Type II odontoid fractures with irreducible posterior displacement are uncommon, and can cause spinal cord compression, respiratory failure and even death. Treatment is usually surgical, with transoral decompression and posterior fusion or with reduction and fusion of C1-C2 by the transoral approach. We describe a case of type II odontoid fracture with irreducible posterior atlantoaxial dislocation that was treated exclusively by the transoral approach with osteosynthesis of the odontoid, thus preserving functional segmental mobility. **Level of Evidence III; therapeutic study.**

**Keywords:** Atlanto-axial joint; Arthrodesis; Fracture fixation, internal; Odontoid process; Spinal injuries.

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**INTRODUCTION**

Odontoid fractures are relatively common, corresponding to 20% of all acute cervical fractures. However, fracture of the odontoid process with posterior atlantoaxial dislocation is uncommon. Patients with this type of injury rarely survive. Its occurrence is not well known in the literature, but it is believed that there are two incidence peaks: one in young people and another in people aged 70 and older.1 These fractures are generally realigned with cervical traction. However, those cases that reduction is not achieved are a challenge. In general, anterior decompresion through transoral approach is proposed, with subsequent fusion or decompression and anterior fusion C1-C2 with specific instruments.2-4 We report another technique, in which we carry out reduction and osteosynthesis of the fracture using a transoral approach.

**METHODS**

This is a case report of a surgical therapeutic approach in a patient with a type II odontoid fracture and irreducible posterior displacement. An Informed Consent Form was duly signed by the patient. This study was not submitted to the Research Ethics Committee.

**CASE REPORT**

We report a case of a 34 year-old patient, male, healthy, not smoker, non osteoporotic, who was victim of motorcycle accident. On admission, he complained of neck pain and retroauricular pain. Neurological examination revealed no abnormalities and there was no associated trauma. Imaging tests showed a fractured odontoid Type II associated with posterior atlantoaxial dislocation and...
involvement of the spinal canal. (Figure 1) Reduction by cervical traction was attempted, without success. A combined transoral approach to decompression followed by posterior cervical fusion was designed.

The patient was taken to the operating room and initially approached by transoral access. We observed the fracture line, where the odontoid process was ankylosed and dislocated posteriorly. After osteotomy performed with the drill in the fracture line, the head was slightly bent and complete reduction of the posterior dislocation of the odontoid process was observed. As the osteotomy resulted in a gap, we removed the iliac graft and placed it between the odontoid and C2 body. Fixation of the fracture was then performed using a mini-plate 2.4 mm. (Figure 2, 3, 4 and 5)

The patient had an uneventful postoperative period and was discharged with instructions to wear a cervical collar for 6 weeks. Patient is now in the twenty-third month of follow-up, with no complaints of pain and with established fusion and cervical mobility preserved. (Figure 6)

**DISCUSSION**

Type II odontoid fracture with irreducible atlantoaxial dislocation although uncommon, can be associated with complex deformities of the craniocervical junction and represents a potential risk for neurological and medical complications such as cervical myelopathy, respiratory failure and even death.5,6

The consensus is that these fractures should be treated surgically. In these cases, the posterior cervical approach is commonly used and involves higher morbidity and - in some cases - the inability to completely reduce the fracture.3,4,6,7 Fa Jing Liu et al.

in 2005 described an interesting option. They developed a plate implanted by the transoral approach (TARP System), which enabled reduction and C1-C2 stabilization with a good fusion rate.2 In 2009, an artificial atlantodens joint was designed in the laboratory that could also be used in these patients, preserving cervical mobility.5

We report another alternative for the treatment of Type II odontoid fractures with posterior irreducible displacement. Instead of fusing C1-C2, we performed osteosynthesis of C2 by the transoral approach. Thus, we managed to realign the fracture, stabilize it, ensure preservation of cervical mobility, and reduce morbidity and surgical time in non-osteoporotic and non-smoker patients.
CONCLUSIONS

We conclude that the reduction and osteosynthesis of the odontoid fracture with irreducible posterior displacement through the transoral approach is feasible, safe and effective in non-osteoporotic young patients without comorbidities.

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REFERENCES