

Bilateral Mandibular Condylar Fractures with Associated External Auditory Canal Fractures and Otorrhagia

David Dang

A rare case of bilateral mandibular condylar fractures associated with bilateral external auditory canal fractures and otorrhagia is reported. The more severe external auditory canal fracture was present on the side of high condylar fracture, and the less severe external auditory canal fracture was ipsilateral to the condylar neck fracture. A mechanism of injury is proposed to account for such findings.

Case report

A 19-year-old female fell 20 feet from a roof and presented with a complete laceration of the lower lip and bilateral otorrhagia. A maxillofacial computed tomography (CT) exam (Fig. 1) revealed a nondisplaced fracture at the mandibular symphysis and bilateral temporomandibular joint (TMJ) fractures. The right TMJ fracture was at the condylar neck. The left TMJ fracture was within the intra-capsular portion of the condyle. There was lateral displacement of the left TMJ. There were comminuted fractures of the anterior walls of both external auditory canals (EAC) with acute blood in the canals (Fig. 2). The EAC fracture fragments were more inferiorly and posteriorly displaced on the left (Fig. 3).

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Abbreviations: CT, Computed tomography, TMJ, Temporomandibular joint, EAC, External auditory canal

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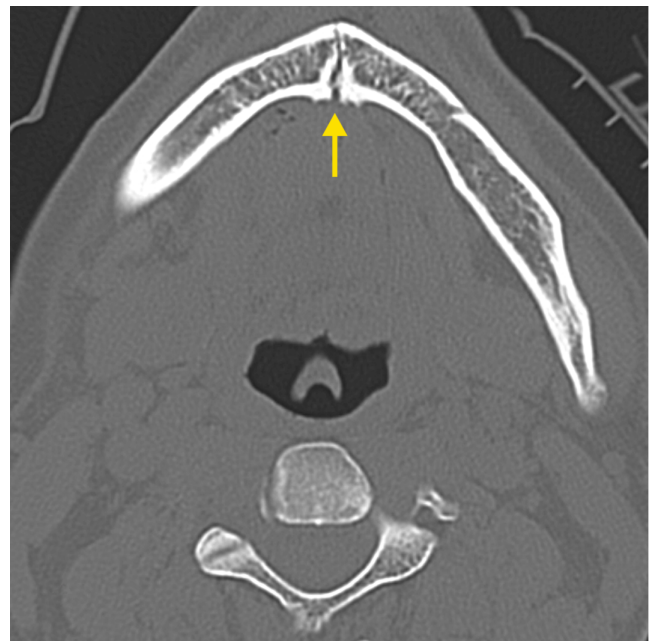


Figure 1A. Maxillofacial CT (0.625 mm axial acquisitions, isotropic reconstructions) of a young female patient after a 20-foot fall. This image shows a nondisplaced mandibular symphyseal fracture.

