

Incidence of metopic suture in adult South Indian skulls.

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Abstract:

The suture between the two halves of the frontal bone usually disappears during infancy or in early childhood. In some cases it persists as a complete suture extending from the nasion to the anterior angle of the bregma and this condition is called metopism. Variations of the metopic sutures have been mentioned by various workers with some agreement over dates of closure, or persistence, whether partial or complete. 125 adult south Indian skulls were examined for the incidence of the metopic suture. It was observed that metopism was present in 3.2% of the skulls and incomplete metopic sutures were present in 26.4% of the skulls.

Key words: *Metopic suture, Metopism, Indian skulls.*

Introduction:

The metopic suture runs between the two halves of the frontal bone from the anterior aspect of the anterior fontanelle to the nasion. In the skulls of adults it is found anterior to the coronal suture along the superior mid sagittal crest of the frontal bone. The metopic suture when complete to be an anterior extension of the sagittal suture. The fusion of the metopic suture commences at the anterior fontanelle proceeds in progressive fashion, and terminates at the nasion[1]. This suture normally closes between the 1st and 2nd year of life and is usually completely fused by the 3rd year, but it can remain patent to the 7th year. In some cases it persists as a complete suture extending from the nasion to the anterior angle of the bregma and this condition is called metopism.

The persistence of the metopic suture has been reported in frequencies ranging from 1% to 12% of skulls. Keith [2] mentions that the metopic suture disappears at the end of the first year, or in the beginning of the second year of life, Piersol[3] claims that it may close by the end of the fourth year, with a faint trace persisting at the lower end. According to Romanes[4], 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[5] 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[6] has states that the metopic suture disappears by the seventh year. Basmajian [7] 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[8] 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 [9].

In the present study, an attempt is made to study the incidence of the metopic suture in south Indian skulls.

Material and methods

The material for the present study consisted of 125 adult south Indian skulls, collected from Department of Anatomy, JJM Medical College, Davangere, Karnataka, India. The skulls were studied for the presence of complete or incomplete metopic suture.

Results

Out of 125 skulls studied complete metopic suture was found in only four cases(3.2%), where as incomplete suture was observed in 33 cases(26.4%)(Table 1).

Table 1: Incidence of metopic suture.

Type of suture	Number	Percentage
Complete	4	3.2%
Incomplete	33	26.4%
Total	37	29.6%

Discussion

In the present study, metopism was found in 3.2 % cases which is higher than the

Table 2: Incidence of metopism in different races as reported by various investigators.

Investigators	Race	Percentage
Bryce (1915)	European	8.7%
Bryce (1915)	Mongolian	5.1%
Bryce (1915)	Negro	1.2%
Bryce (1915)	Australian	1%
Bryce (1915)	Scottish	9.5%
Jit & Shah(1948)	Indian – Punjab	5%
Keith(1948)	Subject to race	3 – 8%
Woo(1949)	Mongolians	10%
Woo(1949)	Negroids	2%
Breathnach(1958)	European	7 – 10%
Breathnach(1958)	Yellow races	4 – 5 %
Breathnach(1958)	Africans	1%
Romanes(1972)	Europeans	0 – 8 %
Das (1972)	Indians – U.P	3.31%
Berry(1975)	Various ethnic groups	0 – 7.4%
Agarwal (1979)	Indians	2.66%
Ajmani (1982)	Nigerians	3.4%
Present study	Indians - South	3.2%

