

# Splanchnocranium Maxilla, Mandible

**Omid Moztarzadeh**

The adult human skull is comprised of 22 bones (excluding the ossicles of the ear) which are divided into two parts of differing embryological origin:

The **neurocranium** and the **viscerocranium (splanchnocranium)**.

The neurocranium is the upper and back part of the skull and as a bony capsule enclosing the brain.

The viscerocranium (or splanchnocranium) is situated anteriorly and forms the skeleton of the face as well as parts of the jaw

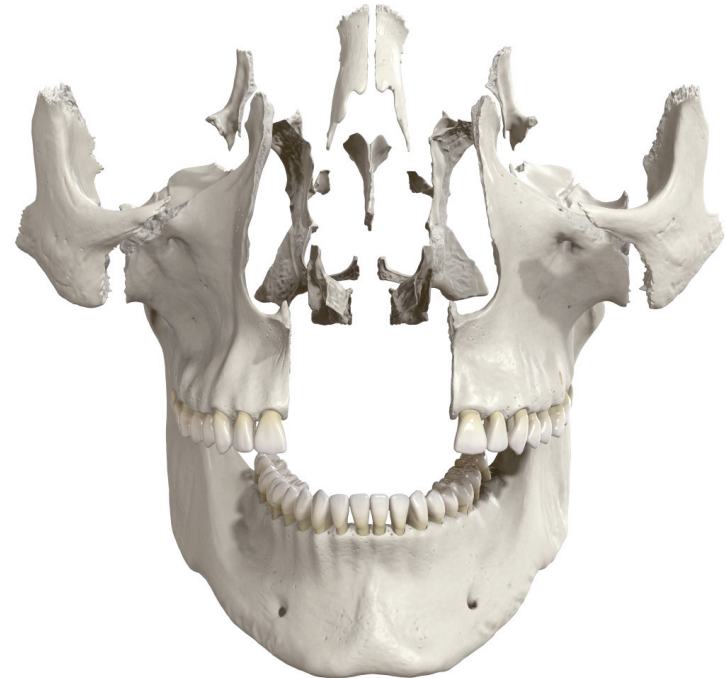


ANATOMY STANDARD

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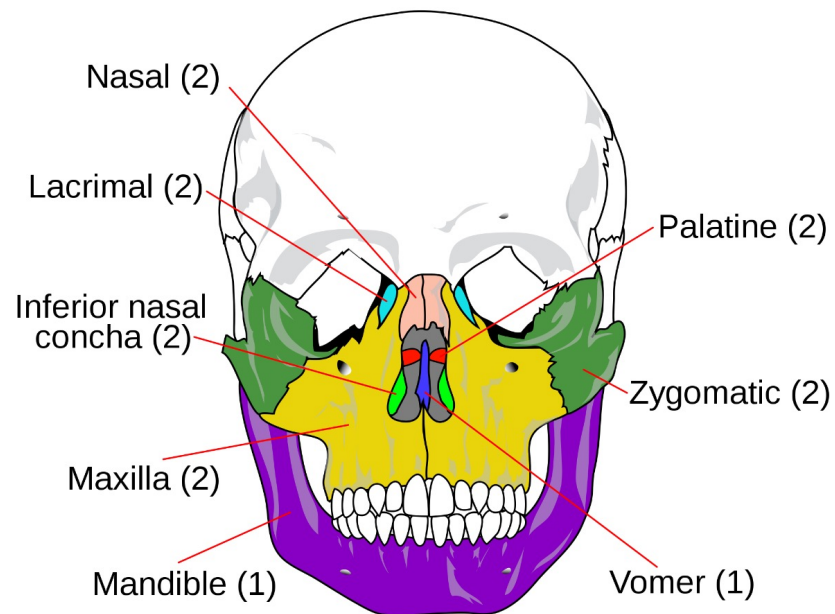


ANATOMY STANDARD



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The **viscerocranium (face)** consists of 14 (15) bones : vomer, 2 inferior nasal conchae, 2 nasals, 2 maxilla, mandible, 2 palatine, 2 zygomatics, and 2 lacrimals, **Ethmoid bone (except cribriform plate)**



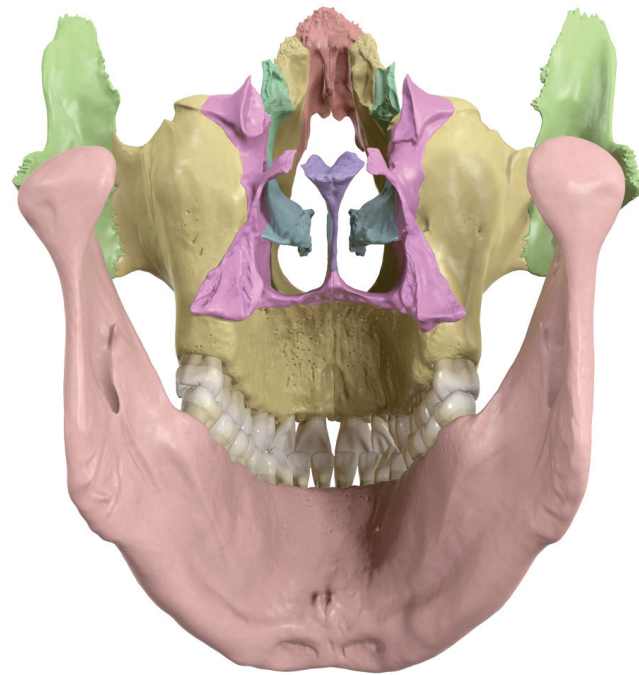
**14 facial bones**

Bones of viscerocranium fuse to house the orbits of the eyes, the nasal and oral cavities.  
Provides attachment sites to muscles of the head.



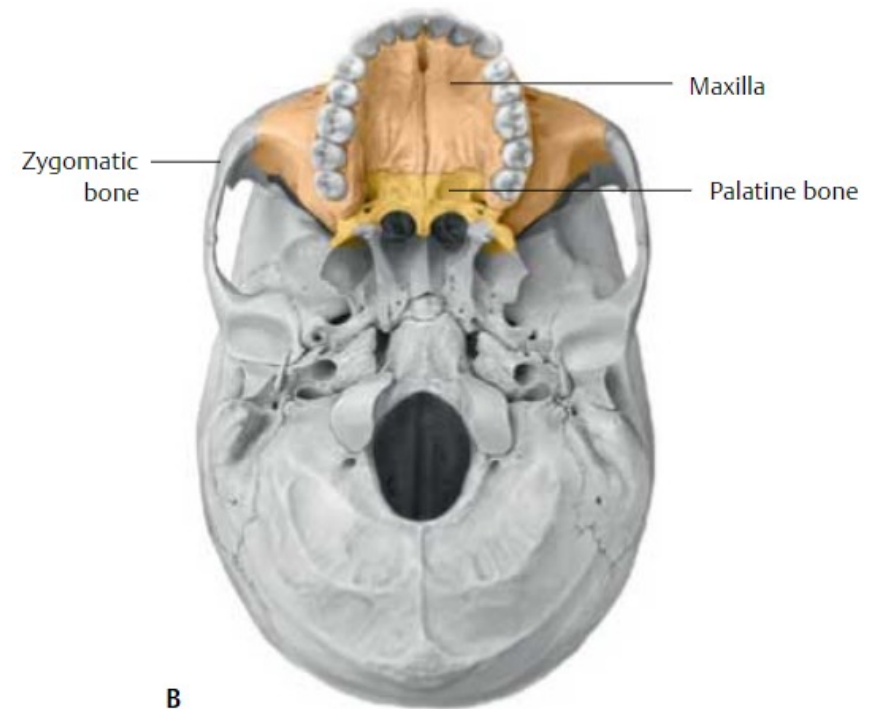
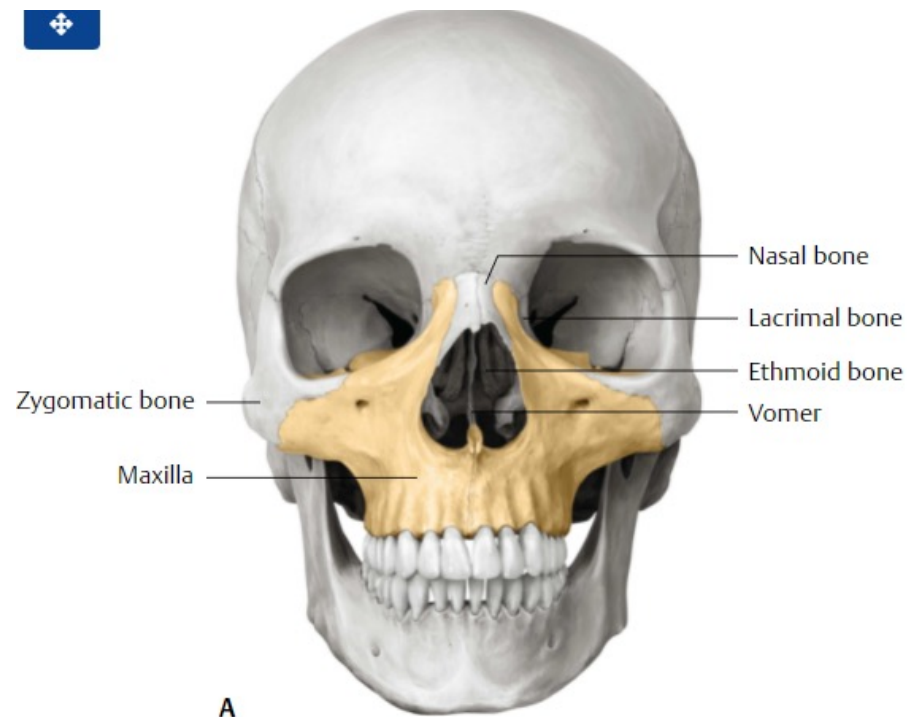
ANATOMY STANDARD

Accommodates the teeth and sensory structures for vision, hearing, smell and taste.



