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Study on patterns of metopic suture found in adult skulls at RIMS, Ranchi

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Abstract
Background: Metopic suture results when two halves of frontal bone fail to fuse. It is often misdiagnosed as skull fracture in trauma cases. Knowledge of various patterns of metopic suture helps clinicians in proper management of trauma cases. The present study was aimed to find the pattern of metopic suture in adult skulls at Department of Anatomy, RIMS, Ranchi
Methods: The present descriptive study was carried out in the department of Anatomy, RIMS, and Ranchi between 2011-13. 105 skulls available at the department were studied for presence of metopic suture and its type.
Results: 2.85% skulls showed metopism while 11.43% had incomplete metopic suture. Mean length was12.13 cm. Knowledge of pattern of metopic suture is essential for proper management of trauma cases.

Keywords: metopic suture, metopism, india, pattern

1. Introduction
The metopic suture is a suture seen between the two halves of the frontal bone. It ossifies in membrane from the two primary centers, which appears by the end of the second month of fetal life and fuses first at the inner surface of the skull. The suture between the two halves of frontal bone generally disappears by 6-8 years [1]. Metopic suture results when this fails to fuse. The clinical importance of this suture is that it can be easily misunderstood as the fracture of frontal bone during X-ray evaluation of skull [2]. Knowledge of various patterns of metopic suture is essential for anatomists, forensic experts and neurosurgeons. When the metopic suture extends from bregma to nasion, it is known as complete metopic suture or metopism. If it is not present throughout, it is known as incomplete metopic suture. Incomplete metopic sutures are further described as "V" shaped, "U" shaped, "H" shaped and linear [3]. Fusion of metopic suture begins at anterior fontanelle and progresses further to terminate at nasion. The time of closure ranges from birth to eight years but is usually complete by two years [4]. Various researchers have studied time of closure of metopic suture in different parts of the world. Data for the trends in Jharkhand is not available.

Aims & objectives
The present study is aimed to find the pattern of metopic suture in adult skulls at Department of Anatomy, RIMS, and Ranchi to fill the knowledge gap.

Material & Methods
The present study was descriptive in nature, carried out in the department of Anatomy, RIMS, Ranchi between 2011-13. Hussain *et al*. (2010) found metopic suture in 29.6% skulls in their study conducted in Karnataka [5]. Using 30% relative precision, the sample size was calculated as below-
Sample size = z^2 X p X q / d^2 = 103. All the 105 skulls available at the department were studied which were satisfying the following criteria-

Inclusion criteria
Adult skull available at department of Anatomy, RIMS, Ranchi

Exclusion criteria
Sign of skull disease, visible abnormalities or damage to the skulls. The skulls were cleaned with soap and water using brush and were dried with a clean dry cloth. The skulls thus cleaned were examined for presence of metopic suture and its type. The length was also measured using a thread. The skulls were also photographed using a digital camera. The metopic suture was classified using criteria mentioned in works of Agarwal *et al*, [6] Ajmani *et al*. [7] and Castilho *et al*. [8]

Results & Discussion
The present study included 105 skulls. 61 were males while remaining 44 were female skulls according to the criteria of sexual dimorphism. The age ranged from 25 to 80 years.
Metopic suture was seen in 15 skulls (14.28%). The type of metopic suture seen is given in table-1.

Table 1: Showing types and morphological patterns of metopic suture (n=105)

Metopic suture	Location	Morphological pattern	No. (%)
Complete	-	-	3 (2.85%)
Incomplete (n=12, 11.43%)	Anterior 1/3rd	Linear	7 (6.67%)
		Side to side excursion	3 (2.85%)
		V shaped	1 (0.95%)
		Y shaped	1 (0.95%)
	Middle 1/3rd	-	0
	Posterior 1/3rd	-	0
Total			15

Bilodi *et al* found metopism in 3.92% skulls while metopic suture was seen in 11.46% skulls [3]. Yadav *et al*. in their study conducted in Kanpur found metopism in 3.5% skulls and metopic suture in 18.04% [9]. Chandrasekaran S *et al*. in their study conducted in Tamil Nadu found metopism in 5% skulls and metopic suture in 40%. They found linear metopic suture in 17% of incomplete cases while U shaped ranked next (15%) [10]. Ajmani *et al*. observed that most common site for persistent metopic suture was lower part of frontal bone [7]. George *et al* found metopism in 4% and metopic suture in 14% cases. Hussain *et al* observed that 3.2% skulls showed metopism and 26.4% showed metopic suture [5]. Thus it is evident that while rate of metopism is similar in Jharkhand as compared to other places, the presence of metopic suture is less. This may have clinical implications in considering skull fractures more carefully.
Length of metopic suture is given in table-2 below-

Table 2: Showing mean length of various types of metopic suture

Type of metopic suture	Length (Mean ± SD)
Complete	12.13 ± 0.12
Incomplete	2.36 ± 0.56

Mean length of metopic suture was found to be 12.8 cm by Yadav *et al*. [9] Pilli *et al* found it to be 11.76 cm [12]. This is similar to the findings of the present study. Wormian bone was not seen in any skull. In case of complete metopism, upper end of metopic suture failed to meet median saggital suture at bregma. In skulls with incomplete metopic suture, three showed highly serrated metopic suture, two showed moderate serrations while remaining seven had minimal serration.

Complete Metopic Suture

Fig 1: Showing a case of metopism in the studied skull

Conclusion

The morphological knowledge of the metopic suture is essential for radiologists and neurosurgeons. Metopic suture may be confused with vertical frontal bone fractures. As the rate of metopism is similar in Jharkhand as compared to other places, doctors treating trauma cases must be aware of this anatomical condition.

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References

1. Partrica Collins. Gray's Anatomy, Churchil Livingstone, London. 38th edition, 1995, Reprint 2000; 354.
2. Keith Moore L, Arthur Dalley F. Clinically oriented anatomy, 4th edition, Lippincott Williams & Wilkins publication, 834.
3. Bilodi AK, Agrawal BK, Mane S, Kumar A. A study of metopic sutures in human skulls. Kathmandu Univ Med J 2003; 2:96-99
4. Bademci G, Kendi T, Agalar F. Persistent metopic suture can mimic the skull fractures in the emergency setting? Neurocirugia 2007; 18:238-240
5. Hussain Saheb S, Mavishetter G F, Thomas S T, Prasanna L C. J Biomed Sci and Res. 2010: 2 (4):223-226
6. Agarwal SK, Malhotra VK, Tewari SP. Incidence of the metopic suture in adult Indian crania. Acta Anat (Basel) 1979; 105:469–474
7. Ajmani ML, Mittal RK, Jain SP. Incidence of the metopic suture in adult Nigerian skulls. J Anat 1983; 137: 177-183
8. Castilho SMA, Oda YJ, Santana GDM. Metopism in adult skulls from Southern Brazil. Int J Morphol 2006; 24: 61-66
9. Yadav A,Kumar V, Srivastava RK. Study of metopic suture in the adult human skulls of north India. J. Anat. Soc. India 2010; 59(2): 232-236
10. Chandrasekaran S, Shastri D. A study on metopic suture in adult south Indian skulls. International Journal of Basic Medical Science 2011; 1 (7): 379-82
11. George SA, Ms.Thenmozhi. Study of Occurance of Metopic Suture in Adult South Indian Skulls. J. Pharm. Sci. & Res. 2015; 7(10): 904-906
12. Pilli N, Sunder RR. Persistence of frontal suture in various forms in adult south Indian skulls. International Journal of Scientific and Research Publications 2013; 3(5):1-7