

A STUDY OF PERSISTENT METOPIC SUTURE IN DRY SKULLS IN CENTRAL INDIA

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ABSTRACT

Introduction: Metopic suture is present between developing frontal bones. It disappears approximately by 2-3 years and latest by 8 years of age. The persistence of this suture is termed as metopism. It may persist normally without any clinical implications. However, it may be confused with skull fracture in Post mortem studies or on imaging studies. Clinically it may be present in few genetic or metabolic disorders.

Materials and Methods: This study was conducted on 70 human adult dry skulls. The skulls were inspected at the Norma Frontalis for the presence of the Metopic suture. The sutures were classified as complete and incomplete types.

Observations and Results: Out of 70 skulls studied, a complete metopic suture was found in 2 skulls (2.85%), whereas an incomplete suture was observed in 3 skulls (4.28%). The remaining 65 skulls (92.85 %) of the skulls did not show any metopic suture.

Conclusion: The present study showed the incidence of metopic sutures in adult skulls of central India. The present study is clinically useful in the fields of Radiology and Medicolegal purposes.

KEY WORDS: Metopic suture, Metopism, Frontal bone.

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INTRODUCTION

The frontal bone ossifies in fibrous mesenchyme from two primary centres which appear in 8th week of intrauterine life. At birth the bone consists of suture between two halves which normally disappears by the second or third year of life. The persistence of this suture beyond 8 years of age is termed as metopism. The metopic or Interfrontal suture extends from the nasion to the bregma [1,2].

The term metopic is from Greek meaning "in the middle of the face" [3]. The metopic suture is found between the tubers of the frontal bone.

This suture undergoes intramembranous ossification from two primary centres, one from each half, that appear by the end of the second month of foetal life [1,4]. The fusion of this suture starts at the anterior fontanelle and terminates at the nasion. Fusion occurs between the two frontal bones at the age of (1-3) years [4]. Previous studies have shown lot of age variations which ranges from 1 to 7 years. Failure to fuse above 8 years of age leads to persistent Metopic suture which is also considered as an anatomic variation. Racial variations in the incidence of fusion of Metopic sutures and shapes have been observed [4,5].

Few authors have claimed that Metopic suture may persist up to the sixth year and even throughout life in about 10% of cases in dry skull studies [6,7]. When the Metopic sutures are complete and extend from nasion to bregma, the condition is called as metopism. If the suture is not present throughout and occupies a small area between these two points, they are considered as incomplete metopic sutures. They are also called as median frontal sutures and usually present between the two super ciliary arches [8]. The knowledge of the anatomy of the metopic suture is important because it can be mistaken for a cranial fracture in radiological images, or even for the sagittal suture. It is also holds significance regarding neurosurgery and forensic medicine [9].

The present study aims at determining incidence and persistence of Metopic suture in skull.

MATERIALS AND METHODS

This study was conducted with 70 human adult dry skulls which were obtained from department of Anatomy PCMS, Bhopal and bone sets from medical students. The skulls were inspected at the Norma Frontalis for the presence of the Metopic suture. The sutures were classified as complete and incomplete. A suture which extends completely between the bregma and nasion is termed as the complete Metopic suture. If it extends to a smaller distance either from the nasion or from the bregma, it is termed as incomplete type. The incomplete sutures were classified as linear type, 'V' shape and 'U' type. The method of classification of the Metopic sutures is based on the reports of earlier studies.^{9,10,11} The incidence of complete and incomplete Metopic sutures were calculated, the data obtained were compared with those from earlier studies.

OBSERVATIONS

A total of 70 dry skulls from department of Anatomy and those with students were studied for the presence of persistent Metopic suture.

Complete Metopic suture was found in two skulls which were extending from Bregma to Nasion. (Fig .1, 2 and 3)

Incomplete suture present in the region of

glabella was seen in 3 skulls it was of linear type. (Fig.4)

Fig. 1 and 2: Showing Metopic suture.