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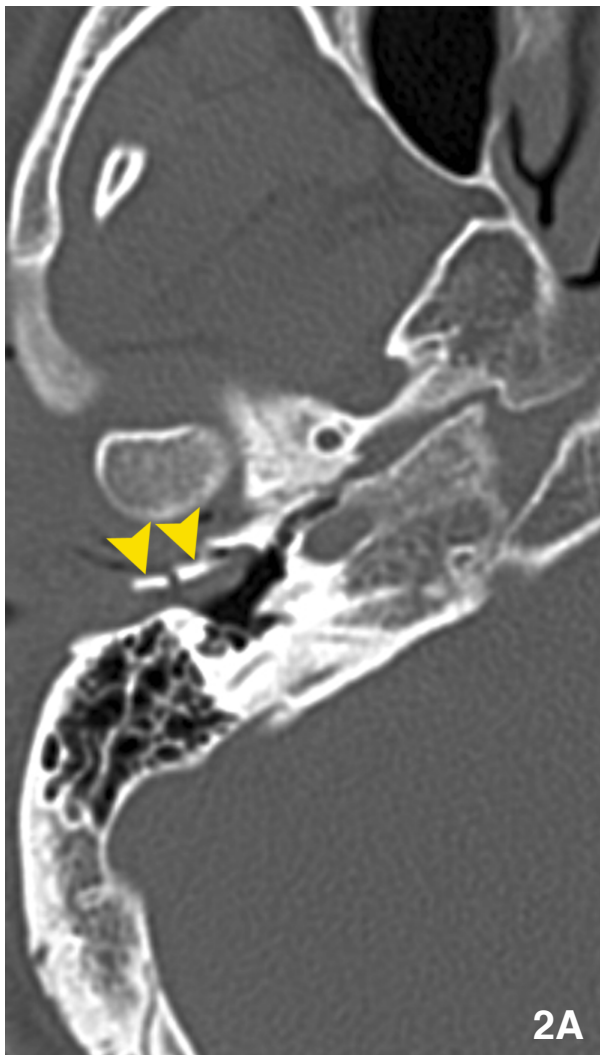
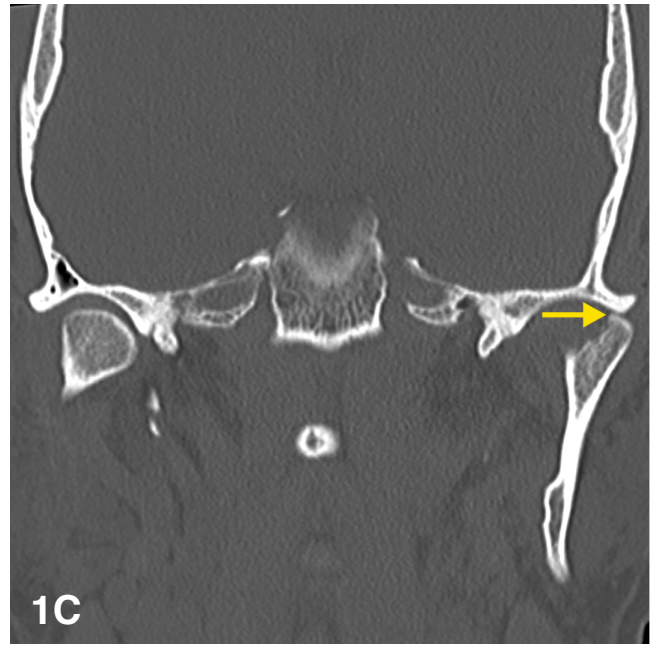
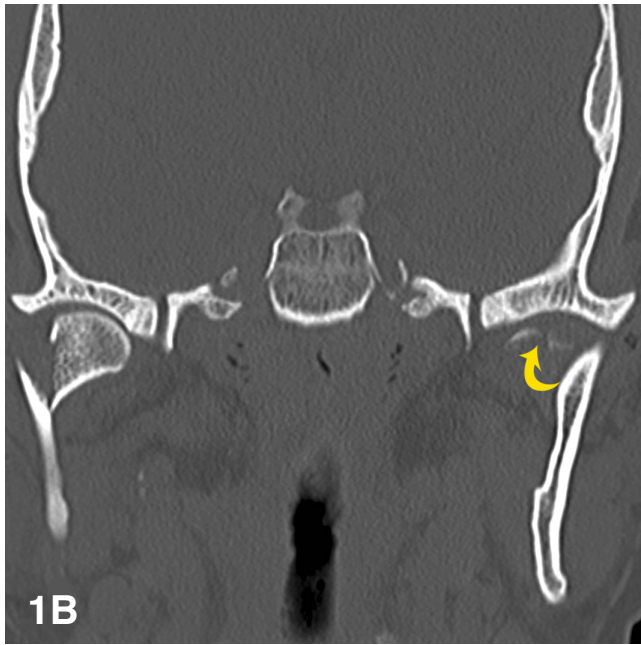


Figure 1B,C. Maxillofacial CT (0.625 mm axial acquisitions, isotropic reconstructions) of a young female patient after a 20-foot fall. Reconstructed coronal (**B,C**) images show an angulated right condylar neck fracture (**B**) and a comminuted left high condylar fracture (**B**, curved arrow). Arrow in **C** points to lateral dislocation of left TMJ.

Figure 2A. Maxillofacial CT (0.625 mm axial acquisitions, isotropic reconstructions) of a young female patient after a 20-foot fall. Axial images show comminuted fractures of the anterior walls of both EAC's (arrowheads). The fluids in the auditory canals likely represent acute blood.

