

Results: Satisfactory reduction was achieved with this infrequently reported technique.

Conclusions/Level of Evidence: Spine surgeons may consider the described procedure a viable treatment alternative in problematic subluxations of the cervical spine. Level V.

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Keywords: Cervical spine; Subluxation; Reduction; Instrumented; Rheumatoid arthritis

Instrumented reduction has been used to treat lumbar spondylolisthesis,^{1–3} thoracic fracture-dislocations,^{4,5} cervicothoracic deformity,⁶ and most recently, craniocervical and atlantoaxial subluxation.^{7–10}

Craniocervical subluxation and atlantoaxial subluxation produce a variety of deformities, for example, cranial settling, basilar invagination, and cervical stenosis. Different instrumented reduction techniques may be particularly suited for each. In cases of cervical stenosis and instability, placement of C1 lateral mass screws is a powerful alternative to the traditional use of wiring and transarticular screw fixation.⁹ C1 lateral mass screws may be difficult to place, however, in a revision or degenerative setting.

As an alternative to the placement of C1 lateral mass screws, we describe occipital plating and fixation of C2 to affect atlantoaxial reduction and correction of cervical stenosis/instability.

Case report

The subject of this case report provided written informed consent for print and electronic publication of this report.

* Corresponding author: Clifton Meals, MD, Department of Orthopedics, George Washington University Medical Center, 300 Massachusetts Ave, NW 24, Washington, DC 20001; Tel: 310-367-6404; Fax: 202-741-3313.
E-mail address: clifftongm@gmail.com

The use of bone morphogenetic protein in this case was off-label.

History

A 34-year-old woman with rheumatoid arthritis presented to our clinic 6 months after undergoing a C1–2 fusion. This procedure had been designed to correct subluxation at the atlantoaxial articulation and was accomplished with iliac crest autograft and cables. The patient had been diagnosed with rheumatoid arthritis at age 20 years, was unable to tolerate Enbrel (Entanercept; Pfizer, New York, New York), and took prednisone only. She had recently been placed in halo fixation to prevent paresthesias with neck range of motion (L'hermitte phenomenon).

Examination

The patient's pin sites were clear, and an examination of her cranial nerves yielded benign findings. Additional examination of the extremities showed her to be neurologically intact and normoreflexic. The patient was noted to have a boutonnière deformity of her left ring finger and a swan-neck deformity of her left middle finger. A cervical computed tomography scan obtained at the time of presentation to our clinic is shown in Fig. 1. The space available for the spinal cord at C1–2 was 6 mm. Revision decom-

pression and fusion of the cervical spine were recommended.

Operation

Intravenous antibiotics were administered, fiberoptic intubation was performed with succinylcholine, and both somatosensory evoked potentials (SSEPs) and motor evoked potentials (MEPs) were obtained in the supine position. The halo was removed, and the patient was positioned prone with her head attached to a Jackson frame via a Mayfield clamp. Prone SSEPs and MEPs were stable. Attempted closed reduction of the C1–2 subluxation was unsuccessful (Fig. 2).

