Original Research Paper

Study of Os Zygomaticum Bipartitum In Skulls of Central India

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Abstract

Zygomatic bone is commonly known as cheek bone, forms prominence of cheek. Present study was conducted on 228 zygomatic bones of 114 dry skulls. Zygomatic bone may divide into two parts either by horizontal or vertical suture. A horizontal suture was observed dividing the zygomatic bone into two parts in two zygomatic bones out of 228 zygomatic bones studied (0.87%). An inferior type of horizontal suture was observed dividing the zygomatic bone. Two zygomatic bones belong to the same skull i.e. bilateral bipartite zygomatic bone. Suture can be well identified by radiography and CT scan.

Primary cartilaginous joint between sphenoid and basi-occiput was not ossified. Complete metopic suture was also observed. Condition is a rare one and therefore can be easily misinterpreted as zygomatic bone fracture in medico legal cases. Therefore the condition should be kept in mind by Forensic experts and maxillofacial surgeons. Both CT scan and Radiography are important tolls in the diagnosis of zygomatic suture and should be considered as primary diagnostic tools in the diagnosis of suture. Presence of zygomaticum bipartitum is addition to the literature.

Key Words: Zygomatic bone; Suture; Os Japonicum; Fracture

Introduction:

Zygomatic bones are pair of quadrangular bones, forms the prominence of cheeks. It articulates superiorly with the frontal bone through fronto-zygomatic suture, posteriorly joins with the temporal bone to complete the zygomatic arch and antero-inferiorly articulates with maxilla.

Zygomatic bone ossifies in membrane from a single centre. [1] Zygomatic bone may sometimes divide into two or three parts, called as bipartite or tripartite zygomatic bone respectively. The condition is more commonly seen in Mongolian race, making the malar prominences flat, hence the condition is called as os japonicum. The incidence of os zygomaticum bipartitum is very low in India.

The present study was undertaken to elucidate the incidence and to document the evidence of bipartite zygomatic bone.

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Materials and Methods:

Present study included 228 zygomatic bones from 114 human adult dry skulls, irrespective of sex. Skulls were taken from Chirayu medical college and L. N. Medical College, Bhopal. Skulls were observed for the presence of any suture in the zygomatic bone and its pattern. Suture was also observed on plain radiograph and CT scan.

Observations:

Out of 228 zygomatic bones studied suture was observed in two zygomatic bones. The zygomatic bones were completely divided into two parts by a horizontal suture. (Fig. 1 & 2)

The zygomatic bones were divided by horizontal suture into large upper and small lower part i.e. inferior type.

The zygomatic bone superiorly articulates with frontal bone and anterio-inferiorly with the maxilla. Radiologically the suture of bipartite zygomatic bone can be conveniently demonstrated by Towne's view. The suture line is seen as a increased density through the zygomatic bone. (Fig. 3)

In CT scan the suture was seen in the zygomatic bone completely dividing it into two parts. (Fig. 4) No oblique divisions were observed in the present study. Primary cartilaginous joint between posterior surface of the body of sphenoid and anterior surface of basi-occiput was not fused. Complete metopic

suture was also present. No wormian or inter-parietal bones were seen in the skull. In present study the incidence of bipartite zygomatic bone was found to be 0.87% in 228 zygomatic bones in skulls of Central India.

Discussion:

Zygomatic bone may divide into two parts by either vertical or horizontal sutures; the condition is termed as bipartite zygomatic bone. The division of zygomatic bone was first reported by E. Sandifort in the 1779. [2]

The presence of bipartite zygomatic bone was documented by Gruber; Hilgendorf and Le Double. [3-5] Hilgendorf reported bipartite zygomatic bone in two cases out of 11 skulls studied and named as 'Os japonicum'.

Os japonicum was named because of its higher incidence in Japanese population. [4]

The horizontal division may be complete or incomplete. Sometimes horizontal suture divides the zygomatic bone into upper larger and lower smaller part. [1] The horizontal division of zygomatic bone may be of superior and inferior type. [6] In inferior type of bipartite zygomatic bone, small lower portion of zygomatic bone was reported by Hanihara et al. [6]

In superior type of horizontal suture divided the zygomatic bone at the site of frontal process. [7] A variant of zygomatic bone was reported by Gruber and Jeyasingh et al, in which maxilla directly articulated with the temporal bone without actual division of zygomatic bone. [3, 8] Zygomatic bone usually ossifies from a single centre usually at the eighth week or end of the second month of intra uterine life.