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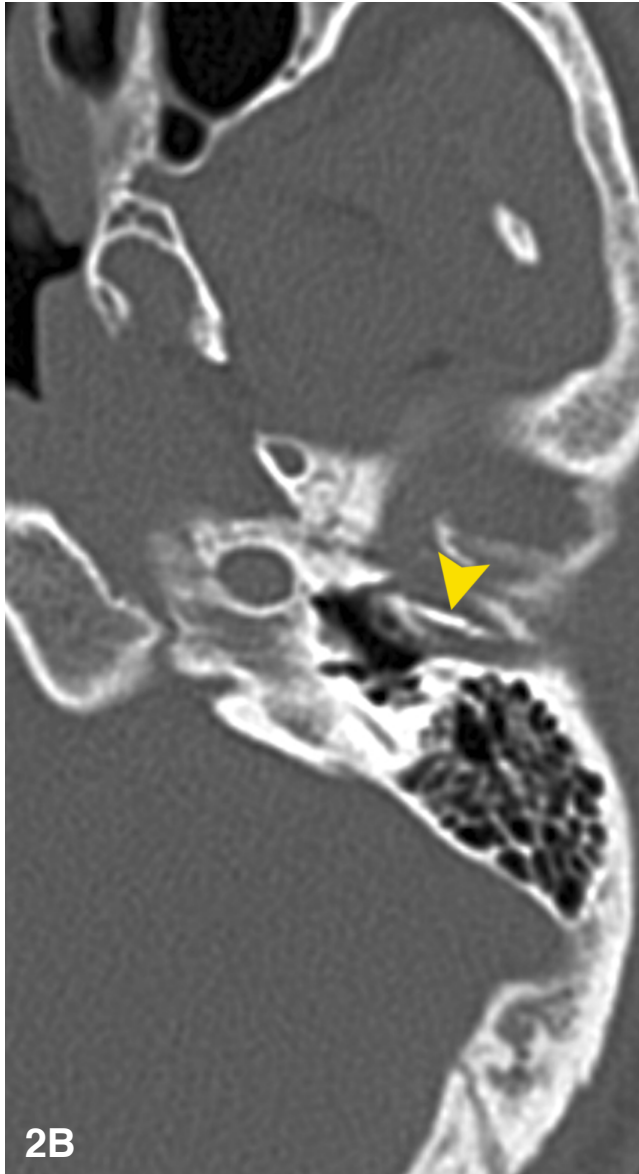


Figure 2B. Maxillofacial CT (0.625 mm axial acquisitions, isotropic reconstructions) of a young female patient after a 20-foot fall. Axial images show comminuted fractures of the anterior walls of both EAC's (arrowheads). The fluids in the auditory canals likely represent acute blood.

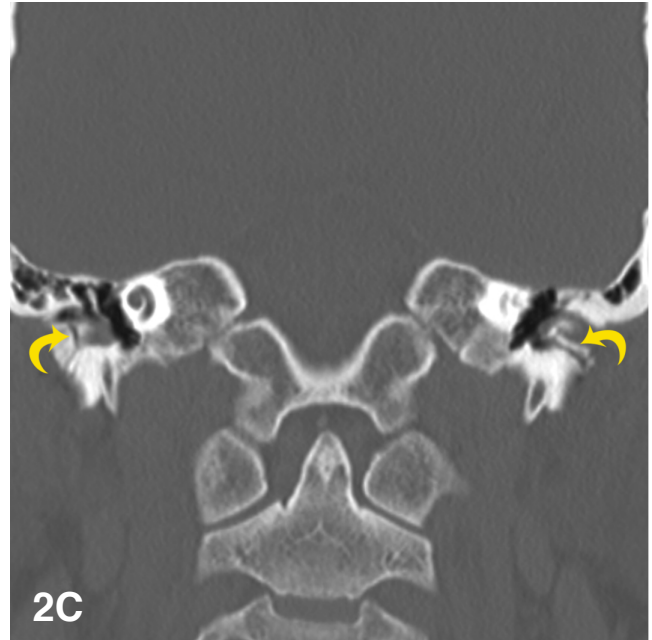


Figure 2C. Maxillofacial CT (0.625 mm axial acquisitions, isotropic reconstructions) of a young female patient after a 20-foot fall. On the coronal view, the fragments are more inferiorly displaced on the left side than on the right side (curved arrows in **C**).

