

محاضرة التشرح الشعاعى -المرحلة الثانية

كلية المامون الجامعة

الفصل الأول

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RADIOLOGICAL FEATURES OF FACIALM BONES FRACTURES

Facial fractures are commonly caused by blunt or penetrating trauma at moderate or high levels of force. Such injuries may be sustained during a fall,

physical assault

motor vehicle collision

gunshot wound

The facial bones are thin and relatively fragile, making them susceptible to injury.

Epidemiology

Males are affected more commonly than females, and facial fractures are most common in the third decade, i.e. 20-30 years ⁴.

Types

Advances in surgical technique enable surgeons to consider reduction, stabilization, and reconstruction of complex midfacial fractures according to five midface subunits ⁵:

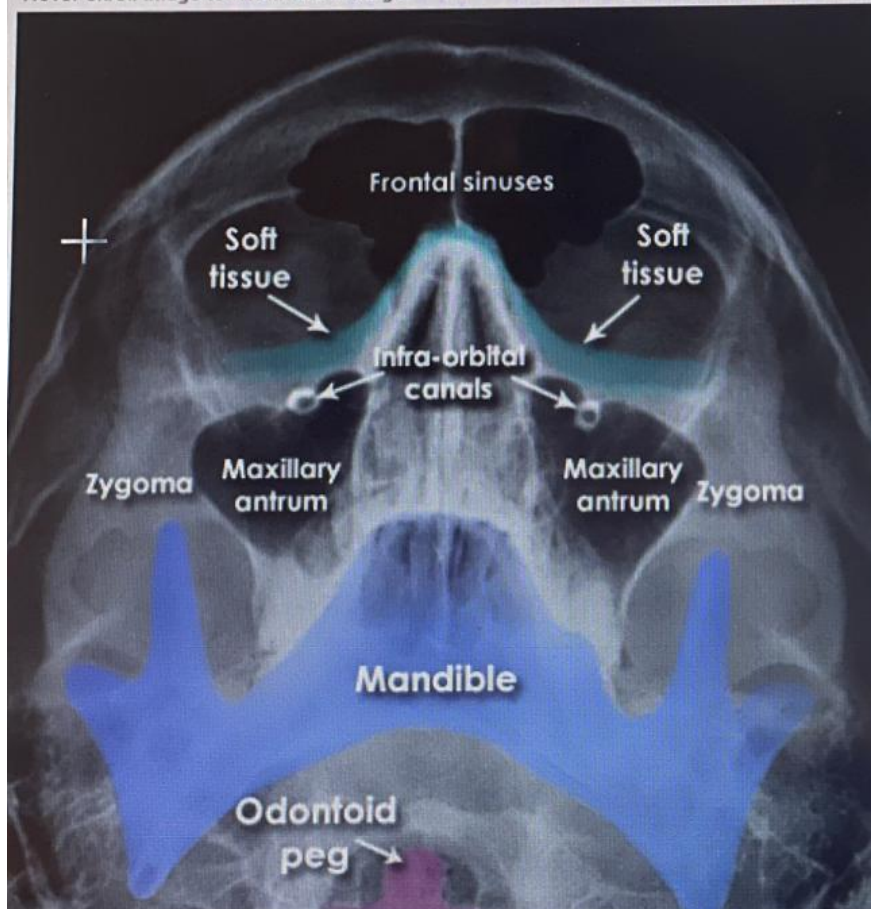
- nasoseptal fractures
- naso-orbitoethmoid (NOE) complex fractures
- orbital fractures
- zygomaticomaxillary complex (ZMC) fractures
 - isolated zygomatic arch fractures / zygomatic arch fractures
- occlusion-bearing maxillary fractures
 - alveolar process fractures

Beyond the midface, other clinically significant fractures of the facial area include:

