

### **Learning Objectives**

- Discuss challenges of occipito-cervical fusions in young children
- Learn an alternative technique for C1 fixation and securing autologous rib graft

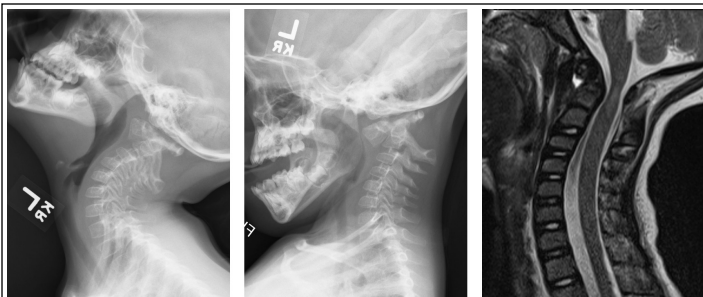
### **Introduction**

Occipitocervical fusion surgery in young children can be challenging. Screw placement can be problematic due to abnormal and smaller-sized anatomy as well as bone quality. While fixation at C1 is not required to achieve a high fusion rate (1), in some cases of occipitocervical instability, a failure to fixate C1 will result in relative subluxation of C1 on C2, requiring a C1 laminectomy to prevent canal stenosis. This in turn limits graft-lamina surface contact. Furthermore, achieving good contact between irregularly shaped autologous bone graft and bony surfaces to optimize osseous arthrodesis can be difficult.

We present a case report to describe a cabling technique to: a) maintain C1 reduction without screw fixation; and B) secure autologous rib grafts.

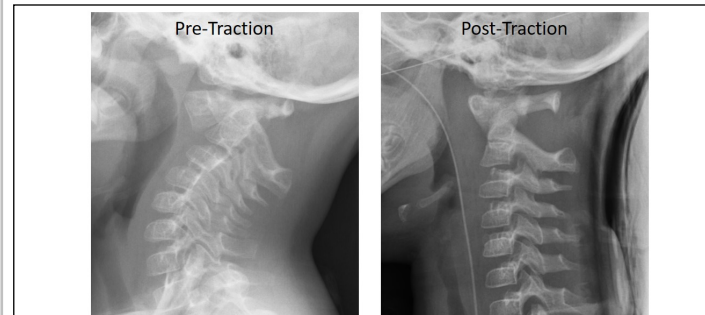
### **Case Presentation**

A 4 year old female with Down syndrome presented with a two month history of neck pain and torticollis with a right-sided head tilt. Her neck pain was aggravated by activity and worse at night. Sensorimotor exam was non-focal. Imaging demonstrated atlantoaxial instability with os odontoideum and myelomalacia at the cervicomedullary junction.

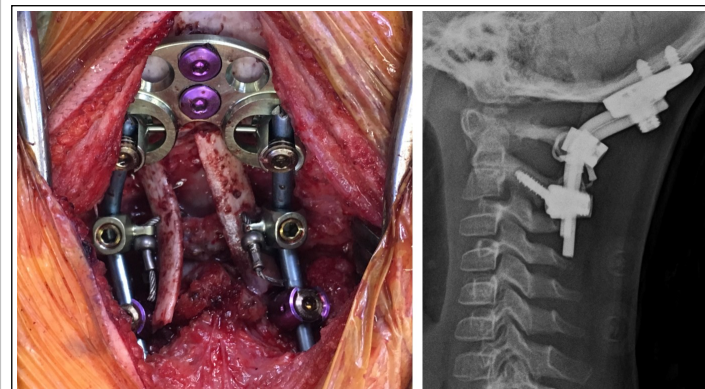


### **Surgical Management**

The patient was initially placed in cervical traction with gradual partial reduction over several days.



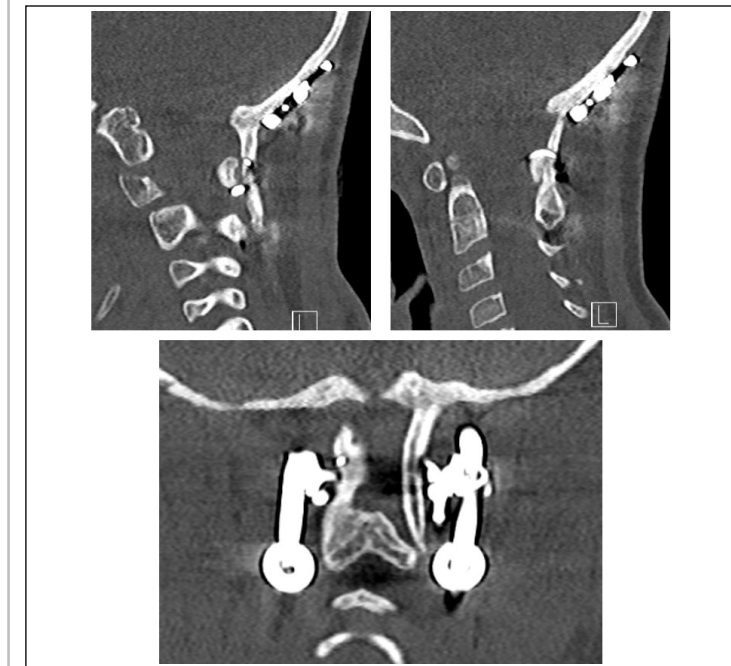
She subsequently underwent occiput to C2 instrumented fusion with autologous rib graft. An occipital plate and bilateral C2 pars screws were placed. The patient's anatomy precluded C1 lateral mass screws and C1 remained anteriorly translated despite good occipital and C2 fixation and alignment. Sublaminar cables were passed at C1. Holes were drilled into each rib graft to allow the cable to run through the graft. The cables were then secured to the rods via eyelet connectors, maintaining proper alignment of C1 while simultaneously securing the graft with apposition of the graft against the occiput as well as the C1 and C2 lamina.



The patient tolerated surgery well, and her neck pain resolved almost immediately after surgery. She was maintained in a hard cervical collar for 6 months.

### **Results**

Cervical spine CT at 6 months post-operatively demonstrated adequate maintained alignment and evidence of bony fusion between the occiput and the rib grafts bilaterally and between C2 and the rib graft on the right side.



### **Conclusions**

C1-sublaminar graft cabling an alternative method to be considered in occipitocervical fusions in young children.

### **References**

1. Hankinson TC, Avellino AM, Harter D, Jea A, Lew S, Pincus D, Proctor MR, Rodriguez L, Sacco D, Spinks T, Brockmeyer DL, Anderson RC. Equivalence of fusion rates after rigid internal fixation of the occiput to C-2 with or without C-1 instrumentation. *J Neurosurg Pediatr.* 2010 Apr;5(4):380-4