ANATOMY STANDARD

**Maxilla (upper jaw):** articulates with opposite maxilla, frontal, ethmoid, lacrimal, nasal, palatine, zygomatic, vomer, inferior nasal concha





# Maxilla

Irregular bone of viscerocranium

4 processes, 4 surfaces

The alveolar process of the maxillae holds the upper teeth, and is referred to as the maxillary arch.

Forms the roof of the oral cavity, the floor and lateral wall of the nasal cavity, floor and medial wall of the orbit.

Forms anterior border of the infratemporal and pterygopalanine fossae

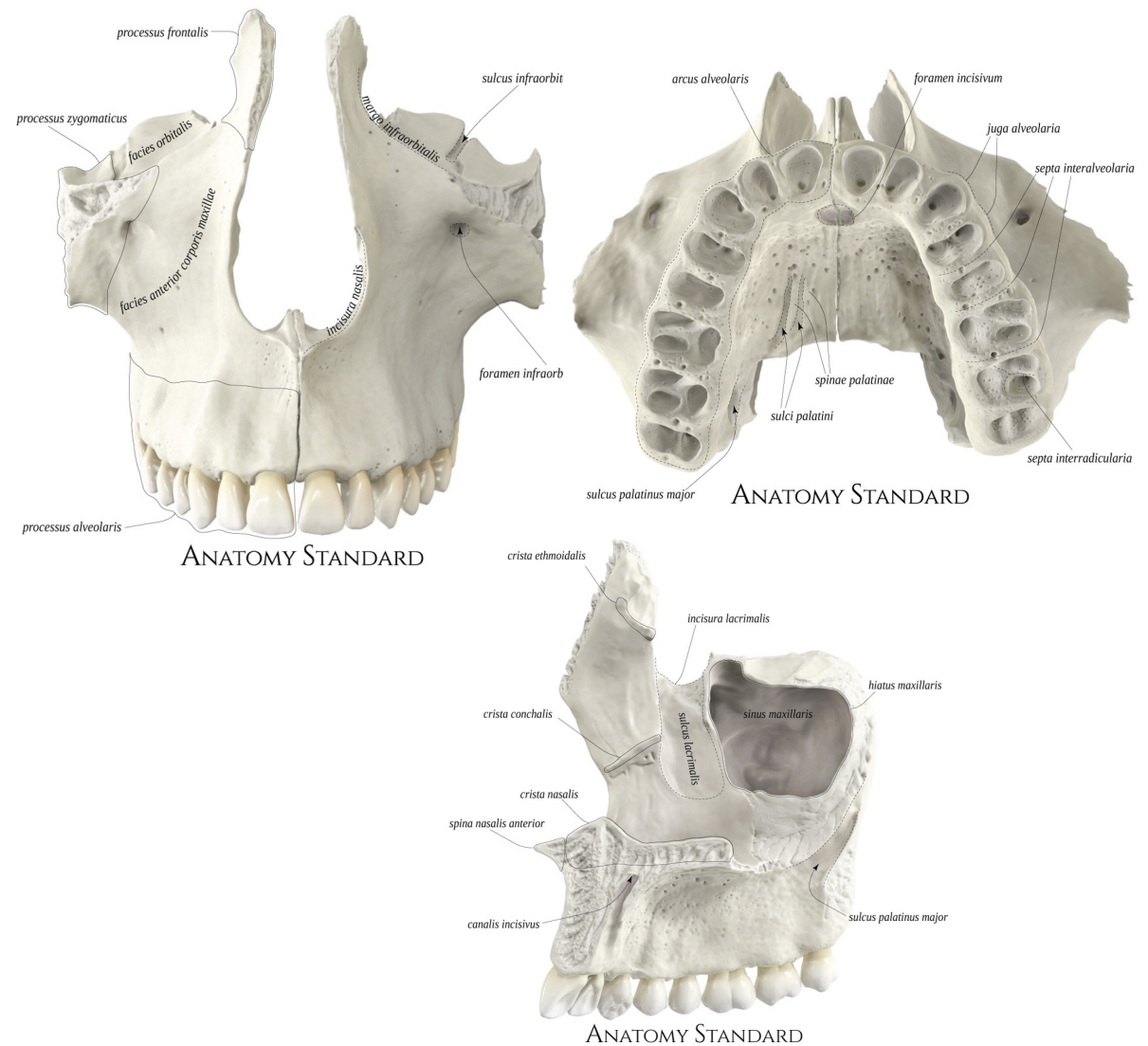
Consists of maxillary sinus (**antrum of Highmore**)

**Infraorbital foramen**- passage of the infraorbital nerve and vessels – (pressure point for examination of the 2nd branch of the trigeminal nerve).(place for application of block anesthesia).

**Posterior superior alveolar foramens and canals** at the **maxillary tuberosity** passage of posterior superior alveolar nerves and vessels (place for application of block anesthesia).

**Incisive foramen**- Passage of nasopalatine nerve and vessels (place for application of block anesthesia).

Maxilla fractures are classified according to the Le Fort classification

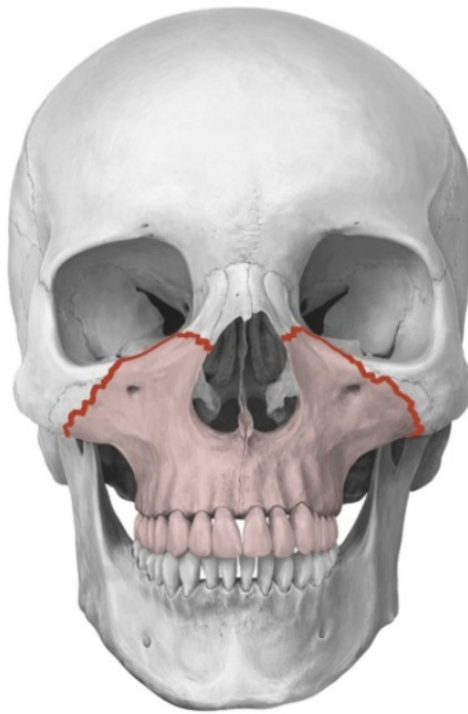




The framelike construction of the facial skeleton leads to characteristic patterns of fracture lines in the **midfacial region** (Le Fort I, II, and III).