Ossification extends from this centre upwards medially towards frontal bone, forwards and backwards towards maxilla and temporal bone respectively. Other centers may exist in case of divided bone. [9] According to Hauser & De Stefano subdivision of the zygomatic bone are modifications of secondary appositions from which definitive zygomatic bone develop. [7]

An aberrant centre may have been developed in the region of zygomatic bone or the original single centre may split into two leading to bipartite zygomatic bone. The condition may have a genetic background. [6]

The incidence of bipartite zygomatic bone was reported in 3 bones of two individuals of Punjab-Kashmir region. [6] Jeyasingh et al reported the incidence of 4% out of 500 skulls from Uttar Pradesh. [8]

In skulls of Madhya Pradesh the only one skull was reported to have bipartite zygomatic bone. [10] Present study reported 2 bipartite zygomatic bones with an incidence of 0.87%. Though this condition has no functional significance but clinically it is of high relevance. Zygomatic bone because of its exposed position on face is more liable to injury. [11]

Unilateral bipartite zygomatic bone may be mistaken for the fracture zygomatic bone. In accidental cases craniofacial, maxillofacial surgeon and forensic experts should be able to differentiate between fracture and the bipartite zygomatic bone.

Conclusion:

Presence of horizontal or vertical suture in the zygomatic bone responsible for the condition called as os Japonicum. Incidence of bipartite zygomatic bone was very low in Central India (0.87 %). As the incidence is very low, the condition may be overlooked.

Due to rarity of the condition, it mimics the fracture zygomatic bone and can be mis-interpreted as fracture of zygomatic bone in cases of child abuse or in accidental cases. Knowledge of this condition is therefore essential for the maxillofacial surgeons and Forensic experts.

Fig. 1: Bipartite Zygomatic Bone on Right Side (Arrow Heads Pointing Horizontal Suture)

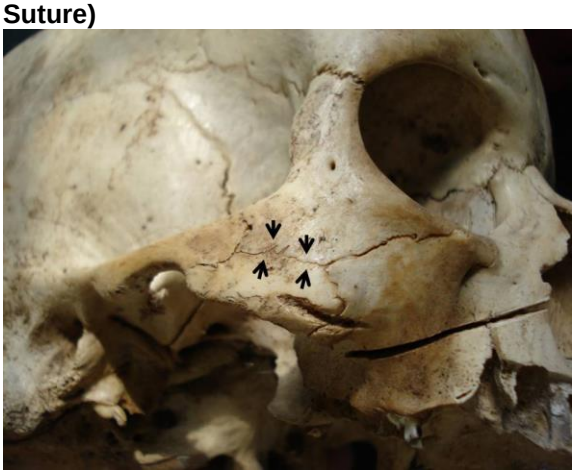


Fig. 2: Bipartite Zygomatic Bone on Left Side (Arrow Heads Pointing Horizontal Suture)

Fig. 3: X-Ray of Bipartite Zygomatic Bone on Both Sides and Metopic Suture (Arrow Heads Pointing Horizontal Suture &Arrow Pointing Metopic Suture)

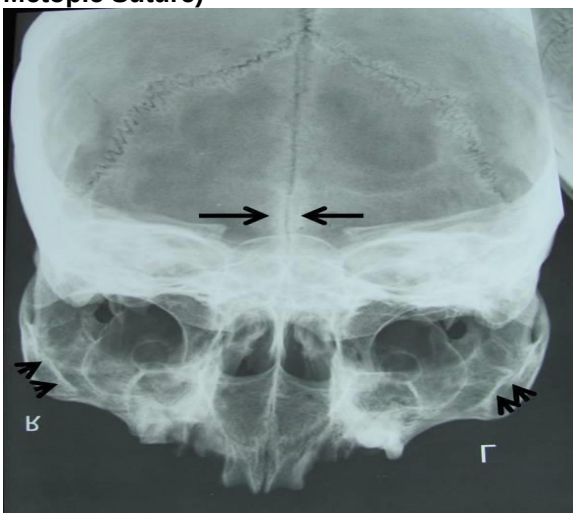
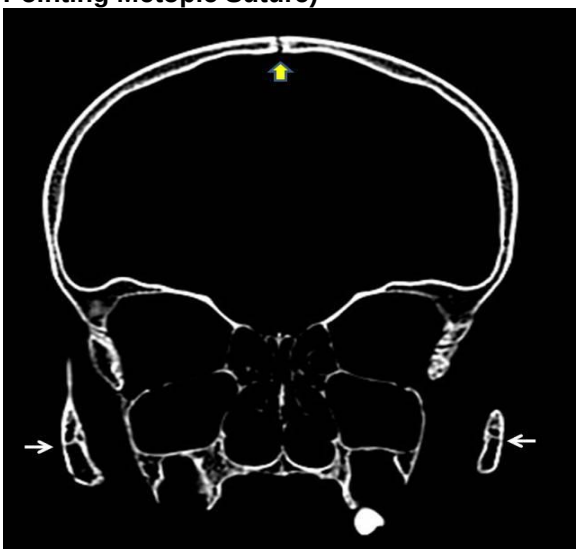


Fig. 4: CT Scan of Bipartite Zygomatic Bone on Both Sides and Metopic Suture (Arrows Pointing Horizontal Suture and Yellow Arrow Pointing Metopic Suture)



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