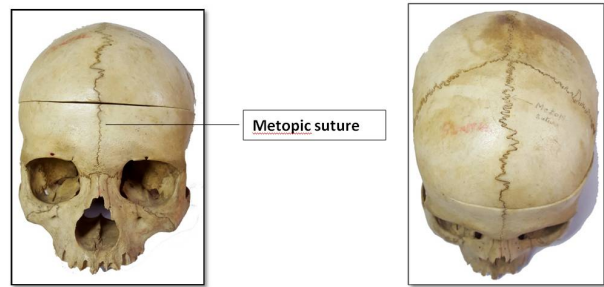


Fig. 3: Showing Metopic suture.

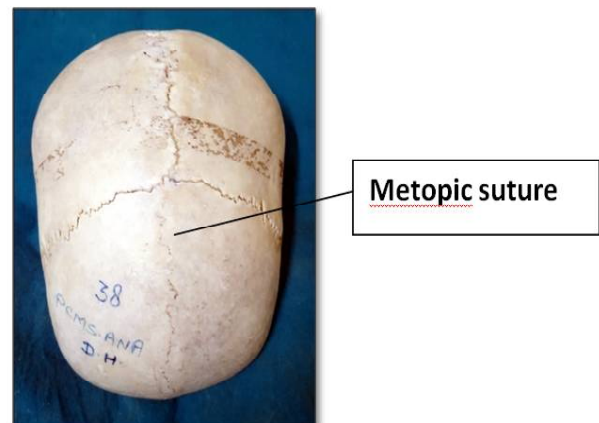


Fig. 4: Incomplete suture present in the region of glabella was seen in 3 skulls it was of linear type.

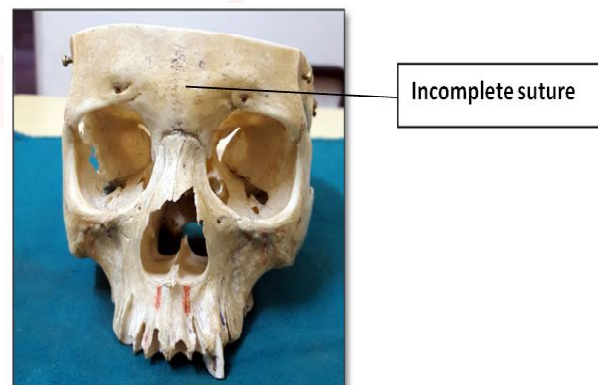
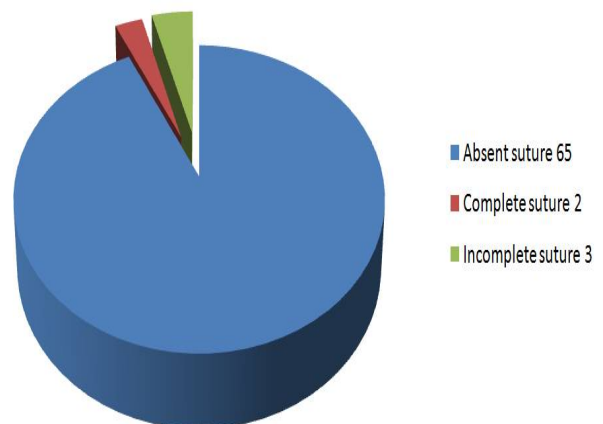


Fig.5: Showing incidence of Metopic suture.



DISCUSSION

Genetic predisposition has been suggested as one of the most accepted pathophysiology for metopism [12]. Del Sol et al has suggested that metopism can be related to abnormal growth of the cranial bones, hydrocephalus, heredity, or atavism [13]. Some other causes of metopism, include active expression of cytokines during cranial fusion and even resorption of the chondroidal tissue [14].

Few authors have suggested that the persistent metopic suture is an adaptation for giving birth to babies with larger brains. They have further stated that metopism may be an alteration for rapidly growing brain after birth and even may also related to the expansion of the frontal lobes. Various terminologies used are stenocrotaphia (abnormal narrowing of the temporal area of the head), plagiocephaly (cranial malformation causing a twisted and asymmetrical head because of the synostosis of the cranial sutures), scaphocephaly (deformed head, projecting forward like the keel of a boat) [13]. Impaired closure of the Metopic suture is common in Apert's Syndrome [15].