I



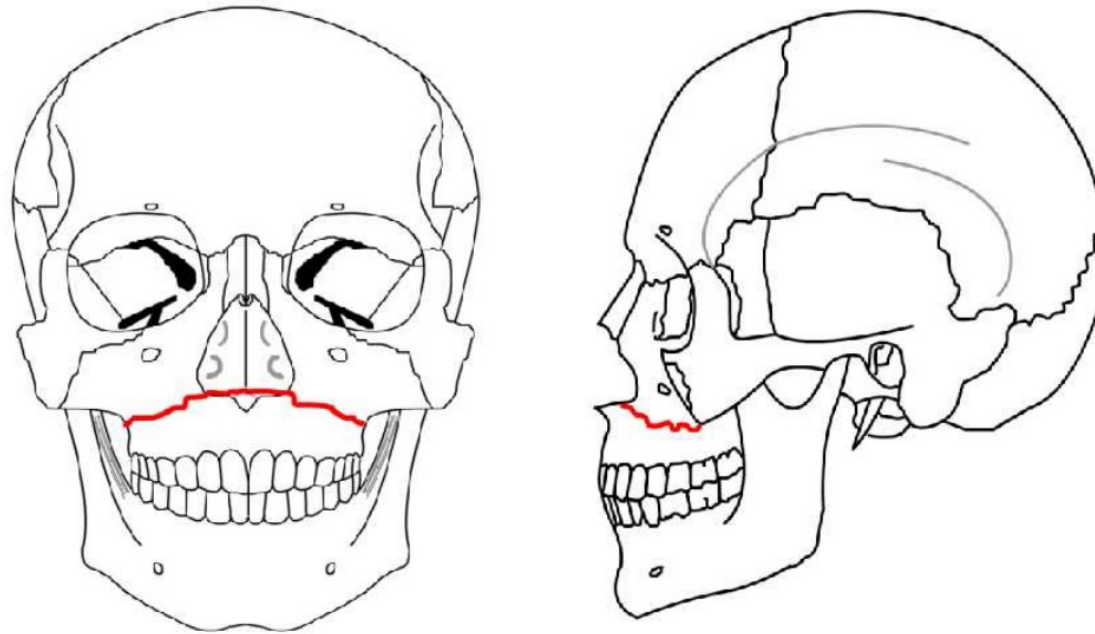
II



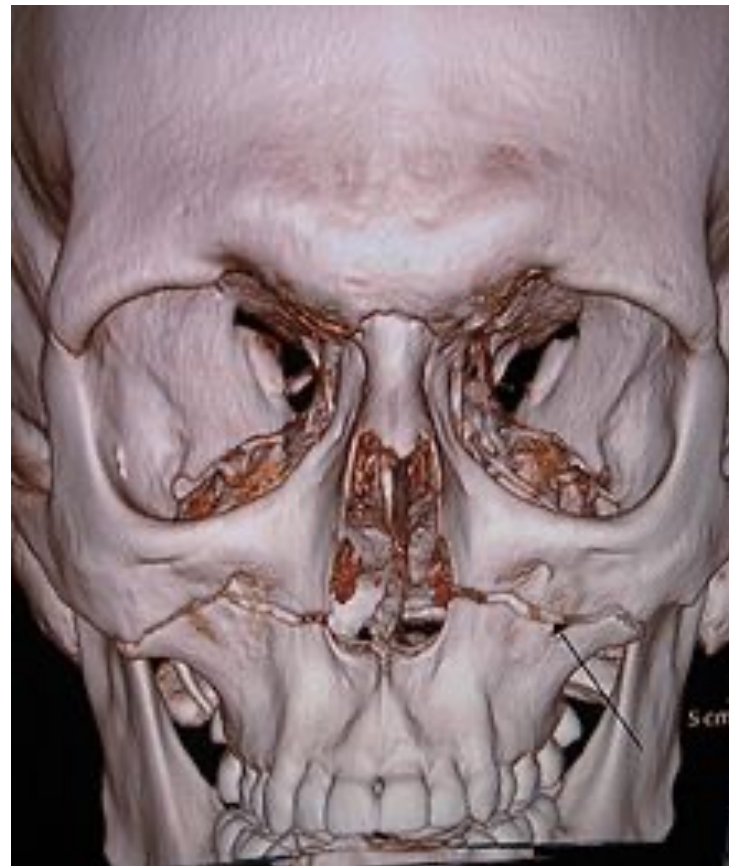
III

**Le Fort I ( lower subzygomatic):** This fracture line runs across the maxilla and above the hard palate above the apexes of the upper teeth at the floor of nasal cavity. The maxilla is separated from the upper facial skeleton and alveolar process, disrupting the integrity of the maxillary sinus (*low transverse fracture*).The fracture line laterally directed to the maxillary tuberosity and continue to the pterygoid processes about in the lower third of their length.

Le Fort I.

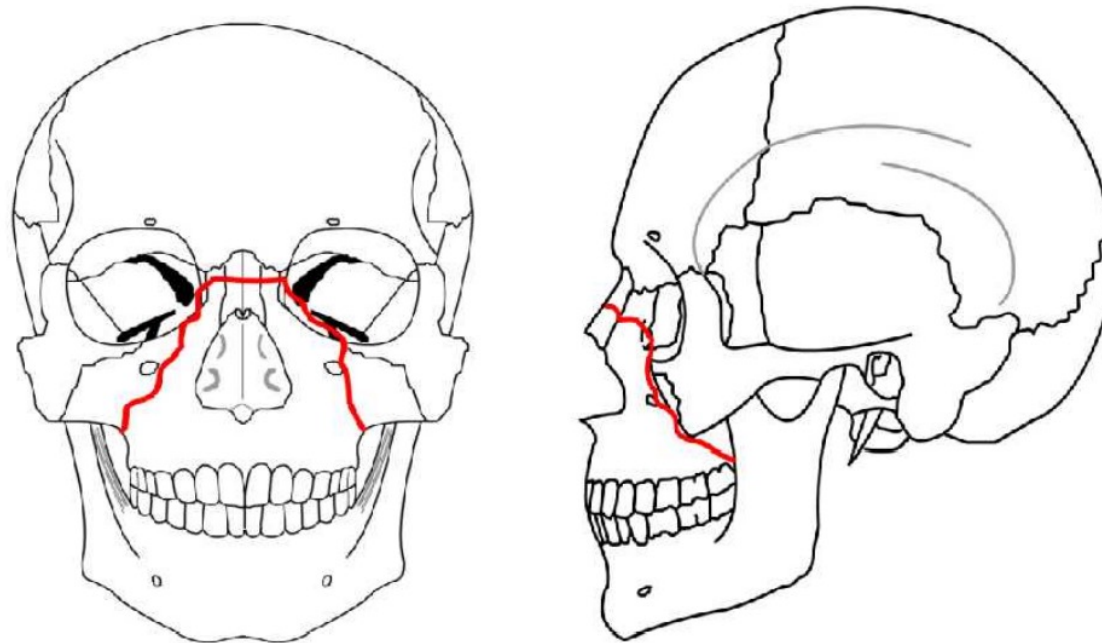


Le fort I



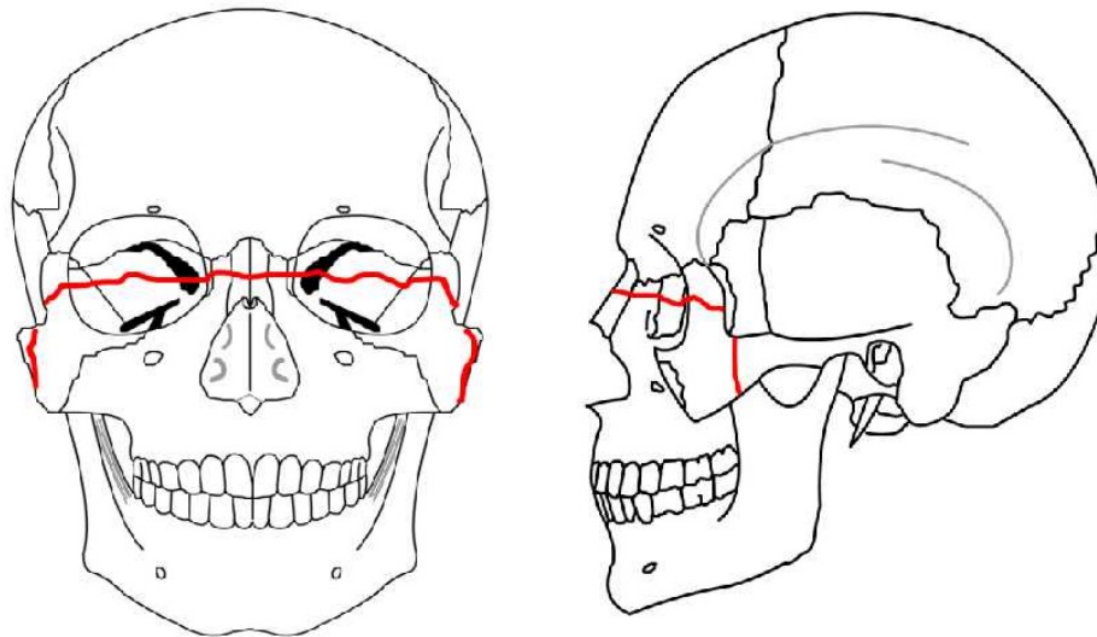
- **Le Fort II ( pyramid or upper subzygomatic):** The fracture line passes across the nasal root, to the medial wall of the orbit through lacrimal and ethmoid bones, toward floor of the orbit to the inferior orbital fissure, continue toward zygomaticomaxillary fissure, distally to the pterygoid process approximately in half of their length. creating a *pyramid fracture* that disrupts the integrity of the orbit.

Le Fort II.