- frontal sinus fracture
- paranasal sinus fractures
- mandibular fracture

Occipito-Mental (OM30) view - Normal

Hover on/off image to show/hide findings



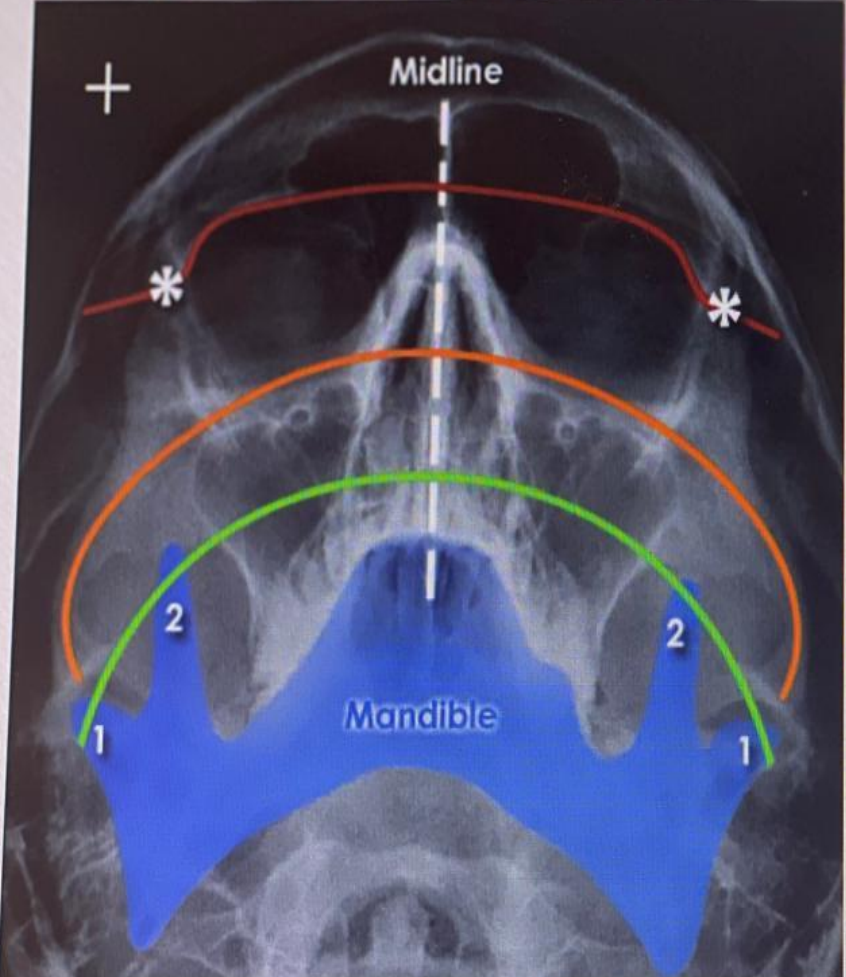
Occipito-Mental (OM30) view - Normal

- ◆ This view is acquired at 30° from horizontal with the patient in the same position as for the OM view
- ◆ Each infra-orbital canal is part of the floor of the orbit - these carry the maxillary division of the trigeminal nerve which can be injured as the result of fracture
- ◆ Note that each maxillary antrum is clear (black)
- ◆ Other visible structures include the mandible and the odontoid peg



