

A study of metopic sutures in human skulls

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Abstract

The present study has been carried out in fifty-one adult human skulls for metopic sutures in the department of anatomy, Nepalgunj Medical College, Chisapani. Metopic sutures were found in six skulls (11.46 %) This study showed higher incidences of incomplete metopic sutures (7.84 %). One skull showed double incomplete sutures (one to right of bregma and other in the middle of the frontal bone in the mid line), which was of, a very rare variety seen in frontal bone of (1.96 %), three skulls showed incomplete sutures (3.92 %). Though the number of the skulls was small, the study showed a rare morphological variety, which was well correlated with earlier workers.

Key words

Metopism, incomplete metopic sutures, nasion, bregma, duplication of incomplete metopic sutures.

Metopic sutures are a vertical sutures occurring as a result of failure of ossification between the two halves of frontal bone. It is very often mistaken for fracture of the frontal bone in the A-P view X-Ray of skull. It also called Median frontal Sutures usually present between two super ciliary arches². At birth two halves of frontal bones are present. Later they come in contact with each other in first year and fuses by 7th or 8th year. Sometimes there may be complete absence of fusion, which may remain open resulting in metopic frontalle. Sometimes there may be presence of wormian bones³. When complete metopic sutures are present from nasion to bregma, then it is called **Metopism**. This metopism is more common in higher races & in brachycephalics⁴.

Different countries showed different incidences of metopic sutures. They are 7% -8% in European populations, 1% in African population & 4 -5% in Mongolians. It also differs in different states of India namely 4% in Dravidians, 5% in Punjabis, 2.35% in UP subjects.

Materials and methods

Fifty-one human skulls from the department of anatomy, of Nepalgunj Medical College Chisapani, constituted the sample for this study. All the skulls were studied for the presence of metopic sutures. Their length, breadth, and type of serrations were studied with the help of thread and measuring scale. Various dimensions of all the skulls were taken to determine whether they were belonging to brachycephalic, dolicocephalic, mesocephalic.

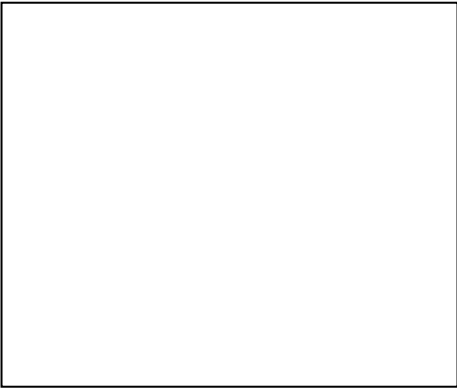
Results

Table 1: Showing various types of metopic sutures:-

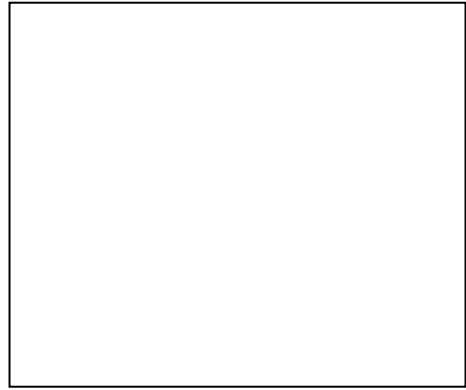
S. No	Type of metopic sutures	Position	Outer aspect of skull	Cranial surface of skull	Wormian bones
1	Complete	In the mid line	Present	Absent	Absent
2	Complete	In the mid line	Present	Present	Present
3	Split incomplete metopic	One to the right of bregma & other in the middle of the frontal bone in the mid line with moderate sutures was observed in one skull	Present	Absent	Absent
4	Incomplete	Highly serrated near nasion	Present	Absent	Absent
5	Incomplete	Highly serrated near nasion	Present	Absent	Absent
6	Incomplete	Highly serrated near nasion	Present	Absent	Absent

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Photograph 1 Normal frontal bone showing absence of metopic sutures



Photograph 2 Showing double incomplete metopic sutures (split metopic sutures)



Photographs 3 & 4 Showing complete metopic sutures

Complete metopic sutures were observed in two skulls, incomplete metopic sutures were found in four skulls a rare variety of split metopic sutures of incomplete type was seen in one skull.