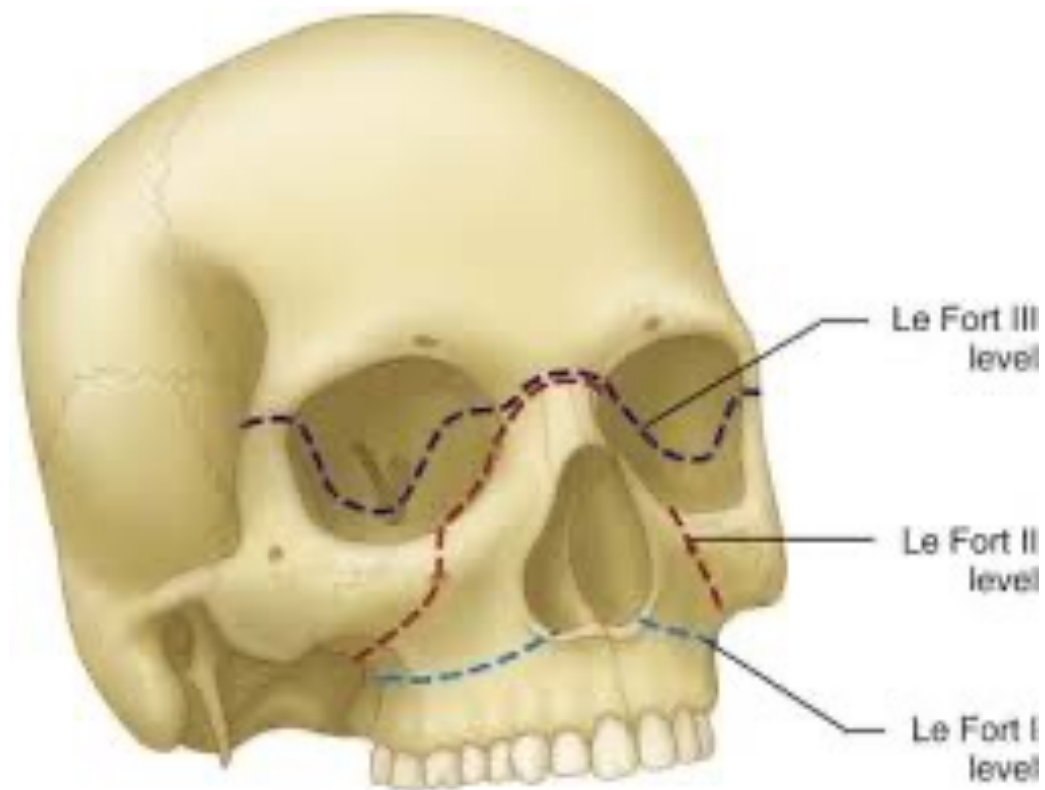


**Le Fort III ( suprazygomatic):** The facial skeleton is separated from the base of the skull. The main fracture line passes through the root of the nose toward the medial wall of orbits, continue to the distal part of the inferior orbital fissure the divided as follow: one line goes toward pterygopalatine fossa and lower third of the pterygoid proces, second line continue toward the lateral wall of the orbit to the zygomaticofrontal suture. Another line interrupts the zygomatic arch near the zygomaticotemporal suture. The fracture may additionally involve the ethmoid bones, frontal sinuses, sphenoid sinuses.

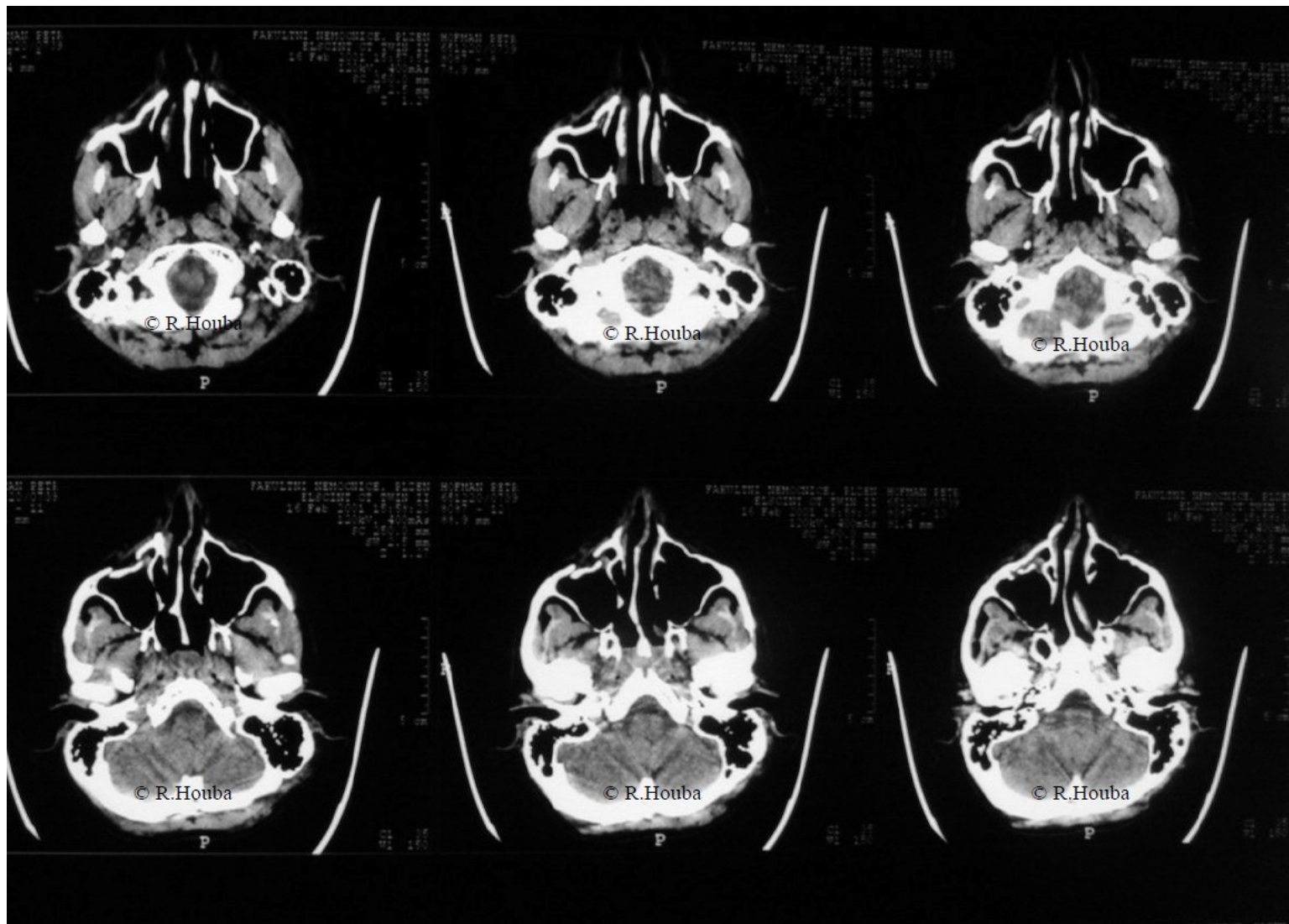
Le Fort III.