McGrigor-Campbell lines

McGrigor-Campbell lines
Hover on/off image to show/hide findings

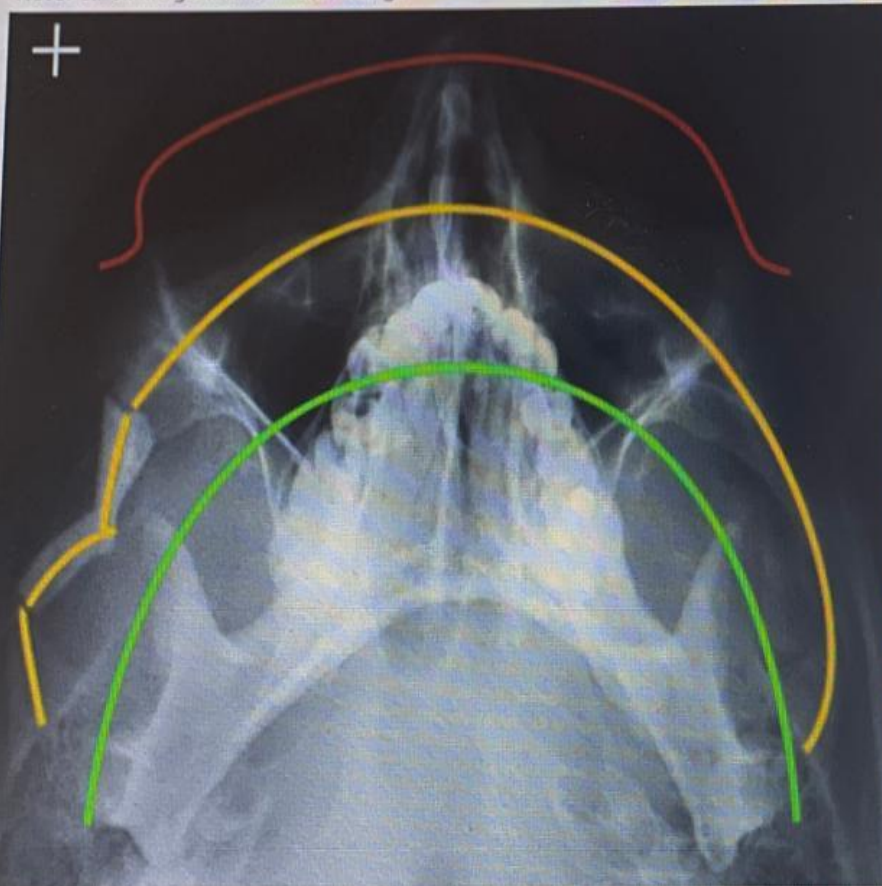


McGrigor-Campbell lines

- ◆ The ' McGrigor-Campbell lines' are visible on OM and OM30 views and can act as anatomical references to assess the facial bones for injury
- ◆ Upper line - (**Red**) passes through the zygomaticofrontal sutures (asterisks) and across the upper edge of the orbits
- ◆ Middle line - (**Orange**) follows the zygomatic arch (elephant's trunk), crosses the zygomatic bone and follows the inferior orbital margins to the opposite side
- ◆ Lower line - (**Green**) passes through the condyle (**1**) and coronoid process (**2**) of the mandible and through the lateral and medial walls of the maxillary antra on each side
- ◆ Midline - used to assess symmetry

