Odontoid screw fixation in younger patients with Odontoid fracture: Successful union with Motion preservation

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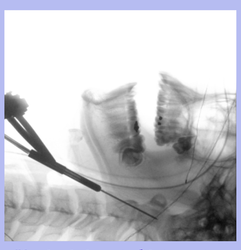
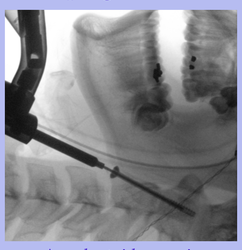
Odontoid fractures can occur in low energy trauma in elderly or high energy trauma in younger patients. Different types of treatment may be offered, ranging from non-operative treatment with rigid neck collar, halo immobilisation to open surgery with anterior or posterior fixation. Here we illustrate the use of Odontoid screw fixation in type II or III odontoid fractures, achieving satisfactory healing and motion preservation.

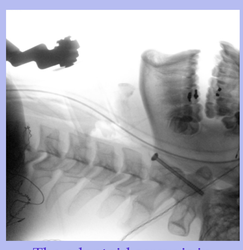
Odontoid screw fixation under fluoroscopic guidance



K-wire is inserted into cortex of the tip of the dens of C2.



An odontoid screw is advanced to the tip of dens.



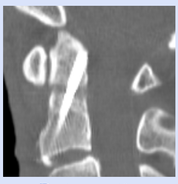
The odontoid screw is in place and K-wire is removed.

Case 1

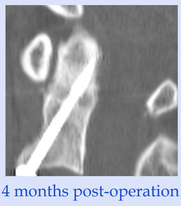
A 39-year-old man suffered from an odontoid fracture as a result of a road traffic accident. CT C-spine revealed a displaced fracture of the odontoid peg. He was initially treated with a halo jacket; however repeat CT 2 and 3 months later still revealed delayed non-union of the odontoid fracture. He then underwent odontoid screw fixation. Interval scan 4 months later then showed complete healing of the fracture with satisfactory alignment.

Initial

3 months post-injury



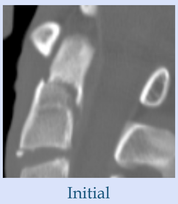
Post-operation



4 months post-operation

Case 2

A 15-year-old boy was involved in a bicycle accident while going downhill, and sustained an odontoid fracture. CT C-spine showed that the odontoid was fractured, with minimal extention into the lateral masses of C2; with mild posterior displacement. He also sustained a large orbital floor fracture in the same incident. Odontoid screw fixation was performed. CT 2 months later showed complete healing of the fracture with restoration of the alignment. The functional outcome was excellent at 1 year follow-up.



Initial

1 month post-operation

2 months post-operation

Conclusion

Satisfactory healing with motion preservation was achieved with odontoid screw fixation. It is an option of treatment for patients with failed initial conservative treatment or patients with displaced odontoid fracture.

Classification of odontoid fractures				
Type I	Type II (Fracture through waist)			Type III
	IIa	IIb	IIc	
Oblique avulsion fracture through tip of dens	Non-displaced, or minimally displaced with no comminution	Displaced with fracture line from anterosuperior to posteroinferior	Fracture from anteroinferior to posterosuperior, or with significant comminution	Through odontoid and into lateral masses of C2
				

Hard neck collar	Halo immobilisation	Operative
Type I	Type II, no risk factors for nonunion	**Type II, risk factors for nonunion**
Type II, not surgical candidate		**Type II/III fracture nonunions**
Type III		

References:
Koivikko MP, Kiuru MJ, Koskinen SK, et al. Factors associated with nonunion in conservatively-treated type-II fractures of the odontoid process. J Bone Joint Surg Br 2004; 86:1146.
Klaus Bohndorf, Mark W. Anderson, Arthur Mark Davies, Herwig Imhof, Klaus Wörtler. Imaging of Bones and Joints : A Concise, Multimodality Approach. Thieme; 2017