**The thin walls of the maxillary sinus are often broken in fractures of the Le Fort I and II**

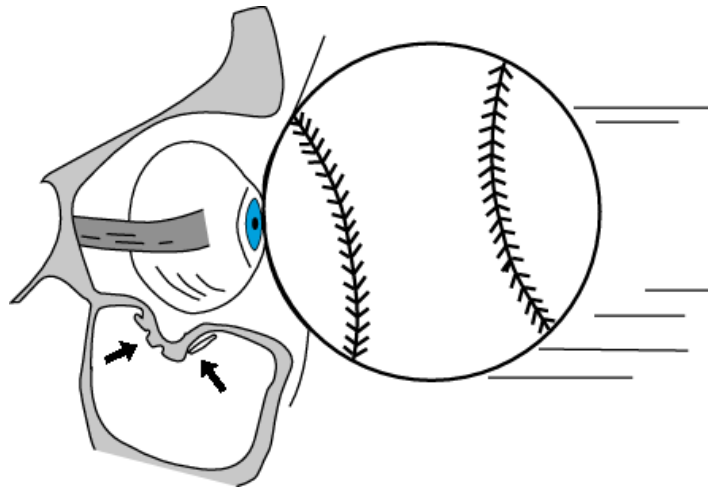






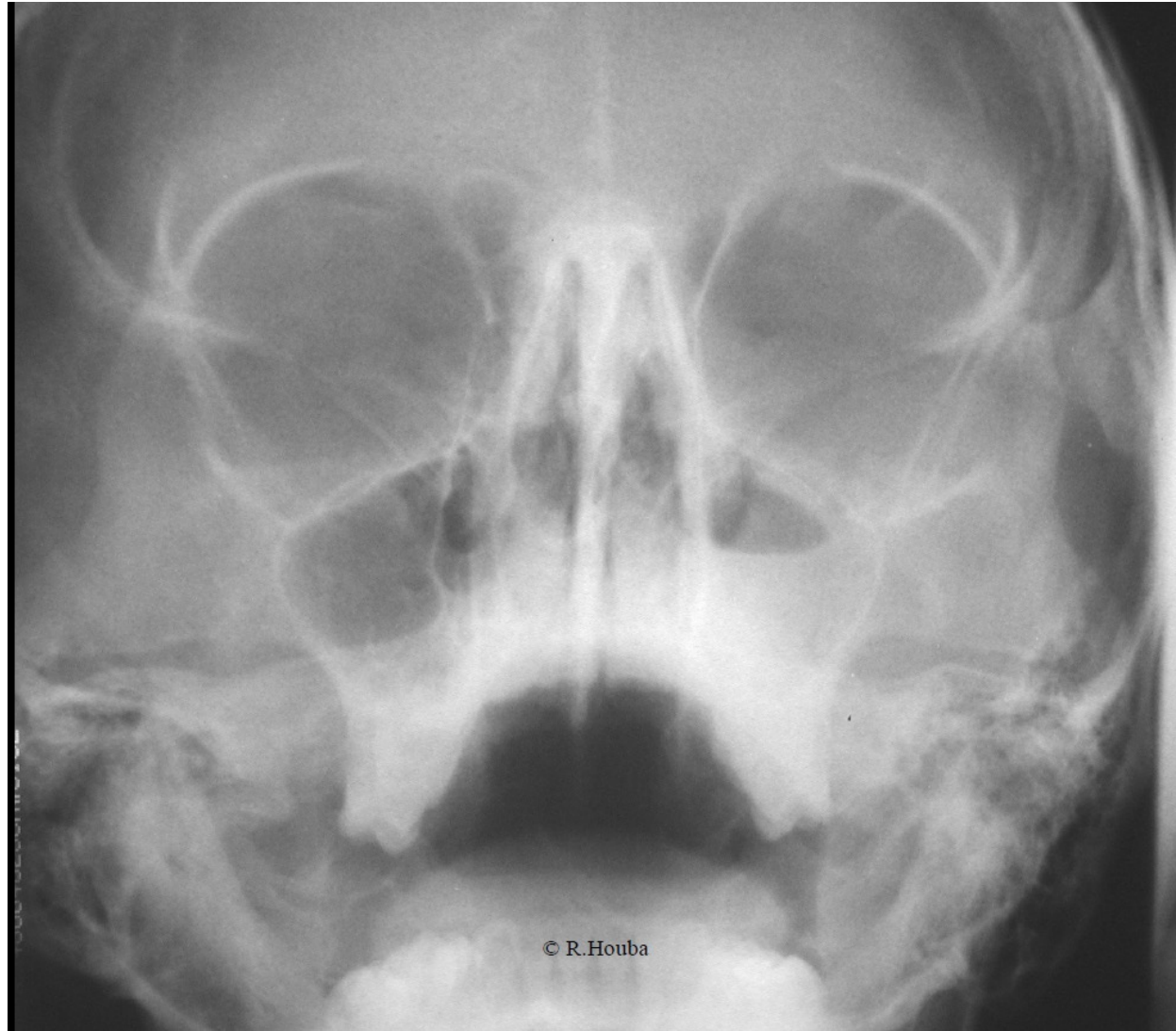


**Blow-out fracture:** A severe blow to the orbit (as from a baseball) from the front may cause hydraulic fracture of the lower wall behind the edge of the orbit (orbital surface of the maxilla) and the contents of the orbital cavity to explode downward through the floor of the orbit into the maxillary sinus. Damage to the infraorbital nerve, resulting in altered sensation to the skin of the cheek, upper lip, and gum, may occur.

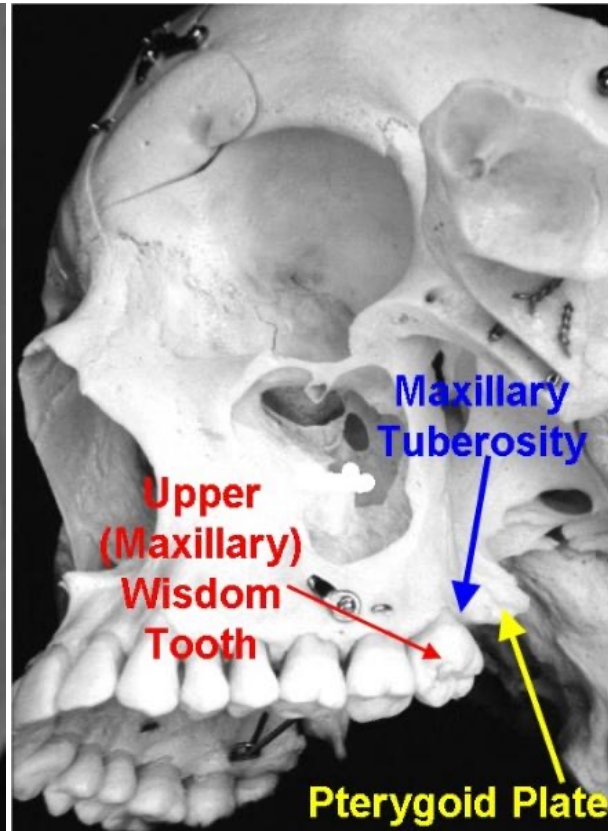


Usually the lower wall of the orbit and / or medial wall of the orbit is included





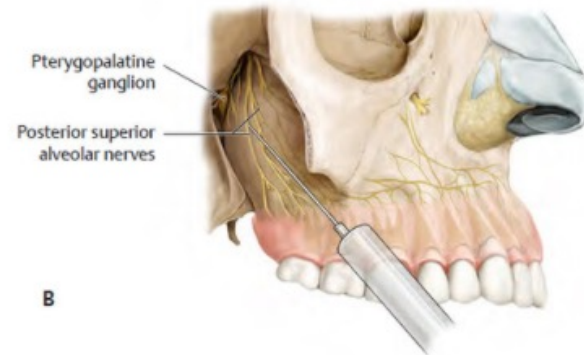
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# Posterior superior alveolar nerve block at the maxillary tuberosity