Isolated zygomatic arch fracture

Hover on/off image to show/hide findings

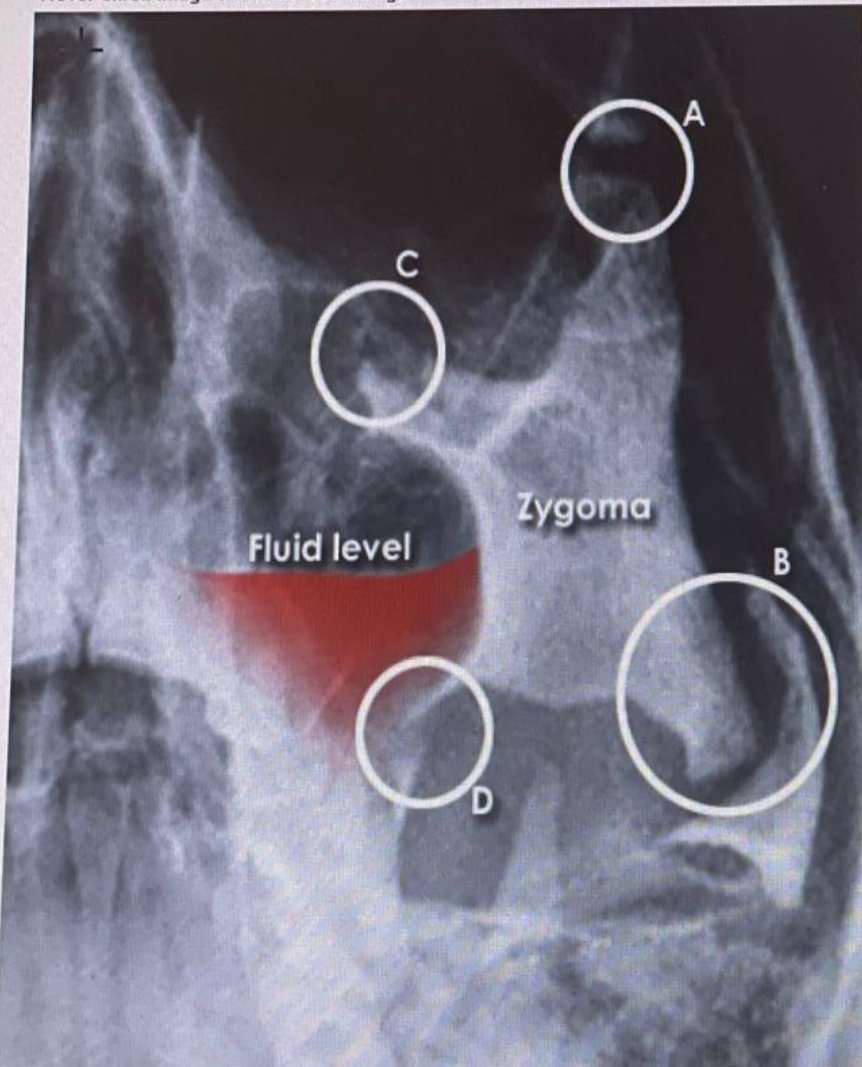


Isolated zygomatic arch fracture

- ◆ Disruption of the middle McGrigor-Campbell line is due to a comminuted fracture of the right zygomatic arch
- ◆ Following the upper and lower lines shows no fracture

Maxillary antrum fluid level

Hover on/off image to show/hide findings



Maxillary antrum fluid level

- ◆ A fluid level of blood seen in the maxillary antrum may be the only obvious sign of fracture

'Tripod' fracture

- ◆ A - Widened zygomatico-frontal suture
- ◆ B - Zygomatic arch fracture
- ◆ C - Orbital floor fracture
- ◆ D - Lateral maxillary antrum wall fracture

Note

- ◆ The zygomatico-frontal suture (A) has a variable normal appearance
- ◆ Widening of the suture - if seen alone - does not indicate a fracture

Orbital 'blowout' fracture- Teardrop

Hover on/off image to show/hide findings



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Orbital 'blowout' fracture - Teardrop sign

- ◆ On the left a 'teardrop' of soft tissue has herniated from the orbit into the maxillary antrum



Mandible anatomy parts are

Body

symphysis

Angle of the mandible

Mandibular foramen

Ramus

Neck

Head or condyle

Coronoid process

The mandible is the largest bone of the facial skeleton

Besides the bones of the middle ear, the mandible is **the only mobile bone in the skull.**

Unlike other bones of the skull,

the mandible doesn't articulate with the surrounding bones via sutures, but rather via a synovial joint called the temporomandibular joint.

This joint allows the mandible to be attached to the skull while at the same time being capable of producing various translatory and rotatory movements. These movements allow complex actions like chewing and speaking.

The mandible consists of *two main parts*: a body and two rami.

The body of mandible is its horizontal portion. It consists of two parts:

- The alveolar part
- The base of mandible
-
- **The mandibular symphysis**: Fibrous tissue in the midline of the mandibular body, which ossifies by the first year of life. It unites the left and right halves of the mandible in order to form a single, symmetrical bone.

The mental foramen: An opening located inferior to the second mandibular premolar tooth which provides the passage for **the mental nerve and vessels**.