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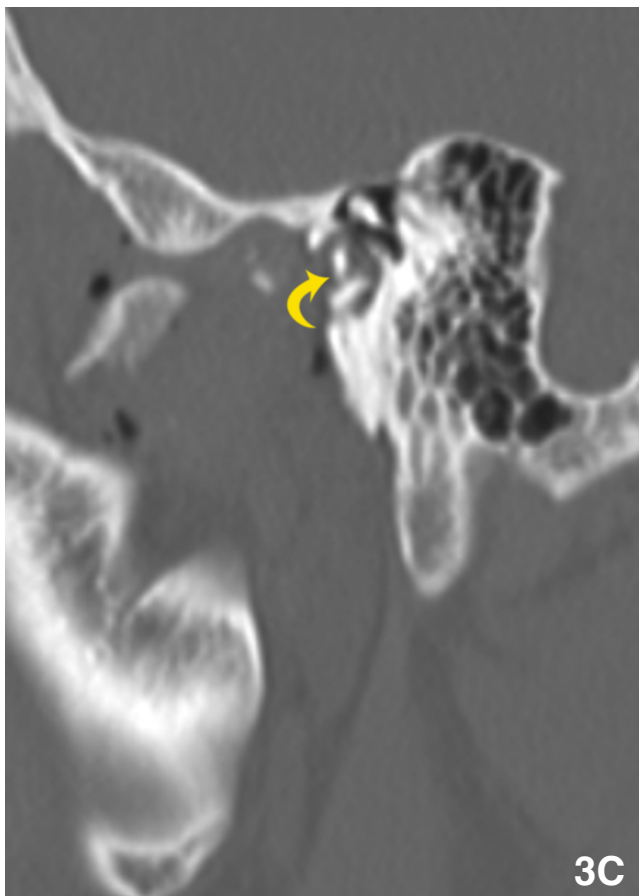
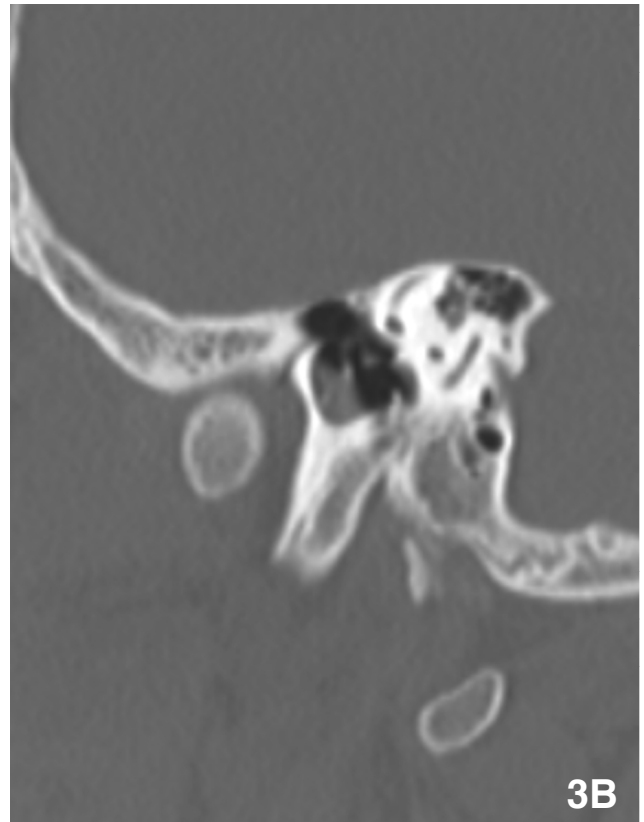
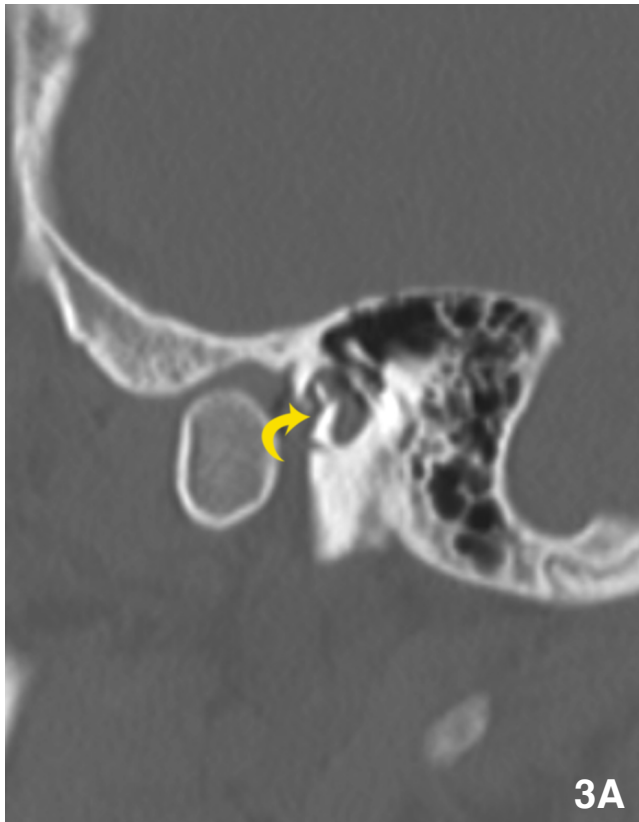