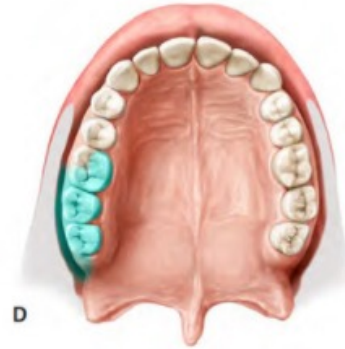
A



B



C

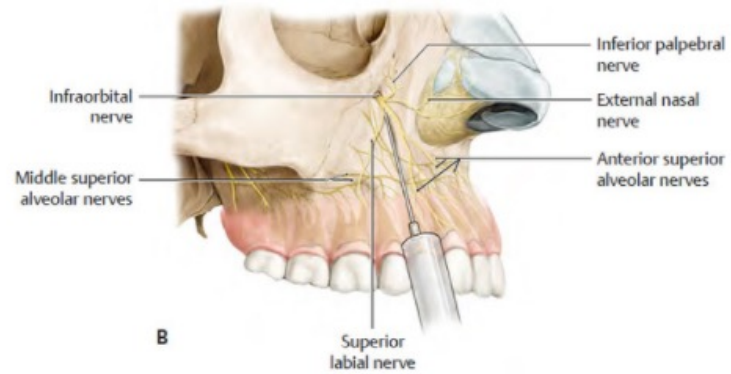


D

# Infraorbital nerve block



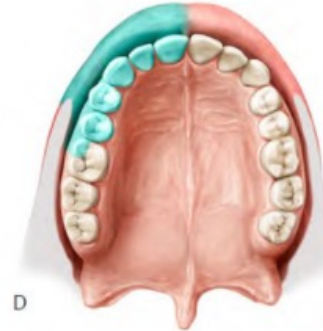
A



B



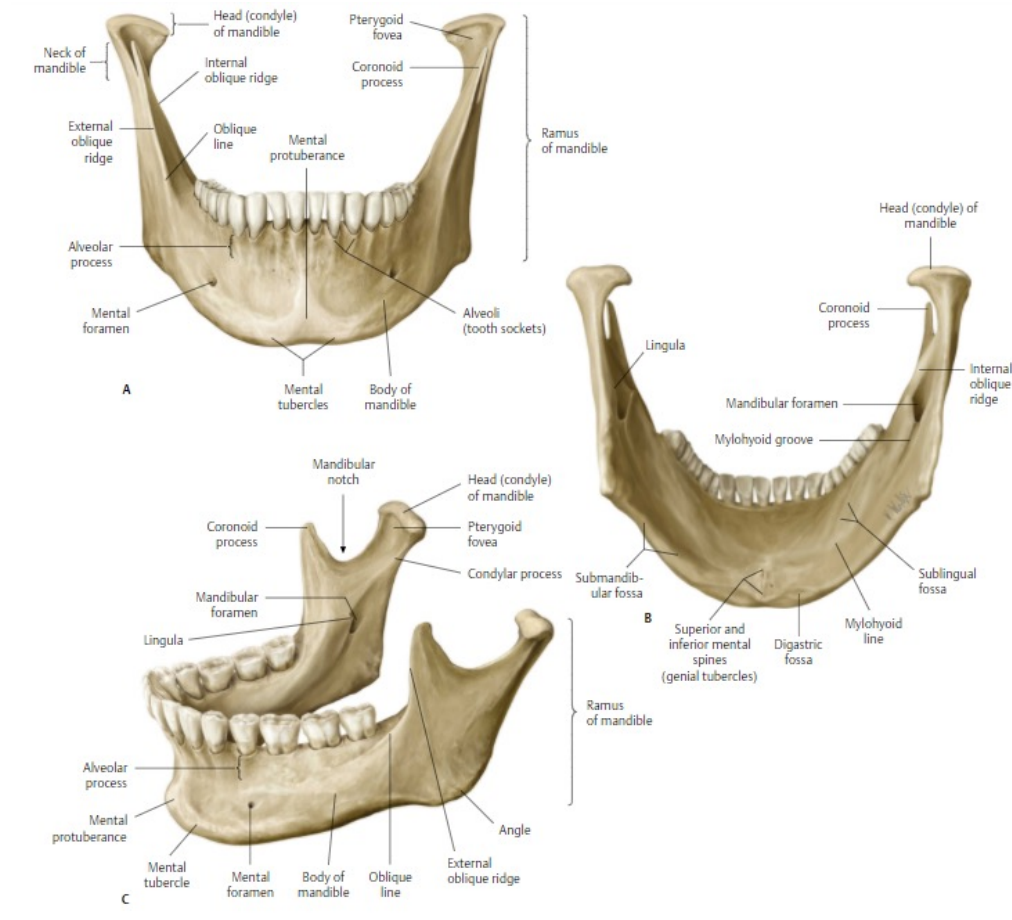
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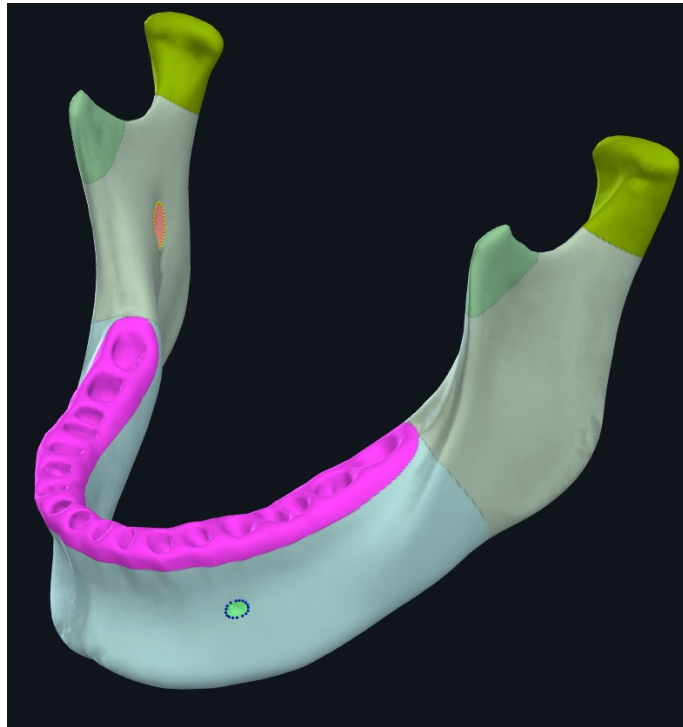


# **Mandible (lower jaw):** Articulates with temporal bone at the temporomandibular joints





**Parts:** body, angle, ramus, condylar and coronoid (muscular) processes.



# Mandible

Irregular bone of viscerocranium.

largest, strongest and lowest bone in the human facial skeleton,

holds the lower teeth in place.

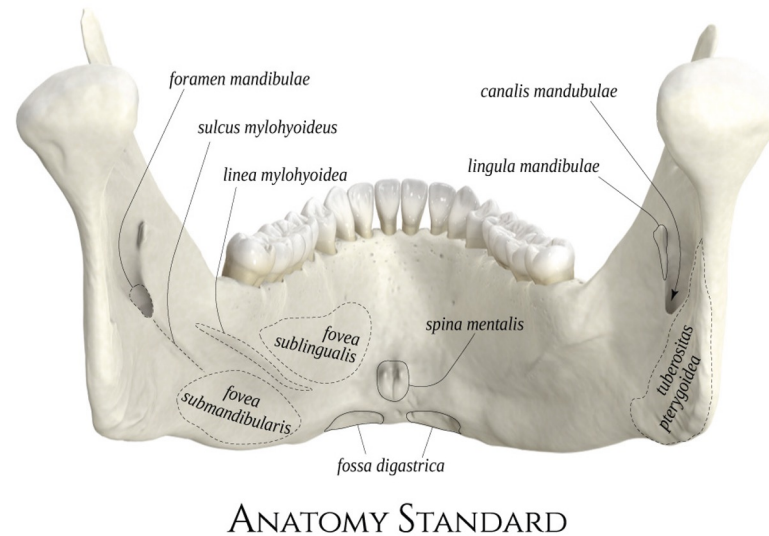
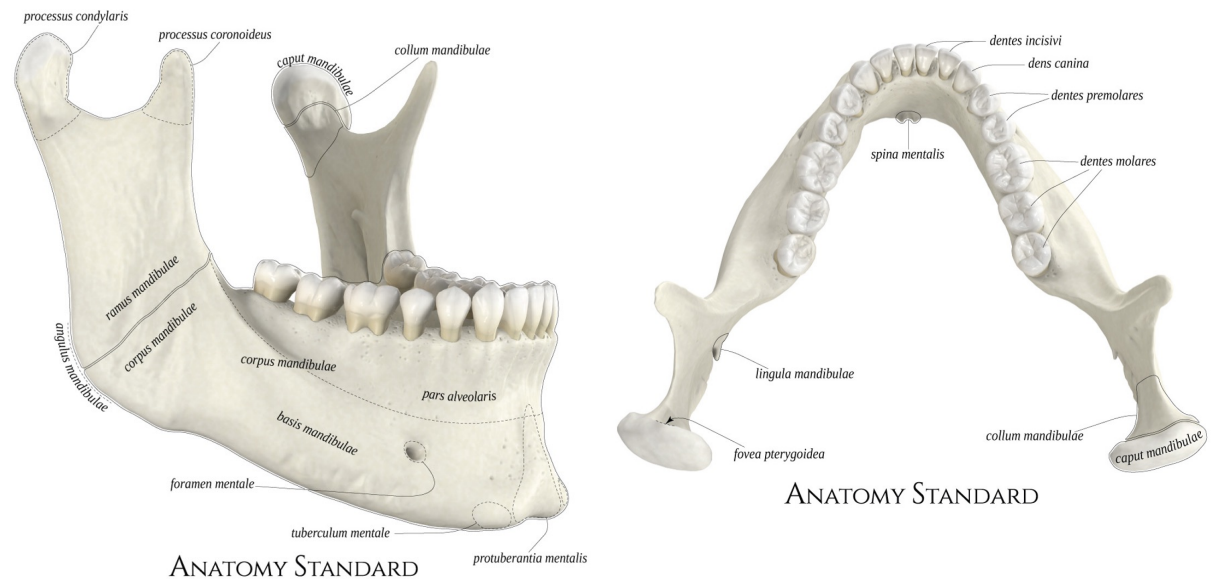
It is the only movable bone of the skull.

The front part gives structure to the chin –  
**mental protuberance**

**Mental foramen:** passage of the mental nerve and vessels – (pressure point for examination of the 3rd branch of the trigeminal nerve). (Place for application of the block anesthesia)

**Mandibular foramen:** place for application of block anesthesia of inferior alveolar nerve.

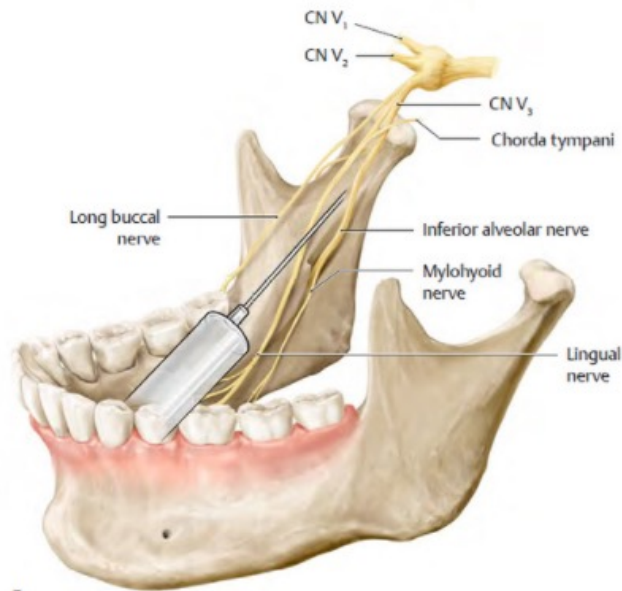
One fifth of facial injuries involve a mandibular fracture.