The ramus is the vertical part of the mandible. The point at which it unites with the body is called the angle of mandible

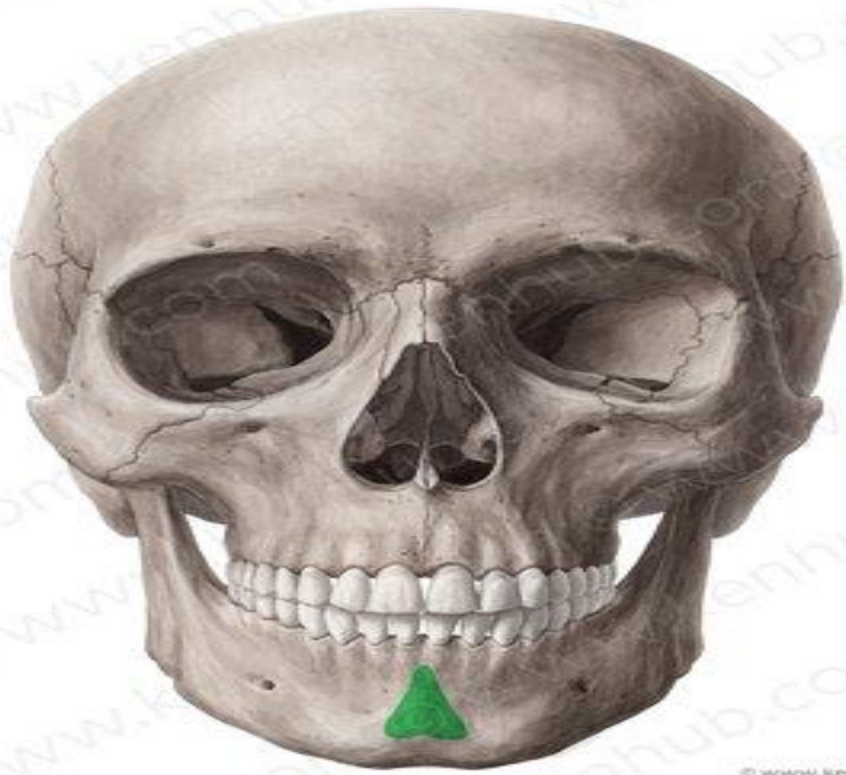
The superior part of the ramus consists of two processes:

the coronoid process (anterior process) and the **condylar process** (posterior process).

The incisure between them is called the mandibular notch and it is crossed by the **masseteric nerve and vessels**.

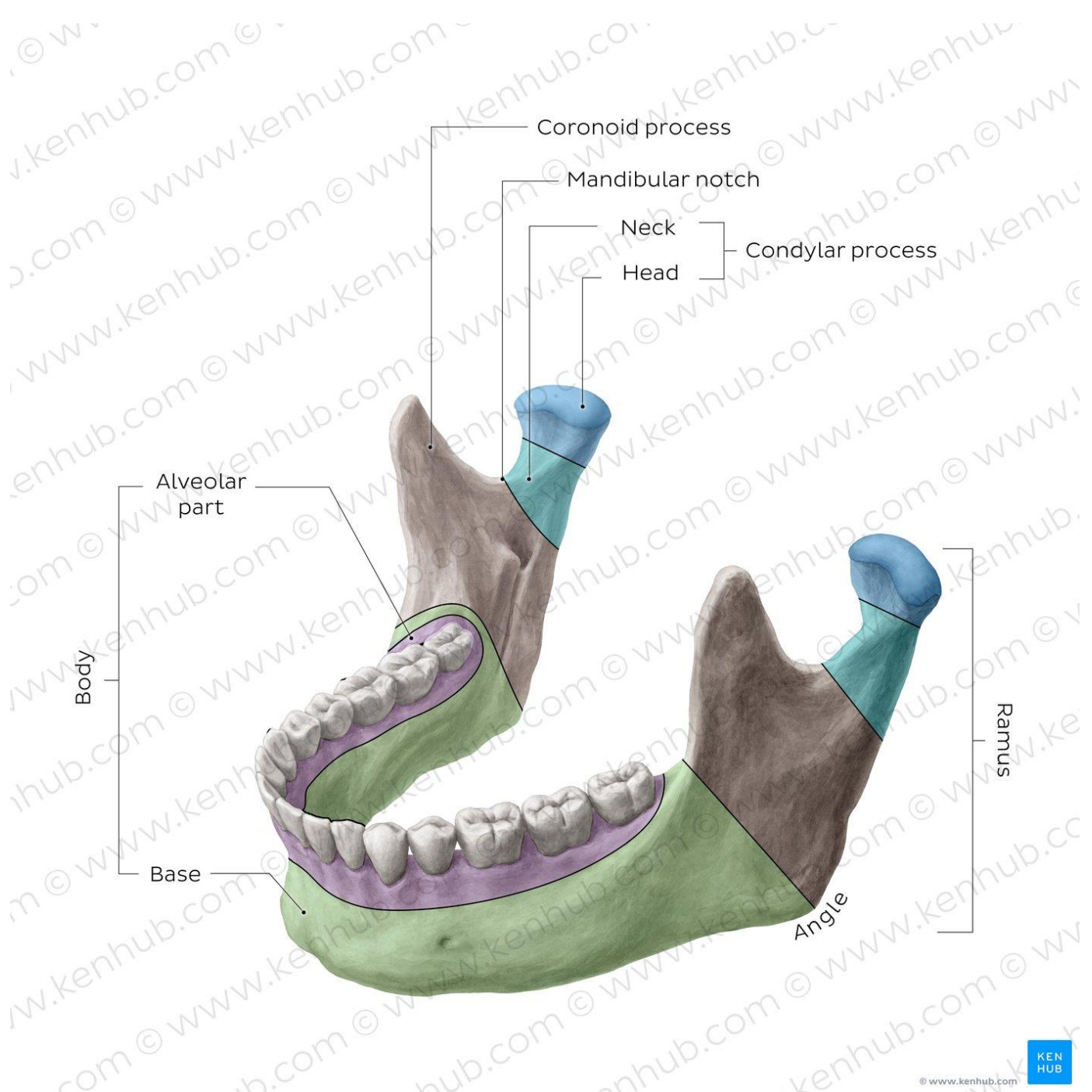
The coronoid process features the temporal crest, which serves as an attachment point for the temporalis muscle.