Figure 3. Maxillofacial CT (0.625 mm axial acquisitions, isotropic reconstructions) of a young female patient after a 20-foot fall. Sequential parasagittal images show more posterior displacement of EAC fractures (curved arrows) on the left (**C** is lateral to **D**) than on the right (**A** is lateral to **B**). Note that the parasagittal images are from comparable sagittal planes as evidenced by similar sections through the semicircular canals.

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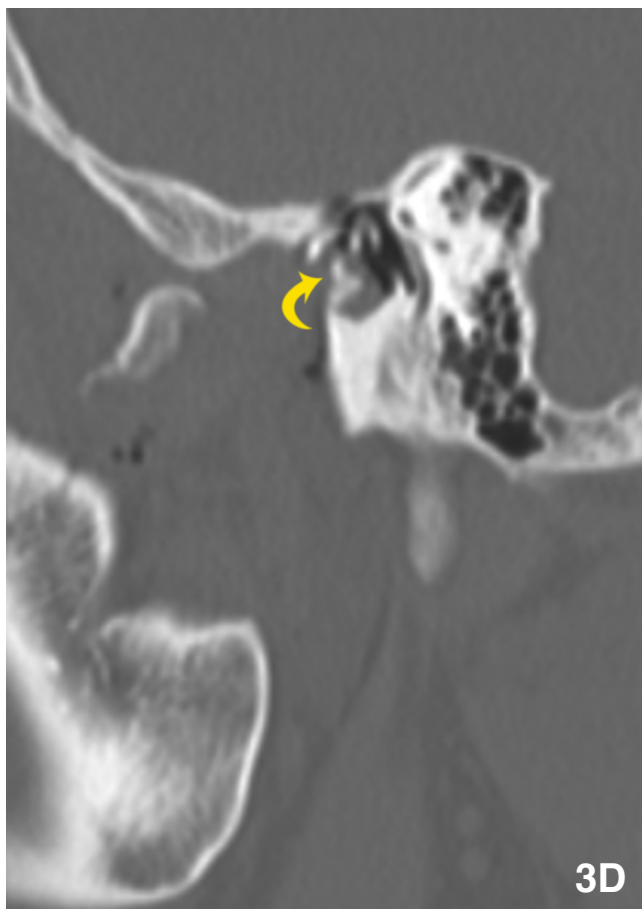


Figure 3D. Maxillofacial CT (0.625 mm axial acquisitions, isotropic reconstructions) of a young female patient after a 20-foot fall. Sequential parasagittal images show more posterior displacement of EAC fractures (curved arrows) on the left (**C** is lateral to **D**) than on the right (**A** is lateral to **B**). Note that the parasagittal images are from comparable sagittal planes as evidenced by similar sections through the semicircular canals.

Discussion

Otorrhagia is a potential complication of mandibular condylar fractures (1). Fractures of the ipsilateral petrous bone are likely the cause of otorrhagia. Penetration of sharp fracture fragments of the mandibular ramus into the auditory canal may also be another cause (2). There is a paucity of published literature describing the relationship between condylar fractures and EAC fractures. There have been only a few case reports, and only one of those is in the general radiology literature (3). This case report contributes further understanding of the mechanism of such injury and posttraumatic otorrhagia.

The EAC and TMJ are intimately located. The EAC is divided into an outer cartilaginous one-third and an inner osseous two-thirds. The TMJ is located anterior to the inner osseous canal. The anterior and inferior walls of the osseous canal are composed of the tympanic portion of the

temporal bone. Due to this intimate relationship, trauma to the TMJ is known to produce trauma to the EAC (4).

