

Frequency of metopic suture in male and female medieval cranial series

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Each half of the adult frontal bone begins to ossify from a single centre. At birth, the frontal bone is composed of two symmetrical halves, which are separated from each other by the metopic suture. 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. A major anomaly is the failure of the two halves to fuse during infancy or in early childhood, a condition known as a metopism or metopic suture. In the present study, an attempt is made to study, compare and assess the sexual differences of metopic suture in male and female medieval cranial series. A total of 318 crania of adult individuals from both sexes are investigated. It is established that metopism is more frequent among the female cranial series compared to the male one.

Key words: metopic suture, cranial series, sexual differences

Introduction

The adult frontal bone is an irregular, bowl-shaped bone. Each half of the frontal bone begins to ossify from a single centre, which appears in membrane between 6 and 7 weeks during the fetal life. At birth, the frontal bone is composed of two symmetrical halves, which are separated from each other by the metopic or frontal suture [9].

Metopic suture is a kind of dentate suture [1], which runs between the frontal bones of the fetus, from the ventral part of the anterior fontanelle to the *nasion*. It is considered to be an anterior extension of the sagittal suture. 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 [10]. The condition, in which the suture is complete and extends from *nasion* to *bregma* is usually referred to as metopism. Remnant of any part of the suture remaining after the age of about 2 years is usually called a *sutura metopica persistens* [9]. If the suture is not present throughout and occupies a small area between *nasion* and *bregma*, it is considered as an incomplete metopic suture. It is also called a median frontal suture and usually present between the two superciliary arches [7].

It has been reported by various workers that the incidences of metopism and metopic suture vary in different populations. The frequency may range from 1% to 12% and the incidence is slightly higher in the male population [10].

It is essential to know about metopism and metopic suture, because they can be easily misdiagnosed as vertical traumatic skull fractures extending in the mid-line in head injury patients or even for the sagittal suture in antero-posterior radiological images. It is also important for paleodemography and forensic medicine [2, 5]. In the present study, an attempt is made to study, compare and assess the sexual differences in frequency of metopic suture in male and female medieval cranial series.

Materials and methods

A total of 318 crania (159 males and 159 females) are investigated. All crania belonged to adult individuals from both sexes. The both cranial series consist of medieval bone material from the IEMPAM, BAS collection. Both the sex and age of the individuals are previously determinate by the metrical and scopical features of the crania and postcranial skeletons [6, 12, 13].

The metopic suture presence and appearance towards its length are assessed according to Movsesyan et al. [14] by the following codes (0-3): 0 – absence of metopic suture; 1 – remnant of metopic suture with length approximately about $\frac{1}{3}$ of the whole suture length; 2 – remnant of metopic suture with length approximately about $\frac{1}{2}$ of the whole suture length; 3 – metopism or metopic suture extending from *nasion* to *bregma*.

Statistical significance of the sexual differences is assessed by chi-squared test (χ^2 -test) at $p < 0,05$.

Results and Discussion

A major anomaly of the frontal bone is the failure of the two halves to fuse in the midline during infancy or in early childhood [9], a condition known as a metopism or metopic suture.

Among the investigated medieval female series metopic suture extending from *nasion* to *bregma* is established in 10,1 % (table 1). Nevertheless, remnant of metopic suture with approximately about $\frac{1}{3}$ of the whole suture length, is established in only one case (0,6 %). The frequency of metopism among the medieval male cranial series (table 1) is lower (8,2 %) compared to female one. However, in male series there are not established cases of metopic suture remnants. These data are in accordance with other researcher results for incidence of metopic suture in Europeans, which range between 7 – 10 % [3, 4, 8].

Table 1. Frequency of metopic suture among the investigated medieval male and female cranial series.

| Metopic suture | Medieval female cranial series | | Medieval male cranial series | |
|--|--------------------------------|--------|------------------------------|--------|
| | n | % | n | % |
| Absence (0) | 142 | 89,31 | 146 | 91,82 |
| Remnant with approximately length about $\frac{1}{3}$ of the whole suture length (1) | 1 | 0,63 | 0 | 0,00 |
| Remnant with approximately length about $\frac{1}{2}$ of the whole suture length (2) | 0 | 0,00 | 0 | 0,00 |
| Metopism (3) | 16 | 10,06 | 13 | 8,18 |
| Total | 159 | 100,00 | 159 | 100,00 |

The comparison between both series shows that metopism is more frequent among the female series compared to male one, but the difference is not statistically significant. Furthermore, remnants of metopic suture are established only among the female series. Tavassoli [11] mentioned the fact that metopism appears more frequently among women than men and it is more prevalent in medieval times than today. The author believed that this is result of disorder in the ossification process due to the action of some biochemical factor, most probably a lack of calcium, which is related with malnutrition amongst women who have become pregnant and have given birth immaturely. Because of this, Tavassoli [11] believed that metopism is not merely an interesting morphological fact, or even a racial or genetic characteristic, but it is an indicator of a definite ossification and biochemical disorders, which are consequence of malnutrition due to intrinsic or extrinsic factors.

Conclusion

In summary, metopism is established with different frequency in both investigated medieval cranial series, but is more frequent among the female series compared to male one. Remnants of metopic suture are rare findings and are established only in female series.

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