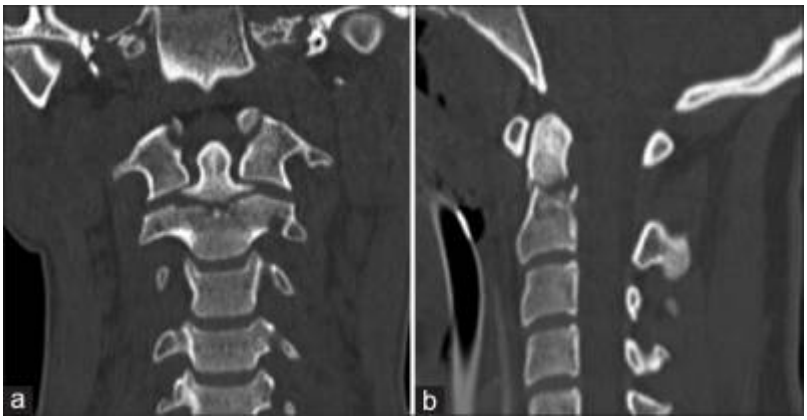
Odontoid fracture

- Lower cervical C6/C7 andersson lesion with upper cervical C1/C2 fracture in ankylosing spondylitis: a case report and literature review
- Comparison of Mechanical Stress on Implants in Anterior Single and Double Screw Fixation of Odontoid Fractures in a Finite Element Model
- Calcium pyrophosphate dihydrate crystal deposition (CPPD) in the retro-odontoid tissue with compression of cervicomedullary junction: Analysis of 46 cases (1984-2020) with literature review
- Masseter Sarcopenia and Mortality After Type II Odontoid Fractures in the Elderly: A 5-Year Follow-Up Study
- Comparative Effectiveness of Conservative Management Versus Surgical Fixation in Acute Type II Odontoid Fractures
- Influence of the magnitude and orientation of forces on the odontoid fracture: A finite element model analyses
- Rotational Bow Hunter's ischemic stroke caused by post-traumatic os odontoideum in an older patient: An illustrative case
- Traumatic posterior atlantoaxial dislocation based on imaging of the anterior arch-odontoid process-transverse ligament complex: a retrospective cohort study

The odontoid process fracture (also known as the PEG or dens fracture) occurs where there is a fracture through the odontoid process of C2.



Pathologic fractures can also occur, e.g. with metastatic involvement.

Key concepts

10–15% of cervical spine fractures. Can occur in older patients with minor trauma, or in younger patients typically following motor vehicle accident (MVA), falls from a height, skiing…

● May be fatal at time of injury, most survivors are intact. Neck pain is common.

● Classification: Anderson & D'Alonzo. Type II (at base) is the most common.

● Treatment: surgery is considered for: Type II if age > 50yrs, Type IIA , or Type II & III if displacement ≥ 5mm or if alignment cannot be maintained with halo.

Epidemiology

see Odontoid fracture epidemiology.

Classification

see Odontoid fracture classification.

Mechanism

Flexion is the most common mechanism of injury, with resultant anterior displacement of C1 on C2 (atlantoaxial subluxation). Extension only occasionally produces odontoid fractures, usually associated with posterior displacement.

Clinical features

Odontoid fracture clinical features.

Diagnosis

see Odontoid fracture diagnosis.

Differential diagnosis

Os odontoideum

Persistent ossiculum terminale

Mach effect

Treatment

see Odontoid fracture treatment.

Outcome

see Odontoid fracture outcome.

International prospective comparative studies

The optimal odontoid fracture treatment in older people remains debated. Odontoid fractures are increasingly relevant to clinical practice due to ageing of the population.

An international prospective comparative study was conducted in fifteen European centres, involving patients aged ≥55 years with type II/III odontoid fractures. The surgeon and patient jointly decided on the applied treatment. Surgical and conservative treatments were compared. Primary outcomes were Neck Disability Index (NDI) improvement, fracture union and stability at 52 weeks. Secondary outcomes were Visual Analogue Scale neck pain, Likert patient-perceived recovery and EuroQol-5D-3L at 52 weeks. Subgroup analyses considered age, type II and displaced fractures. Multivariable regression analyses adjusted for age, gender and fracture characteristics.

The study included 276 patients, of which 144 (52%) were treated surgically and 132 (48%) conservatively (mean (SD) age 77.3 (9.1) vs. 76.6 (9.7), P = 0.56). NDI improvement was largely similar between surgical and conservative treatments (mean (SE) -11 (2.4) vs. -14 (1.8), P = 0.08), as were union (86% vs. 78%, aOR 2.3, 95% CI 0.97-5.7) and stability (99% vs. 98%, aOR NA). NDI improvement did not differ between patients with union and persistent non-union (mean (SE) -13 (2.0) vs. -12 (2.8), P = 0.78). There was no difference for any of the secondary outcomes or subgroups.

Clinical outcome and fracture healing at 52 weeks were similar between treatments. Clinical outcome and fracture union were not associated. Treatments should prioritize favourable clinical over radiological outcomes [1)].

Case series

see Odontoid fracture case series.

1)
Huybregts JGJ, Polak SB, Jacobs WC, Arts MP, Meyer B, Wostrack M, Butenschön VM, Osti M, Öner FC, Slooff WM, Feller RE, Bouma GJ, Harhangi BS, Depreitere B, Nygaard ØP, Weber C, Müller K, Timothy J, Pellisé F, Rasmussen MM, van Zwet EW, Steyerberg EW, Peul WC, Vleggeert-Lankamp CLA. Surgical versus conservative treatment for odontoid fractures in older people: an international prospective comparative study. Age Ageing. 2024 Aug 6;53(8):afae189. doi: 10.1093/ageing/afae189. PMID: 39193720.