The condylar process has an articular surface (the condyle), via which the mandible articulates with the articular tubercle of the temporal bone to form the **temporomandibular joint**.



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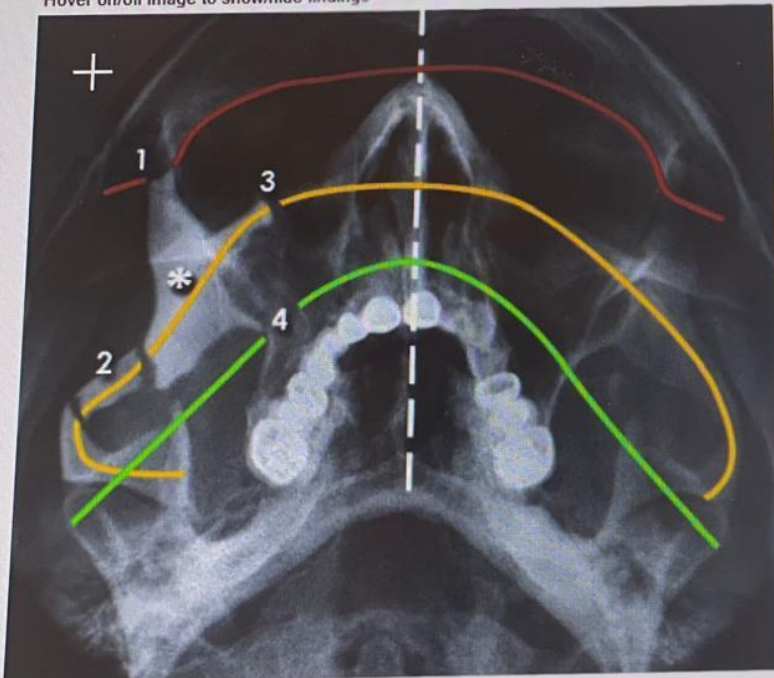




be a more accurate term as four fractures

'Tripod' fracture

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'Tripod' fracture

- ◆ 1 - The zygoma (**asterisk**) is separated from the frontal bone at the zygomatico-frontal suture
- ◆ 2 - Comminuted fracture of the zygomatic arch
- ◆ 3 - Orbital floor fracture
- ◆ 4 - Breach of the lateral wall of the maxillary antrum

Zygomatic arch

the zygomatic arch, or cheek bone, is a part of the skull formed by the zygomatic process of the temporal bone (a bone extending forward from the side of the skull, over the opening of the ear) and the temporal process of the zygomatic bone (the side of the cheekbone), the two being united by an oblique suture (the zygomaticotemporal suture)

the tendon of the temporal muscle passes medial to (i.e. through the middle of) the arch, to gain insertion into the coronoid process of the mandible (jawbone).