Fractures of the TMJ are often due to high impact injuries such as road traffic accidents, violence or falling. The vast majority of these fractures are either high condylar or subcondylar fractures. High condylar fractures are fractures of the intracapsular condyle (condylar head). Subcondylar fractures occur at a weak point in the ramus at 2-3 cm caudal to the condylar neck. The condylar neck is also another weak point.

The patient in this case report suffered a right condylar neck fracture and a left high condylar fracture. As shown on figures 2 and 3, the fragments of the anterior wall of the left EAC (Fig. 3 C-D) were displaced more posteriorly and inferiorly than those on the right (Fig. 3 A-B). This suggests that the force applied to the left EAC was greater. One possible explanation is the shorter distance between a high condylar fracture and the ipsilateral temporal bone. With a condylar neck or subcondylar fracture, such distance is longer, allowing for greater dissipation of force. Angulation at the left TMJ in this patient may also contribute a shearing component to the fractures and cause lateral dislocation of the joint.

Bilateral mandibular condylar fractures are frequently associated with concomitant fractures of the mandibular body (5). It is likely that condylar fractures are a result of indirect force while mandibular body fractures are due to direct impaction (6). In this patient the exertion of force from falling was not fully absorbed in the area of its primary application at the mentum, with the remainder of the force transmitted to the condyles. Fractures of the condyles in these injuries are thought to be protective of brain injury as intracranial displacement of the condyles is avoided (7). The direction, degree, magnitude and precise point of application of the force and the state of dentition and the occlusal position of the mandibles determine the displacement of condylar fractures (8). Fractures of the condyles are more likely to occur with an open mouth (9).

Computed tomography is the diagnostic modality of choice for mandibular condylar fractures (10). It is important to recognize potential association between mandibular condylar trauma and temporal bone fracture. This case report highlights the need to scrutinize the temporal bones, particularly the petrous portion as well as the EAC on CT for fractures in a patient with condylar fractures. Such scrutiny is especially important on the side with a high condylar fracture as there is a greater impaction on the ipsilateral temporal bone.

References

1. Avrahami E, Frishman E, Katz R. CT evaluation of otorrhagia associated with condylar fractures. *Clin Radiol.* 1994;49:877-8. [[PubMed](#)]
2. Avrahami E, Katz R. An association between imaging and acute posttraumatic ear bleeding with trismus. *Oral*

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- Surg Oral Med Oral Pathol Oral Radiol Endod. 1998;85:244-7. [[PubMed](#)]
3. Chong VF, Fan YF. Technical report. External auditory canal fracture secondary to mandibular trauma. Clin Radiol. 2000;55:714-6. [[PubMed](#)]
 4. Selesnick SH, Carew JF, Di Bartolomeo JR. Herniation of the temporomandibular joint into the external auditory canal: a complication of otologic surgery. Am J Otol. 1995;16:751-7. [[PubMed](#)]
 5. Lindahl L. Condylar fractures of the mandible. I. Classification and relation to age, occlusion, and concomitant injuries of teeth and teeth-supporting structures, and fractures of the mandibular body. Int J Oral Surg. 1977;6:12-21. [[PubMed](#)]
 6. MacLennan WD. Consideration of 180 cases of typical fractures of the mandibular condylar process. Br J Plast Surg. 1952;5:122-8. [[PubMed](#)]
 7. Oikarinen KS. Surgical versus nonsurgical treatment of unilateral dislocated low subcondylar fractures. Discussion. J Oral Maxillofac Surg. 1994;360-1. [[PubMed](#)]
 8. Zachariades N, Mezitis M, Mourouzis C, Papadakis D, Spanou A. Fractures of the mandibular condyle: a review of 466 cases. Literature review, reflections on treatment and proposals. J Craniomaxillofac Surg. 2006;34:421-32. [[PubMed](#)]
 9. Rowe NL, Killey HC. Fractures of the Facial Skeleton, 2nd edition. Edinburgh: E. & S. Livingstone; 1968:137-72.
 10. Schimming R, Eckelt U, Kittner T. The value of coronal computer tomograms in fractures of the mandibular condylar process. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1999;87:632-9. [[PubMed](#)]