# Inferior alveolar nerve block and mental nerve block



A



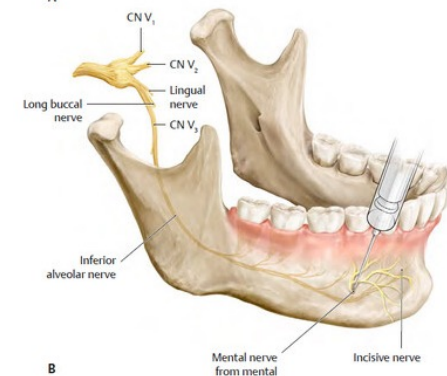
B



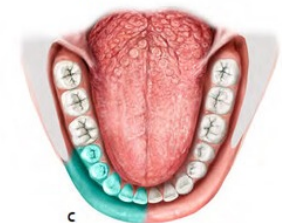
C



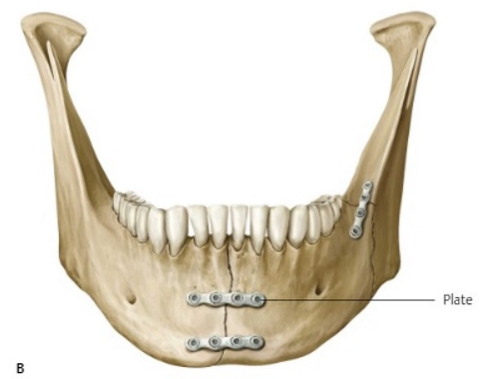
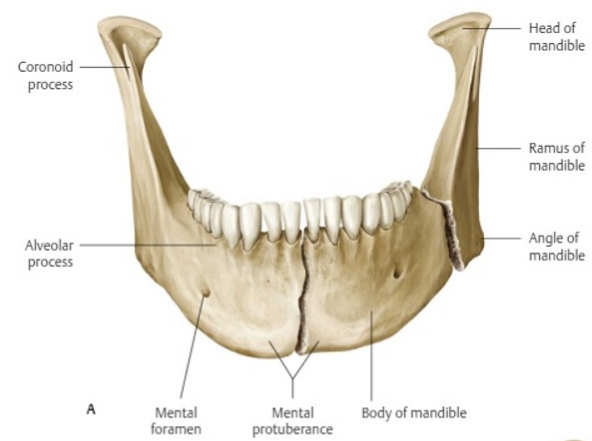
A



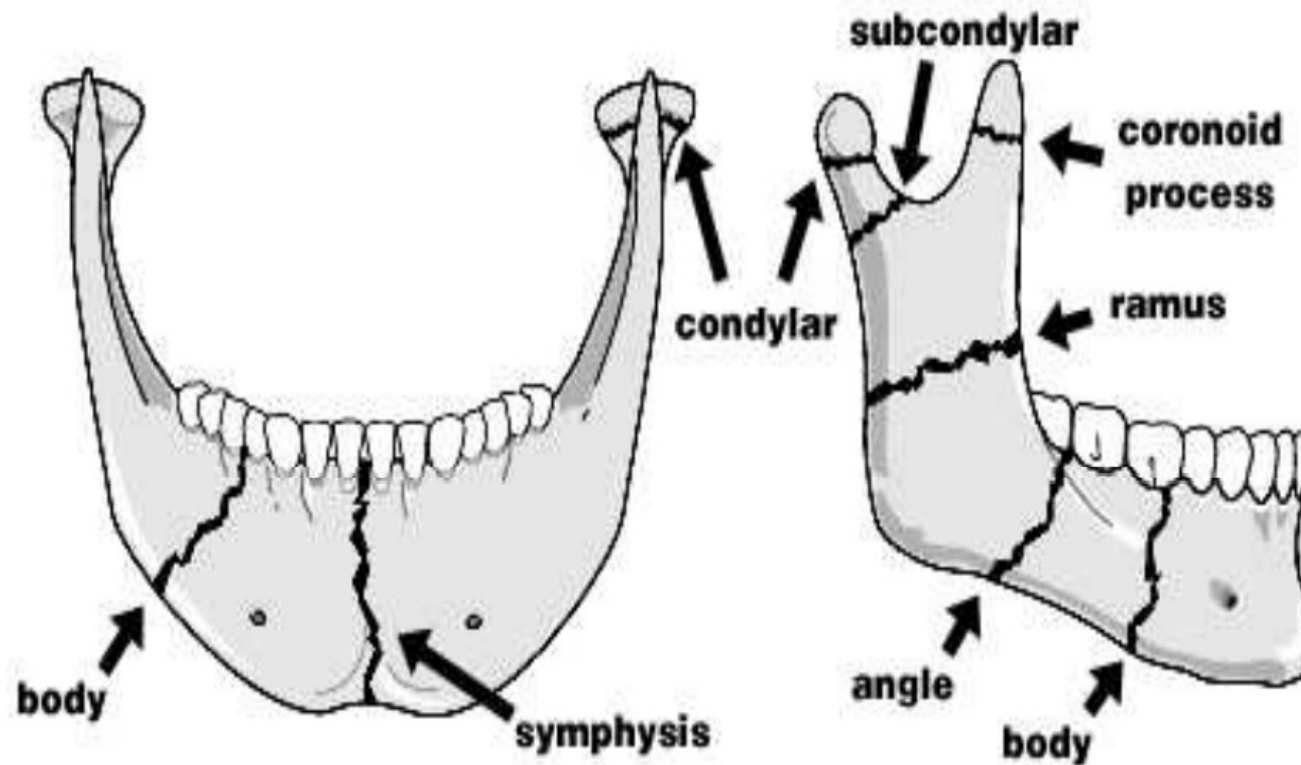
B



C



Mandibular fracture is a common injury, for example, following motor vehicle accidents, fights, or sporting accidents, due to the prominence of the mandible and its relative lack of support. Most fractures occur in the body (~30%), condyle (~25%), angle (~25%), and symphysis (~17%).



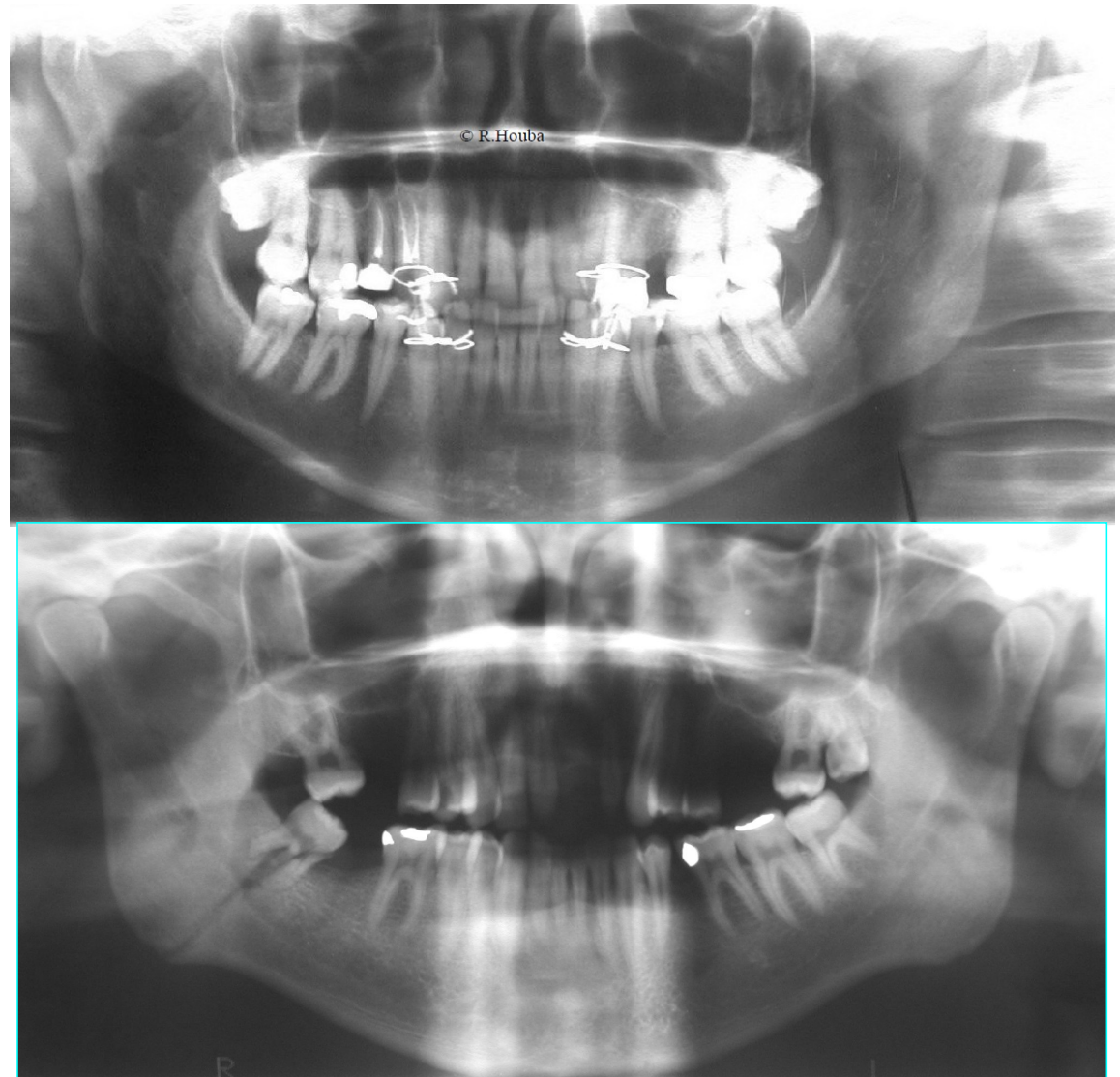
## Four predilection sites of fracture

**1.** In the middle line in the chin region, the fracture line runs vertically. This place on the mandible is actually the strongest, but a (blow) impact from the side on one half of the mandible (if the other half is propped up) results in a fracture by a mechanism similar to breaking a U-shaped rod.

