



CASE STUDY

MORPHOMETRIC STUDY OF PTERION IN SOUTH INDIAN SKULLS

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ABSTRACT

Aim: To determine the morphometric of pterion in south Indian skulls

Materials and Methods: A total 40 dry human adult aged skull of unknown sex were studied. A 0-150 mm digital electronic calliper was used for Morphometrical measurements.

Results: In the present study, four Types of pterion: sphenoparietal, frontotemporal, stellate and epiptereric were observed in south Indian skulls. The dominant type of pterion was Sphenoparietal (83%). This was followed by stellate (6.0%), epiptereric (6.0%) and the least was frontotemporal (5.0%) and their respective distances from frontozygomatic fissure and zygomatic arch were measured.

Conclusion: Relationship between the middle meningeal artery and the pterion is of great importance in the field of surgery, anthropology and in forensic medicine. The relationship between the point of middle meningeal artery and the pterion is not only playing roles in approaching the anterior division of middle meningeal artery, it is also useful in approaching the Brocca's area on the left side of brain and the lateral (Sylvian) cerebral fissure.

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INTRODUCTION

Pterion is a craniometric point near the sphenoid fontanelle which is usually a H-shaped small circular area formed by the convergence of four bones namely frontal, parietal, temporal and sphenoid. It is seen on the norma lateralis of the skull. The pterion is also known as the Sylvian point. Pterion is located superior to the zygomatic arch and posterior to the frontozygomatic suture. The pterion corresponds to the site of the antero-lateral fontanelle of the neonatal skull, which closes in the third month after birth. The joints of the cranial vault are sutural joints which ossify in membranes. As the bones are growing, the unossified sutural membranes connect the periosteum covering the outer and inner surfaces of the bone, which helps in growth as well as binding the bones together to their apposed margins. A sutural bone is sometimes present at the pterion. This bone is called pterion ossicle or Epiptereric bone or flower's bone (Ersoy *et al.*, 2003) Pterion is an important anatomic landmark as it overlies the anterior branch of the middle meningeal artery and the lateral fissure of the cerebral hemisphere. This point is an important clinical landmark because the calvaria's wall is thin in this region. Therefore pterion is a fragile point that could be fractured easily even in a mild head injury the anterior branch of the middle meningeal artery runs beneath the pterion. It is

vulnerable to damage at this point and rupture of the artery may lead to an extradural hematoma. The Sylvian point is where the stem of lateral sulcus of cerebral hemisphere divides into its three limbs, anterior, ascending and posterior, right beneath the pterion. It has been reported that the pterion is also an important landmark for the anterior branch of the middle meningeal artery, Broca's area, the insula, and the stem of the lateral sulcus. It is also a primary site during surgery to gain access to the sphenoid ridge and optic canal. The pterion is also commonly used in cranial suture closure methodology as an important guide for age estimation and sex determination in archeological and forensic specimens. It's an important landmark for neurosurgeons and maxillofacial surgeons (Moore and Dalley, 1999). There are various classification of Pterion based on its sutural pattern. The pterion was first classified into three types by Broca in 1875 as sphenoparietal, frontotemporal and stellate. Later, Murphy in 1956 defined four types of pattern namely: sphenoparietal, the sphenoid and parietal bones are indirect contact; frontotemporal, the frontal and temporal bones are indirect contact; stellate, all the four bones meet at a point; and epiptereric, when there is a small sutural bone uniting all the bones. Wang *et al.* in 2006 gave six classifications namely sphenoparietal, frontotemporal, stellate, epiptereric, zygomaticoparietal and zygomaticotemporal (Saxena *et al.*, 2003).