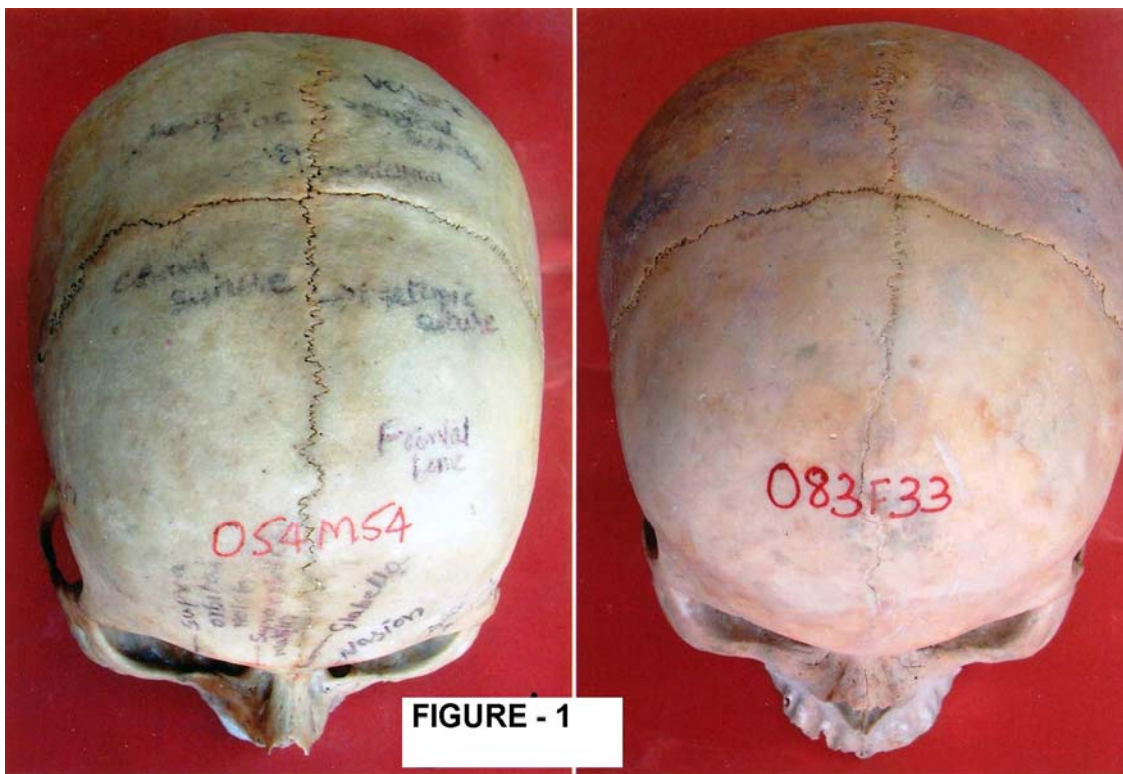


FIGURE - 1

Figure 1: Skulls showing metopism extending from nasion to bregma.

incidence reported in Africans by Breathnach (1%) in Negroids by Woo (2%) and in Indians by Agarwal et al. 2.66%. Caffey[10] mentioned that complete metopic suture found in about 10% of cases.

According to Bryce 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[11] 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. Recently, metopism has been assessed at 0-7% of individuals in various ethnic groups. 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 [1]. However, the incidence of metopism observed by Bryce, Jit & Shah, Woo, Breathnach and Romanes is higher than ours.

Conclusion

This study was carried out on 125 adult south Indian skulls for the incidence of metopic suture. Metopism was present in 3.2% of cases, and incomplete metopic suture observed in 26.4% of the skulls.

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References

- [1] Weinzweig J, Kirschner RE, Farley A, Reiss P, Hunter J, Whitaker LA. Metopic synostosis: Defining the temporal sequence of normal suture fusion and differentiating it from synostosis on the basis of computed tomography images. *Plast Reconstr Surg.* 2003;112: 1211-1218.
- [2] Keith, A. *Human Embryology and Morphology*, 6th ed. London: Edward Arnold, 1948.
- [3] Piersol G. A. *Human Anatomy*, 5th ed. Philadelphia: Lippincott 1916.
- [4] Romanes G. J. 1972. *Cunningham's Textbook of Anatomy*, Oxford University Press, London, 11th ed 1972; p133.
- [5] Partrica Collins. *Gray's Anatomy*, Churchill Livingstone, London. 38th ed, 1995; p. 354.
- [6] Hamilton W. J. *Textbook of Human Anatomy*, Macmillan & Co., London . 2nd ed, 1976; p. 60.
- [7] Basmajian J. V. *Grant's Method of Anatomy*, S. Chand & Co.Ltd, New Delhi , 9th ed, 1975; pp. 451&604.
- [8] Wood F. *Buchanan's Manual of Anatomy*, 8th ed, Pailliere, Tindall. London: 1953.
- [9] Breathnach A. S. *Frazer's Anatomy of the Human Skeleton*, Churchill, London: 5th ed ; 1958.
- [10] Caffey, John. *Paediatric X-ray Diagnosis*, Year Book Medical Publication Inc. London 7th ed. 1978; Vol. 1, p. 10&25.
- [11] Woo, JU-Kong. Racial and sexual differences in the frontal curvature and its relation to

- metopism. American Journal of Physical Anthropology 1949;7:215-226.
- [12] Jit, I. & Shah, M. A. Incidence of frontal or metopic suture amongst Punjabi adults. Indian Medical Gazette 1948;83:507.
- [13] Das A. C, Saxena R. C, Beg M. A. Q. Incidence of metopic suture in U.P. subjects. Journal of the Anatomical Society of India 1973;22:140.
- [14] Agarwal S. K, Malhotra V. K. & Telewari S. P. Incidence of the metopic suture in adult Indian crania. Acta anatomica 1979;105:469-474.
- [15] Baaten PJ, Haddad M, Abi-Nader K, Abi-Ghosn A, Al-Kutoubi A, Jurjus AR. Incidence of metopism in the Lebanese population. Clin Anat. 2003;6: 148–151.
- [16] Ajmani ML, Mittal RK, Jain SP. Incidence of the metopic suture in adult Nigerian skulls. J Anat, 1983;137: 177–183.
- [17] Del Sol M, Binivignat O, Bolini PD, Prates JC. Metopism in Brazilians. Rev Paul Med 1989;107: 105–107.