Metopic sutures were seen in six skulls, out them, two were complete three near nasion (incomplete). And other skull showed split incomplete sutures. The maximum length of me topic sutures was 11.5 cms & minimum width was 1.0 mm In one skill there was highly serrated metopic sutures, moderately serrations sutures were seen in two skulls. And minimal serrations were seen in three skulls.

Discussion

In the present study, there were six skulls that showed the presence of metopic sutures. Out of them two skulls showed complete metopic sutures in the mid line extending from nasion to Bergma, while three skulls showed traces of me topic sutures near nasion in the midline and one skull showed double incomplete metopic sutures which is of rare variety in the middle frontal bone. But no skull showed traces of metopic sutures in the upper part of the frontal bone.

Our study has confirmed the view of Cunningham which stated "*Obliteration on metopic sutures usually begins at the level of frontal eminence and extends both upwards and downwards and traces may be left either at bregma or nasion, if the fusion is not complete*"⁵.

Unlike in other studies, our study has shown the presence of metopic sutures both in upper part (not traces) and in the middle of the frontal bone in the form of split metopic sutures.

Metopic sutures in this study was found in 11.4% of skulls while incidences in other studies are as follows: - Das (1967) was 24.65% in UP subjects⁴ and in earlier studies done by Dixit & Shukla from same geographical area was very low i.e., 2.53%⁶. This difference may be due to either population or racial difference.

Incidences of metopism (complete metopic sutures) was observed in 3.92% cases which was low, when compared to the studies of Rau (1934) 4.0% in Madrasi skulls⁴ and in Inderjit & Shah (1948) 5.0% in Punjabi skulls and 11% in Linc & Fleischman (1969) of Czech skulls. But higher when compared to Das et al studies (3.31%) in U.P Skulls & Dixit & Shukla studies (2.53%) also in U.P.Subjects⁶

Inderjit & Shah (1948) have described V shaped (11.25%), Y shaped (1.25%), and H shaped (1.25%) metopic sutures near nasion in their studies⁷.

But in our studies Y types of metopic sutures were found in two skulls (3.92%) and Y shaped in one skull (1.96%).

Table- 2 showing the incidences of metopic sutures as reported by the various authors.

Sino	Author	year	Subjects	Incidence of metopic sutures	Remarks
1	Cunningham	1964	European	8.0%	Suture bones may the line of sutures
2	Frazer	1960	European, ----- African, ----- Mongolian-----	7-10% 1.0% 4-5%	-
3	Linc & Fleischman	1969	Czech skulls	11%	-
4	Davies	1969	Not specified	9%	-
5	Rau	1934	Dravidian	4%	-
6	Inderjit and Shah	1948	Punjabis	32.5%	-
7	Dixit & Shukla	1967	U.P. Subject	2.53%	-
8	Anjamani et al	1989	Nigerian	3.4%	-
9	Woo 1949	1949	Mangoloids	10%	-
10	Das. Saxena & Baig	1973	U.P. Subjects	24.65%	-
11	Present study	2003		11.56%	-

From the above table it is evident that incidences of metopic sutures were in higher in Punjabi skulls (Inderjit and Shah 1948)-32.5%, Czech skulls (Line & Fleischman 1969)-11% and European races (7-10%) while other races showed lower incidences.

Present study also showed higher incidences (11.46%).

Inderjit and Shah (1948) observed presence of double metopic sutures in their studies.

But the present study showed split incomplete sutures in one skull, but not double metopic sutures⁷

Conclusion

This study has shown an incidence of 11.46% of metopic sutures, three types of metopic sutures were found namely complete in 3.92% incomplete in 5.88% and split incomplete metopic sutures were not only found on outer aspect but also on inner aspect in one skull(1.96%). Two skulls showed the presence of wormian bones.

This study has been well correlated with earlier workers that have given us knowledge in different population. The higher incidence of incomplete metopic sutures (7.84%) may be due to racial difference or numerical difference of skulls. Hence the study has been done on metopic sutures.

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