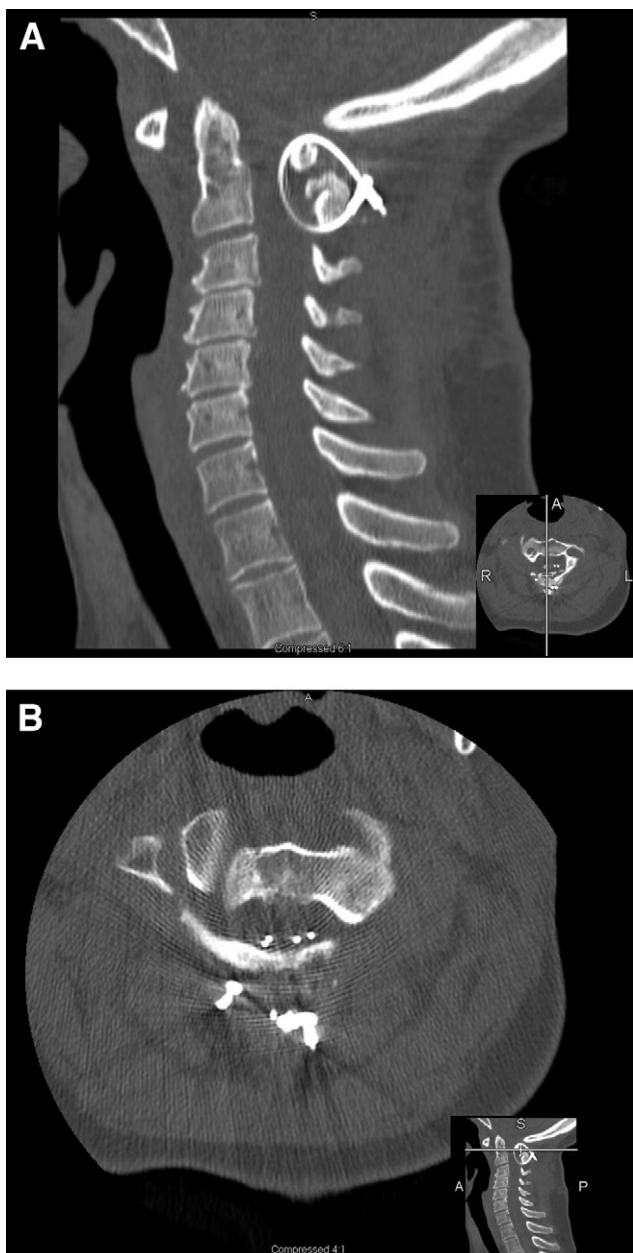


Fig. 1. Sagittal (A) and axial (B) computed tomography images of cervical spine obtained at time of presentation to clinic.



Fig. 2. Fluoroscopic intraoperative image showing failed closed reduction.

The patient’s neck was then prepared and draped, and a midline subperiosteal approach was performed with sharp dissection and bipolar electrocautery to avoid monopolar contact with the C1–2 cables. With the cervical spine exposed from the occiput to C3, laminectomy of C1 and C2

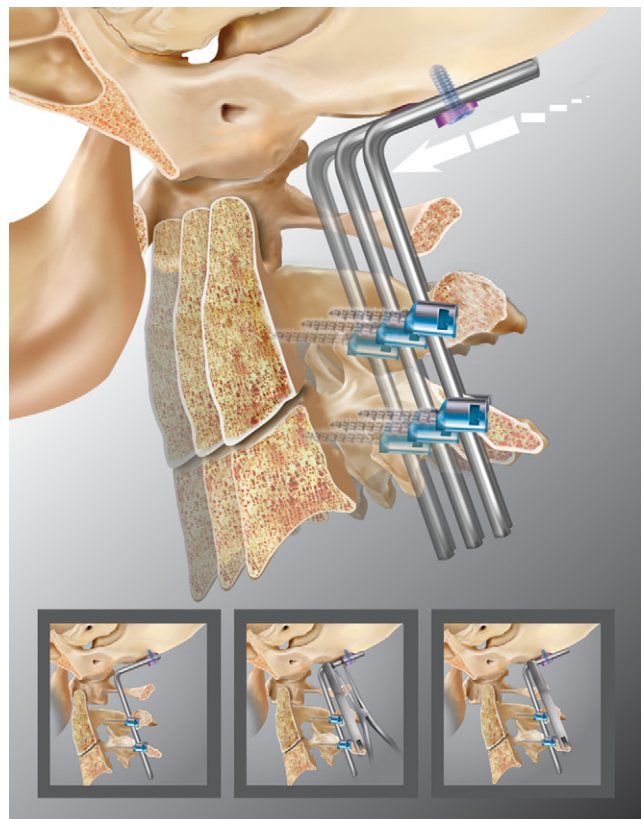


Fig. 3. Instrumented reduction of atlantoaxial articulation using occipital plate.

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