

ORIGINAL ARTICLE**AUTOPSY STUDY OF METOPIC SUTURE INCIDENCE IN HUMAN SKULLS IN WESTERN RAJASTHAN****William F Masih¹, Sumit Gupta², P K Saraswat³, S K Aggarwal⁴**¹Associate Professor, ²Assistant Professor, Department of Anatomy, Govt. Medical College, Kota, ³Professor in Forensic Medicine, ⁴Professor in Anatomy, JLN Medical College, Ajmer.**Correspondence:** Dr. William F Masih, Email: dr.williammasih@yahoo.com**ABSTRACT****Introduction:** Metopic suture which is placed between frontal bone and usually disappear during infancy and childhood, may persist from nasion to anterior angle of bregma, this is called metopism.**Objective:** To find the incidence of metopism in western Rajasthan and to compare it with other study in other parts of India and Abroad.**Methodology:** Present study was autopsy done on 200 dead bodies of all age group who were brought to J L N Medical college, Ajmer for autopsy during the period of 6 months. Vault was observed morphological for presence of metopism on both outer and inner side after removal of periosteum.**Results:** The incidence of metopism was 6.5% in all observed skull in this study. The incidence of metopism was observed more in child age group i.e. 100% in 0-5 years & 80% in 6-10 years as compare to the adults and old age groups i.e. 3.4% in 41-50 years.**Conclusion:** The presence of metopic suture simulates the fracture of frontal bone, therefore it should be properly ruled out in x-rays by radiologists and neurosurgeons.**Keywords:** Skull, Metopism, Metopic suture, Frontal bone**INTRODUCTION**

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. Metopism has been assessed at 0-7.4% of individuals in various ethnic groups¹.

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^{2,3,8}. The suture closure began endocrinally (inwardly) and it spread outwardly to ectocranium⁴.

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 skull¹.

Incomplete metopim is present in different shape linear shape, U shaped and V shaped of which linear shape is most common^{5,17}. This is important for radiologist, neurosurgeon and forensic medicine, because the fracture of frontal bone is most common in metopic suture.

The aim of the study was to report the incidence of metopism and to compare the result obtained in the present study with the other studies in India and abroad.

MATERIAL AND METHOD

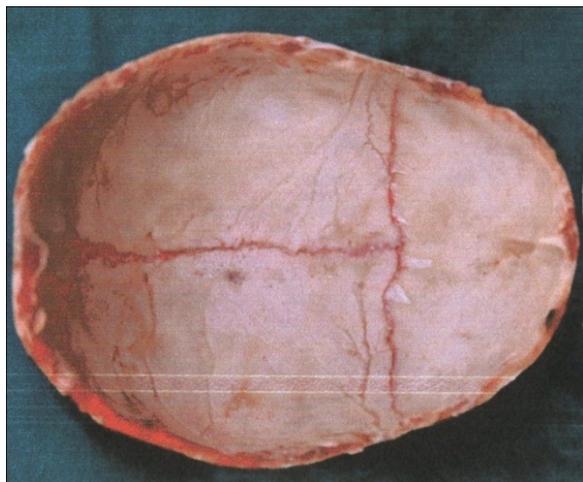
This study was done in Department of Anatomy in association of Department of Forensic Medicine at J L N Medical College, Ajmer for 200 cases for 6 months

Total 200 cases (157 males and 43 females) from all age groups both urban and rural habitats were studied, who were brought to the institution for autopsy.

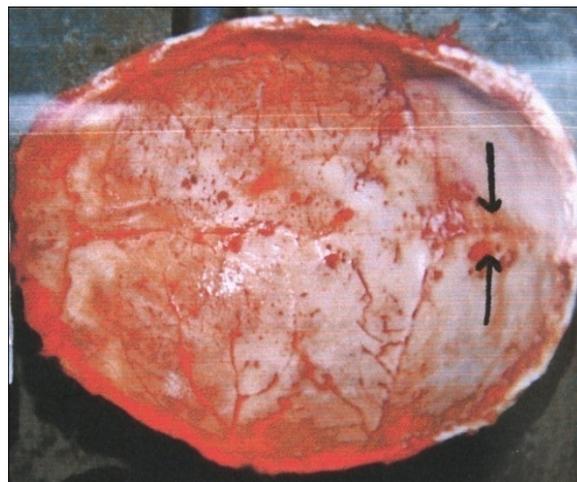
The history of congenital disease, hypertension, diabetes mellitus, hyper or hypothyroidism, pulmonary tuberculosis, convulsive disorder, mental diseases along with their dietary habit was enquired from relatives.

Scalp was incised across the vertex from tip of one mastoid process to the other. The scalp tissue was reflected anteriorly upto superciliary arches on forehead and posteriorly upto external occipital protuberance. The vault was completely cleaned by peeling off the temporalis muscle, soft tissue and periosteum. The presence of metopic suture was observed carefully. After that the vault cap were removed and also

examined on inner side also. The presence of metopism, incomplete metopic suture and its shape was recorded.



Photograph 1: showing normal fusion of two halves of frontal bone



Photograph 2: showing presence of incomplete metopic suture

RESULTS

In this study, 200 medicolegal cases who were brought to J L N Medical College, Ajmer for autopsy both males and females of all age groups were studied.