Boundaries

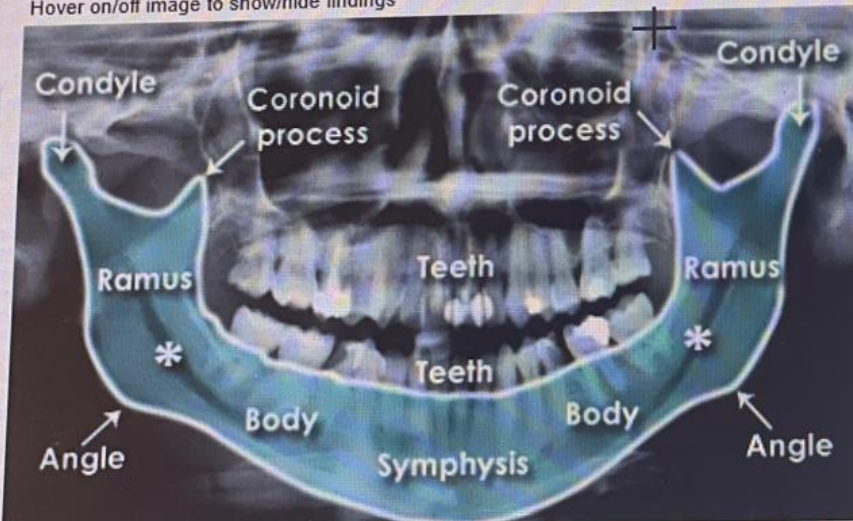
The anterosuperior (orbital) border is concave and smooth. It is the border between the lateral and orbital surfaces of the zygomatic bone.

The anteroinferior (maxillary) border is the articular surface for the zygomaticomaxillary suture



Normal mandible - Orthopantomogram (OPG)