In case of head injury patient, the persistent Metopic suture may be confused with vertical fracture. In such cases reconstructed tomography scans are superior to the plain X- ray film. The knowledge about Metopic sutures is also helpful for the medico legal consultants and forensic experts. Their morphological details are important for the clinician from radiological and surgical point of view. While reading the X-ray/ CT and MRI films, the possibility of the metopic suture should always be considered in list of differential diagnosis [16].

CONCLUSION

This study was carried out on 70 human adult dry skulls for the incidence of the metopic suture. Complete Metopic suture was found in 2.85 % while incomplete suture was found in 4.28% cases. Thus Metopism was found in 7.14 % of skulls and 92.85 % skulls showed absence of Metopic suture.

The knowledge of Metopic sutures is very important for the doctors while dealing with

patients of head injury and cranial surgeries.

The present study was an effort to enhance some essential anatomical data of Metopic suture in the central Indian adult population. Nevertheless more studies demanding large sample size, comparison between sexes, different age groups and distribution in different geographic areas remains to be studied.

Conflicts of Interests: None

REFERENCES

- [1]. Borley NR. Gray's Anatomy. 40th ed. London: Churchill Livingstone; 2008. P.472.
- [2]. Study of incidence of metopic suture in adult skulls. Wadekar PR et al. Indian Journal of Basic and Applied Medical Research; December 2014;4(1):277-283.
- [3]. Guerram A, Le Minor JM, Renger S, Bierry G. Brief communication: The size of the human frontal sinuses in adults presenting complete persistence of the metopic suture. American Journal of Physical Anthropology. 2014;154:621-627.
- [4]. Metopism in adult skulls from southern Brazil. Int. J. Morphol., 2006; 24(1):61-66.
- [5]. Keith A. Human Embryology and Morphology. 6th ed. London: Edward Arnold; 1948
- [6]. Ajmani ML, Mittal RK, Jain SP. Incidence of the metopic suture in adult Nigerian skulls. J Anat 1983;137: 177-83.
- [7]. Caffey J. Pediatric X-ray diagnosis. 7th ed, Vol. 1. London: Medical Publication Inc; 1978. p. 10-25.
- [8]. Bilodi AK, Agrawal BK, Mane S, Kumar A: A study of metopic sutures in human skulls. Kathmandu Univ Med J 2003;2:96-99.
- [9]. Hauser, G.; Mnazi, G.; Vienna, A. & De Stefano, G. F. Size and shape of human cranial sutures – a new scoring method. Am. J. Anat. 1991;190:231-44.
- [10]. Agarwal SK, Malhotra VK, Tewari SP. Incidence of the metopic suture in adult Indian crania. Acta Anat (Basel) 1979;105:469-474.
- [11]. Ajmani ML, Mittal RK, Jain SP. Incidence of the metopic suture in adult Nigerian skulls. J Anat 1983;137:177-183.
- [12]. Castilho SMA, Oda YJ, Santana GDM. Metopism in adult skulls from Southern Brazil. Int J Morphol 2006;24:61-66.
- [13]. Falk D, Zollikofer CPE, Morimoto N, de León MSP. Metopic suture of Taung (*Australopithecus africanus*) and its implications for hominin brain evolution. Proceedings of the National Academy of Sciences. 2012;109:8467-8470.
- [14]. Vikram S, Padubidri JR, Dutt AR. A rare case of persistent metopic suture in an elderly individual: Incidental autopsy finding with clinical implications. Archives of Medicine and Health Sciences. 2016; 2: 61.

- [15]. Faro C, Chaoui R, Wegrzyn P, Levallant JM, Benoit B, Nicolaides KH. Metopic suture in fetuses with Apert syndrome at 22–27 weeks of gestation. *Ultrasound Obstet Gynecol.* 2006;27:28-33.
- [16]. Bademci G, Kendi T, Agalar F. Persistent metopic suture can mimic the skull fractures in the emergency setting? *Neurocirugia* 2007;18:238-240.

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