

A STUDY ON INCIDENCE OF METOPIC SUTURE IN ADULT HUMAN DRY SKULLS

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ABSTRACT

Background: The frontal bone is ossified in fibrous mesenchyme from two primary centers, one near each frontal tuber. At birth the bone consists of two halves. The median suture usually disappear by about 8 years, but may persist as the metopic suture. Metopic suture present at birth between the right and left halves of the frontal bone and closes at 2-5 years of the age, but may present during adult life. The suture closure began endocranially and it spread to pericranium.

Materials and Methods: Total 500 skulls were used for this study from different medical institutions of south India.

Results: Out of 500 skulls, 11(2.2%) skulls showed complete metopic suture and 108(21.6%) skulls showed in complete metopic suture.

Conclusion: The Knowledge of metopic suture is very important in radiological and orthopedic surgeons during their practice in head injuries and it also important in practice of anthropologists and neurosurgeons.

KEY WORDS: Frontal bone, Metopic suture, Anterior fontanelle, Metopism.

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INTRODUCTION

The frontal bone is a curved plate of pneumatic flat bone. The two halves of the developing frontal bone remain separate as the metopic suture, which is disappears during infancy or in

early childhood. Remnants of the metopic suture may persist in some skulls at the glabella or a complete suture extending from the Nasion to the Bregma. Metopism which is defined as a condition in which the two pieces of the frontal bone fail to merge in early childhood. Growth

at metopic suture increases the breadth of the skull. The metopic suture fuses at around 18 months after birth, by which time most of the increase in breadth of the forehead is complete. Premature fusion result in the formation of a narrow, elongated skull. Incomplete metopim is present in different shape linear shape, U shaped and V shaped of which linear shape is most common. This is important for radiologist, neurosurgeon and forensic medicine, because the fracture of frontal bone is most common in metopic suture [1,2,3].

The persistence of the metopic suture has been reported in frequencies ranging from 1% to 12% of skulls. Keith [4] mentions that the metopic suture disappears at the end of the first year, or in the beginning of the second year of life, Piersol [5] claims that it may close by the end of the fourth year, with a faint trace persisting at the lower end. According to Romanes [6], the metopic suture is present at birth but is normally closed by the fifth or sixth year, only traces of it being left above and below. Warwick and Williams [7] state that the two halves of the frontal bone begin to unite in the second year, and the suture is usually obliterated by the eighth year. Hamilton [8] has states that the metopic suture disappears by the seventh year. Basmajian [9] claims that the two halves of the frontal bone fuse about the second year but in some skulls they remain separate, i.e. the interfrontal or metopic suture persists. Wood Jones[10] is of the opinion that when the metopic suture persists it has very definite characteristics. It is a typical dentate suture. The posterior part is the pars bregmatica and the area included within the anterior fontanelle. The anterior end of the suture fails to meet the suture between the two nasal bones. Frequently in the fetus or infant, a dilatation of the fissure, metopic fontanelle, is found near the upper part of its lower third. There are a few cases of traces of it in the adult [11,12]. The metopism is more common in higher races & in brachycephalics [13]. The present study is aimed to observe the incidence of metopic suture in adult dry skulls of south India.

MATERIALS AND METHODS

Total 500 skulls were used for this study from

different medical institutions of south India. All the skulls were observed carefully for metopic suture, if any other variation along with metopic suture were recorded.

RESULTS

Out of 500 skulls, 11 (2.2%) skulls were found with complete metopic suture which is completely extended from bregma to nasion and 108(21.6%) skulls were observed with incomplete metopic suture (Table 1)(Figure 1).

Table 1: Showing the Incidence of various metopic suture patterns.

Type of suture	Number	Percentage
Complete	11	2.2
Incomplete	108	21.6
Total	119	23.8

Fig. 1: Showing skulls with metopic suture.



DISCUSSION

In the present study, metopism was found in 2.2 % cases which is correlated with studies of Africans by Breathnach[11] (1%) in Negroids by Woo[14] (2%) and in Indians by Agarwal et al.[15] 2.66 %. Caffey[16] mentioned that complete metopic suture found in about 10% of cases. Incidence of metopic suture varies in different races. Metopic suture can be due to various causes such as abnormal growth of cranial bones, growth interruption, heredity, sexual, hormonal influence, atavism, cranial malformations, and hydrocephalus. According to Breathnach[11] the incidence of metopic suture varies from 4-5 % in Yellow races, 7-10% in Europeans, and 1%in African skulls .

According to Bryce [17] metopism is present in 9.5 % of Scottish skulls, 8.7 % of European crania, 5.1 % of Mongolian subjects, 1.2 % of Negroes and 1% of Australian skulls. Breathnach

[11] reported it to be 7-10% in Europeans, 4–5% in Yellow races and 1 % in African skulls. The figure of European skulls (7–10%) more or less agrees with that mentioned by Romanes, up to 8 %. According to Woo [14] also, metopism is more frequent among Whites and Mongoloids (about 10%) than among Negroids (2%). Similar studies have also been made of Indian crania, and metopism has been found to be 5% (Punjab), 3.31 % (U.P) and 2.66 % (Lucknow), varying according to different regions of the country. In the X-ray diagnosis of fractures of the frontal bone, particularly vertical fractures near the mid-line, the possibility of complete or incomplete metopic suture must be considered. The persistence of the suture and its relation to age and to race have excited comment over a long period of time. In the Lebanese population metopism is present in 0.82% and 0.93% of cases, respectively, leading to an overall incidence of 1.75%. The incidence of the metopic suture is slightly higher in males (1.84%) than in females (1.62%).

Moreover, according to Baaten et al [15], people who live in rural areas have a higher incidence of metopism compared to people living in urban areas, with ratios of 4:1 and 4:2 respectively. Ajmani et al. [19] carried out a study on 206 adult Nigerian skulls for the incidence of the metopic suture. They noted that metopism was present in 3.4% of cases, but a incomplete metopic suture was observed in 34.97% of the skulls. Metopism was studied in adult Brazilian skulls and it was found out that only 2.75% of the skulls showed this characteristic, although an incomplete metopic suture existed in 28.75% skulls [17]. Metopism was also observed in 2.66% of adult Indian skulls [18]. The incidence of metopism observed by Bryce, Jit & Shah, Woo, Breathnach and Romanes is higher than ours. The knowledge of metopic suture is very helpful in practice of anthropology, orthopedic, neuro- surgery and radiology.

Conflicts of Interests: None

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