Hover on/off image to show/hide findings

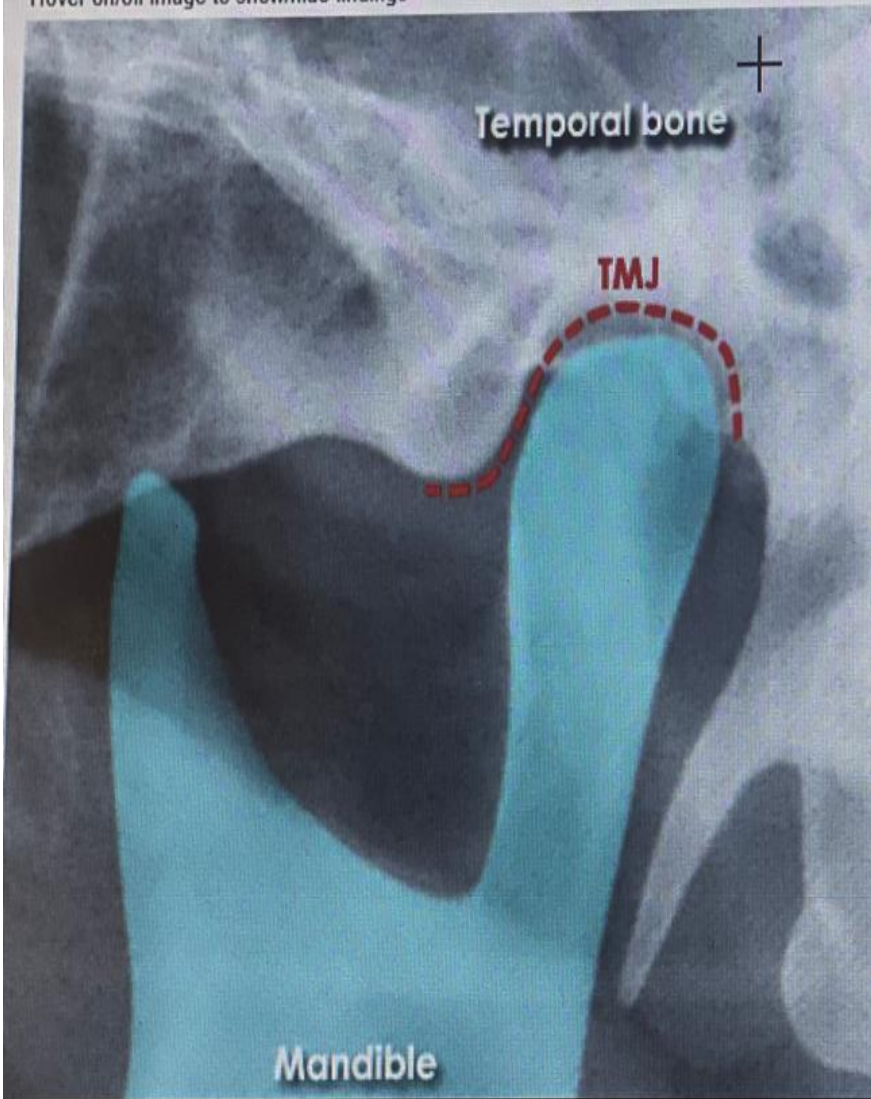


Normal mandible - Orthopantomogram (OPG)

- ◆ Follow the cortical edge all the way around the mandible
- ◆ Check the temporomandibular joints
- ◆ **Asterisks** = Inferior alveolar canal - the course of the inferior alveolar nerve

Normal temporomandibular joint - OPG (detail)

Hover on/off image to show/hide findings



OPG detail - Normal temporomandibular joint

- ◆ The condyle of the mandible meets the glenoid fossa of the temporal bone to form the temporomandibular joint (TMJ)

Normal mandible - Mandibular view

Hover on/off image to show/hide findings



Normal mandible - Mandibular view

- ◆ Follow the cortical edge all the way around the mandible

Mandible fracture - Mandibular view

Hover on/off image to show/hide findings



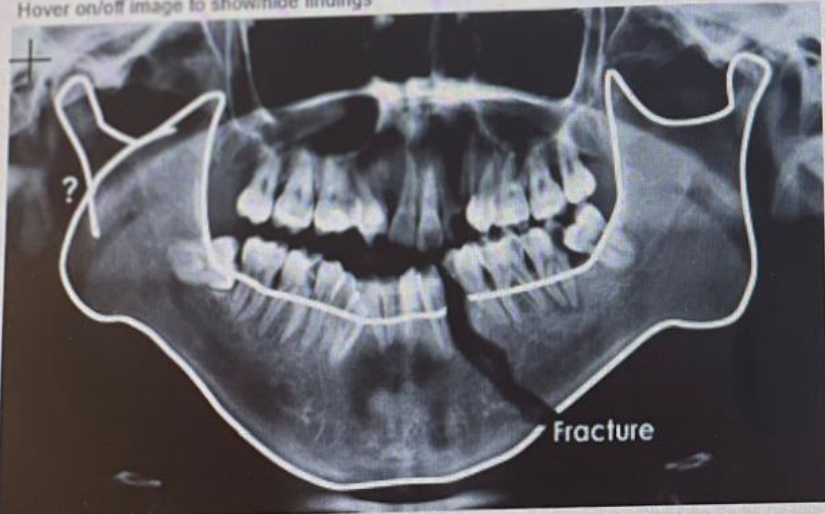
Mandible fracture - Mandibular view

- ◆ (Same patient as image above)
- ◆ On this view the right condylar fracture is more easily seen

be a more accurate term as four tra

Mandible fracture - OPG

Hover on/off image to show/hide findings



Mandible fracture - OPG

- ◆ (Same patient as image below)
- ◆ A fracture of the left mandible body is easy to see
- ◆ On the right the cortical outline is difficult to follow at the base of the condyle (?) - but no second fracture is readily seen