**2.** At the alveolus of the lower canine, the lower jaw is weakened by a relatively long and strong tooth root. The fracture is either unilateral or, in the case of a direct impact on the chin from the front, it is symmetrically bilateral

**3.** Another predilection site is in the mandibular angle. Here the bone is flattest, its compacta is weakest and the trabecular bone is softer.

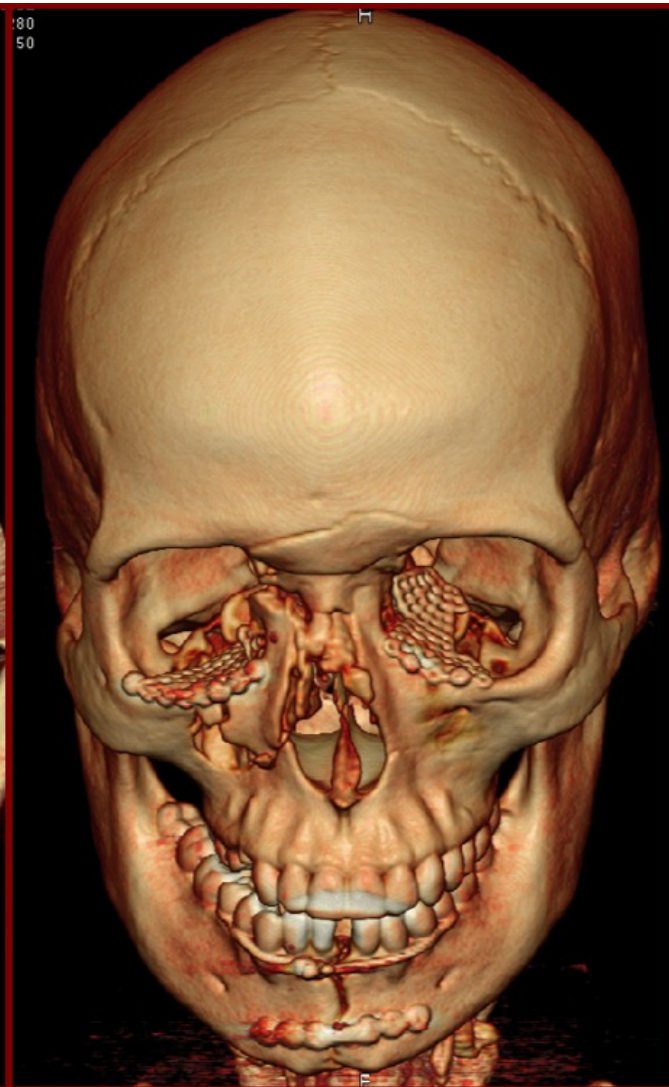
**4.** Impact from the front on the chin area can affect the neck of the mandible. The impact can be transmitted from the head of the mandible to the articular fossa of TMJ, in extreme cases the head can break through the mandibular fossa and end up in the middle cranial fossa.







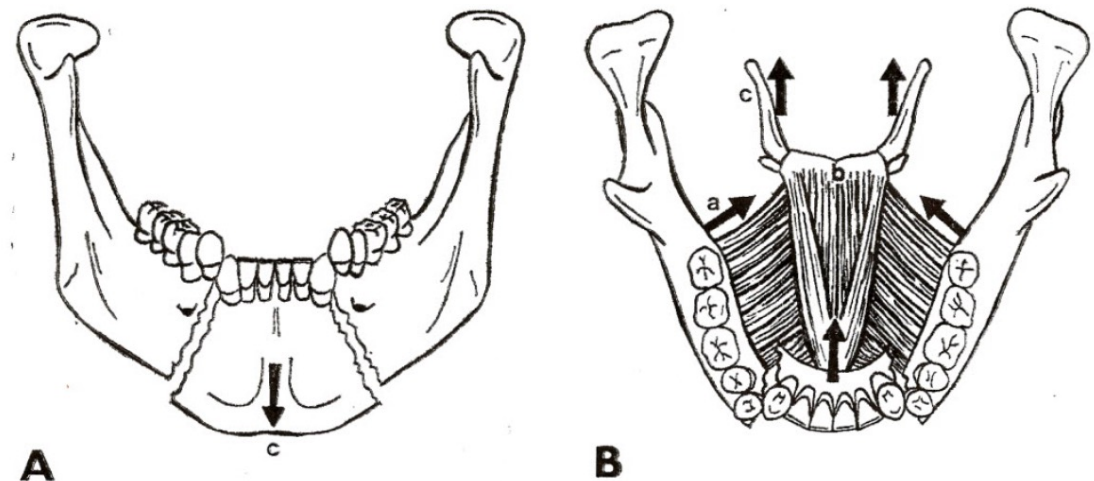




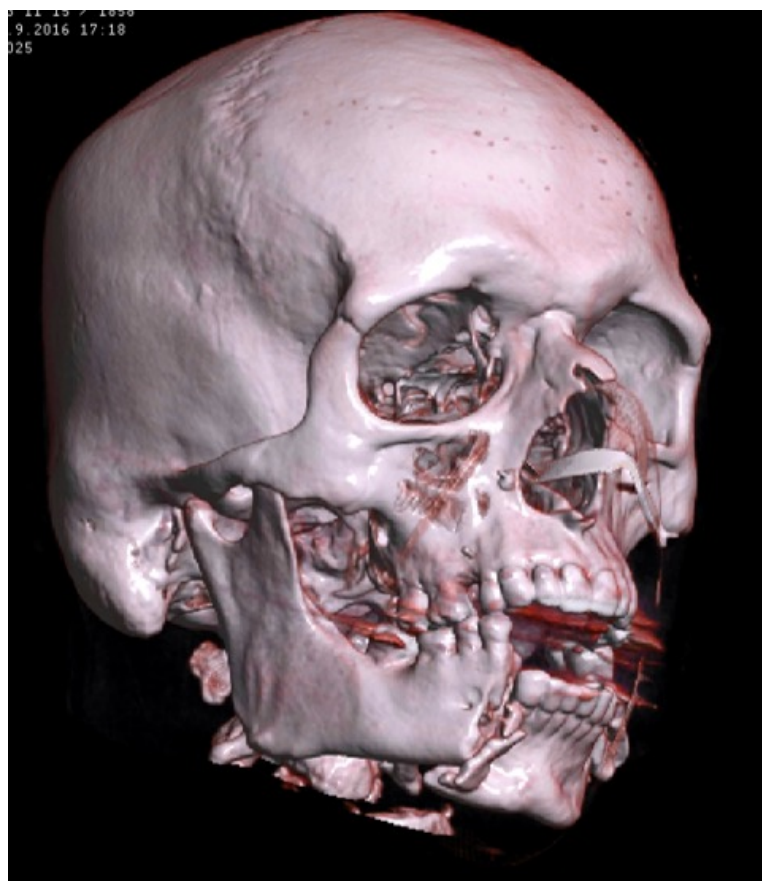
## Diagram of the course of bilateral fracture of the lower jaw passing through the sockets of the lower canines

For the dislocation of fragments, the direction of pull of the muscles attaching to the fragments is of main importance in the mandible.

Particularly dangerous dislocations can occur in the case of a bilateral fracture of the chin part of the lower jaw (pulling of the genioglossus m., geniohyoideus m., the Ant. belly of the digastric m. and part of the mylohyoid m. dislocates the broken off chin part in the dorsocaudal direction. This stops the ventral pull on the hyoid bone, so, together with the root of the tongue, engages with the pull of the styloglossus m., glossopharyngeal part of the sup. pharyngeal constrictor and chondro-, cerato-pharyngeal parts of the middle pharyngeal constrictor m. in the dorsocranial direction. **The root of the tongue can fill the oropharynx and hypopharynx (laryngopharynx) and the patient is at risk of suffocation!!!**



Obr. 71. Schéma průběhu lomných štěrbin u oboustranné zlomeniny dolní čelisti procházející lůžky dolních špičáků. A — dislokace bradové části mandibuly (při pohledu zředu) tahem suprahyoidních svalů (c). B — úlomek je tažen dolů a dozadu k jazyce. Jazyk s kořenem jazyka (šipky) je dislokován dozadu do hypofaryngu. a — m. mylohyoideus, b — m. geniohyoideus, c — os hyoideum. (Podle Urbana a Sazamy.)



**Thank you for your  
attention**