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MATERIALS AND METHODS

A total 40 dry human adult aged skull of unknown sex were studied from the Department of Anatomy, SAVEETHA DENTAL COLLEGE. Damaged skulls, new-born, infants and children skulls and very old skulls with obliterated sutures are excluded from the study. A 0-150 mm digital electronic calliper was used for Morphometrical measurements (Lama and Mottolese, 2000). On both the left and right sides of each skull, the sutural pattern of the pterion was determined based on descriptions (sphenoparietal, frontotemporal, stellate and epiptereric types). A circle of smallest radius was drawn connecting the four bones involved in the formation of the pterion, the center of which was taken as the center of the pterion. Following measurements taken twice then averaged so as to minimize bias errors, using digital Vernier callipers with an accuracy of 0.1 mm, of the distances between the pterion and specific identifiable bony landmarks (Figure-1):

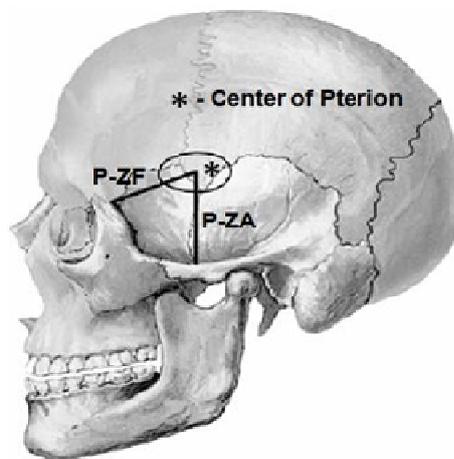


Figure 1. Distance measurements on lateral aspect of skull

- P-FZ: the distance from the center of the pterion to the posterolateral aspect of the frontozygomatic fissure,
- P-ZA: the vertical distance from the center of the pterion to the zygomatic arch.

RESULTS

The following measurements were taken in cm. They show the measurements of each type of pterion to the frontozygomatic fissure and zygomatic arch.

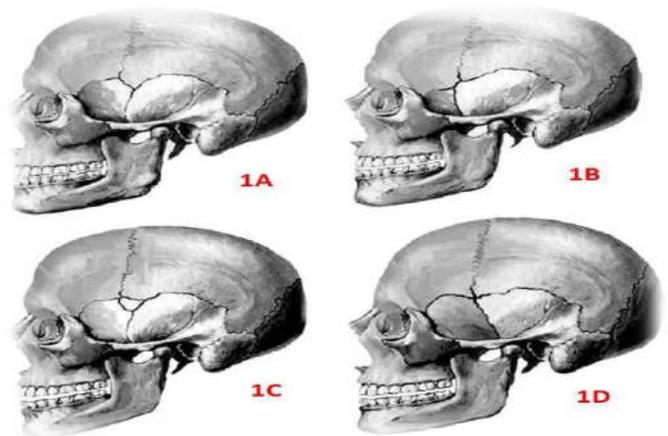


Figure 2. Types of the pterion. : 1A-Sphenoparietal; 1B-Frontotemporal; 1C-Epiptereric; 1D-Stellate

Figure 3. Pre-riormorphometrics showing the mean value

	Sphenoparietal type		Stellate type		Epiptereric type		Frontotemporal type	
	Right	Left	Right	Left	Right	Left	Right	Left
P-FZ	4.02	4.11	3.44	3.68	3.66	3.48	4.18	3.48
P-ZA	3.32	3.19	2.71	2.79	3.00	2.75	3.10	3.10

DISCUSSION

In the present study, four Types of pterion: sphenoparietal, frontotemporal, stellate and epiptereric were observed in south Indian skulls. The dominant type of pterion was Sphenoparietal (83%). This was followed by stellate (6.0%), epiptereric (6.0%) and the least was frontotemporal (5.0%). Other several researches have proven that racial and ethnic variations were observed. Pterion was more significant in females over males. Thus anatomical location of pterion is quite important in surgical innervations like extradural haemorrhages, tumors and even olfactory meningioma's (Saxena *et al.*, 2003). This approach can help determine the exact location and can help in the fields of forensic medicine, neurosurgery, archaeology and maxilla-facial surgery.

Conclusion

Relationship between the middle meningeal artery and the pterion is of great importance in the field of surgery, anthropology and in forensic medicine. The relationship between the point of middle meningeal artery and the pterion is not only playing roles in approaching the anterior division of middle meningeal artery, it is also useful in approaching the Brocca's area on the left side of brain and the lateral (Sylvian) cerebral fissure.

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