Table 1 Shows incidence of persistent metopic sutures among the subject in this study. 100 % male and female upto 5 years of age had metopic suture, whereas all males and 50 % females between 6-10 years had non-united metopic suture. One female showed metopism in 21-30 years of age, whereas total incidence was 1.8% in this age group.

Table 1: Incidence of Metopic Suture / Metopism (N=200)

Age In years	Cases			Subjects having persistent metopic suture		
	Male	Female	Total	Male	Female	Total
0-5	2	2	4	2(100%)	2(100%)	4(100%)
6-10	3	2	5	3(100%)	1(50%)	4(80%)
11-20	11	13	24	1(9.9%)	-	1(4.2%)
21-30	46	10	56	1(2.2%)	1(2.3%)	2(1.8%)
31-40	38	7	45	1(2.6%)	-	1(2.2%)
41-50	25	4	29	1(4%)	-	1(3.4%)
Total	157	43	200	9	4	13(6.5%)

One males showed evidence of metopism in 31-40 years to 41- 50 years i.e. 2.6% & 4% respectively. Total incidence of metopism in this study was 6.5% in all age groups in both sexes.

Table 2: Incidence of Types of Metopic Suture and their Shape

Types of Suture	Number (%)
Complete Metopic Suture	13 (6.5)
Incomplete Metopic Suture	68 (34)
A. Linear Shape	40 (20)
B. ‘U’ Shape	16 (8)
C. ‘V’ Shape	12 (6)

Incomplete suture were in 34% of the cases, Linear shape 20 %, ‘U’ shaped 8%, ‘V’ shaped 6% was seen and split incomplete were not seen on outer aspect but were seen on inner aspect in two skull. Linear variant was the commonest.

DISCUSSION

Predominantly the cases in this study were Hindus (78.5%) followed by Muslims (19.5%) and Christian(1.5%). This is very much in proportion to the religion wise distribution of these three main communities in India.

72.5% cases in this study belonged to low socioeconomic group followed by 23.7% and 4 % individual from middle and high socioeconomic group respectively. It reflects the effect of dietary habits & nutrition effect of closure of suture.

Metopic suture has been observed in all male and female upto age of 5 years, whereas all male and 50 % females between 6-10 years had metopic suture. After the age of 10 years one female showed persistent metopic suture between 21-30 years of age group, while 4 male showed evidence of metopic suture one in 11-20 years of age, one in 21-30 years of age, one in 31-40 years of age & one in 41-50 years of age respectively.

Table 3: Comparison of Metopism with other studies

Authors	% of Metopism	Race
Bryces et al ⁶ (1915)	8.5%	European
	5.5%	Mongolism
	1.2%	Negros
Jit and Shah et al ⁷ (1948)	5%	Indian Punjabi
Woo et al ⁸ (1945)	10%	Mongoloid
Romanes et al ⁹ (1972)	8%	European
Das et al ¹⁰ (1973)	3%	India
Berry et al ¹¹ (1975)	3.4%	Nigerian skull
Chandersekharan et al ¹² (1985)	3%	South Indian
FakhruddinS et al ¹³ (1967)	7-10%	European
	4.5%	Yellow races
Herker NG et al ³ (1981)	1%	African
	3%	Maharastrian(Miraj)
Castil HO et al ⁵ (2006)	7.04%	Southern Brazil
Mangalgi et al ¹⁴ (2010)	3.95% complete metopism	Central India
	52.96% Incomplete metopism	
Bilodi AK et al ¹⁵ (2003)	11.46% complete metopism	Chisapani (Nepal)
Gupta R et al ¹⁶ (2012)	2(5%) metopism	Bracilly (U.P)
Chakravarthi K K et al ¹⁷ (2012)	6.25% Metopism,	Manipal(Karnataka)
	38.75% Incomplete metopism	
Present study	6.5%	All age group
	34% incomplete metopism	

As regards metopism, our study is very close to other studies namely Harker NG et al(1981), Chandrasekharan P (1985) which show 3% each in Maharastrian and south India respectively. Das et al observed 3.3% in Indian, and Jit and Shah (1948 in Punjabi, Indian). In a study by Bilodi AK et al (2003) at Chisapani (Nepal) in 51 skull reported 11.4% complete metopism, incomplete metopic suture 7.84%. In a study by Castillo HO et al (2006) reported skull from Southern Brazil 7.04% metopism in 80% male and only 20% female. Incidence of metopism in present study is very near to study by Berry AC et al(1975) in Nigerian(3.4%), Bryces(1915) had mentioned it as 8.5% cases among European, 5.5% in Mongolian and 1.2% in Negroes. 3.95% had complete metopism in central India as reported by Mangalgi AS et al (2010). This difference of percentage evidently proves racial difference in closure of metopic suture.

CONCLUSION

The morphological knowledge of the metopic suture is important for the radiologist and neurosurgeon in day to day practice. The presence of metopism found to be of considerable regional and racial significance and it stimulates fracture of frontal bone, therefore it should be properly ruled out in x-rays.

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