Volume : 5 | Issue : 8 | August 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48

Morphology of Pterion

Medical Science

KEYWORDS : Epipetric bones, Pterion, Pterion types.

Srinivasa Rao Y	Assistant Professor, Department of Anatomy, GIMSR, Visakhapatnam.
Eswari A.K	Professor, Dept of Anatomy, KMC, Chennai
Swayam Jothi S	Professor & HOD, Dept of Anatomy, Shri Sathya Sai Medical College & Research Institute, Kancheepuram District, Tamilnadu
Rajeswara Rao N	Assistant Professor, Dept of Anatomy, Shri Sathya Sai Medical College & Research Institute, Ammapettai, Kancheepuram District, Tamilnadu.

ABSTRACT

Standring et al (2005) reported that the Pterion is an important landmark on the side of the skull as it overlies both the anterior branch of the middle meningeal artery and the lateral cerebral fissure intracranially. They also stated that it usually lies 3cm above the zygomatic arch and 3.5cm behind the frontozygomatic suture. The present study was performed on 112 norma lateralis of crania of unknown sex and age to determine the type of Pterion. Sutural bones appear in great numbers in hydrocephalic skulls and they have been linked with rapid cranial expansion. The presence of these sutural bones at Pterion may also complicate surgical orientation, leading to pitfalls.

INTRODUCTION:

The frontal and parietal bones, the greater wing of the sphenoid, and the squamous part of the temporal bones the floor of the temporal fossa. These four bones meet on each side of the head at a small circular area of sutures called pterion (Standring et al 2005). It usually lies 3cm above the zygomatic arch and 3.5cm behind the frontozygomatic suture. Earlier studies reveal that there are four types of pteria: sphenoparietal, frontotemporal, Stellate and epipetric. The fontanelles permit the skull to accommodate the rapid growth of the brain during infancy. Complete ossification of anterolateral fontanelle normally occurs immediately after birth (Standring S et al, 2005) (Williams et al., 1998). Epipteric (Wormian or Sutural) bones are small, irregular ossicles formed due to additional ossification centres. These are seen in or near Pterion. Studies reveal that the wormian bones are markers for various diseases .They can be misleading in the diagnosis of fractures. The present study was carried out to know the details of Pterion, its anatomical variations so that it will help in trephening of the skull during operation.

AIM OF THE STUDY:

The present study was conducted to determine the type of Pterion

MATERIALS AND METHODS:

The study comprised 112 Norma lateralis of dry human skulls of unknown sex and age, obtained from from Shri Sathya Sai Medical College, Kilpauk Medical College, Sree Balaji Medical College & SV Medical College. The pterion and its sutural articulations with frontal, parietal, sphenoid and temporal bones and also anatomical variations if any were studied.

OBSERVATIONS:

Sphenoparietal type (Fig: 1,1a) of Pterion was the commonest and was observed on 74 sides. The way the four bones were meeting to form the H-shaped suture showed lot of variations. There were differences between right side and left side. The next common variety was stellate type (Fig: 2, 2a) found in 13 sides where all the four bones were meeting at a point. Rarely both the sides showed this type. Different types were seen in the same skull. Epiteric (Fig: 3,3a) type was seen almost in equal number of skulls (twelve) Fronto temporal (Fig: 4,4a) variety was rare and was seen in three sides only Sutural bones (Fig: 5, 5a) were also observed in the viscinity of the Pterion.

Table -1 show the frequency distribution of the Pterion types on both sides of the skull. The dominant Pterion type was sphenoparietal (66%) taken when both sides of the skull were taken together (Left side = 33%), right side=33%). This is followed by stellate (11.6%), (left side = 5.3%. Right side = 6.2%); epipetric (10.6%), Left side= 2.6%. right 8.0%) and frontotemporal (2.6%) (Left side = 0.8%, right side = 1.7%)

Table -1 shows the frequency distribution of the Pterion types on both sides of the skull

Pterion type	Total	Side	
		Right	Left
Sphenoparietal	74 (66%)	37 (33%)	37 (33%)
Stellate	13 (11.6%)	7 (6.2%)	6 (5.3%)
Epipteric	12 (10.6%)	9 (8%)	3 (2.6%)
Frontotemporal	3 (2.6%)	2(1.7%)	1 (0.8%)
Unidentified	10 (8.9%)	-	-





Fig: 1 **Fig: 1a**

Fig: 1, 1a Spheno-parietal type of pterion





Fig: 2 Fig:2a

Volume : 5 | Issue : 8 | August 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48

Fig: 2, 2a Stellate type of pterion




Fig: 3 **Fig:3 a**
Fig: 3, 3a Epiteric type of pterion




Fig: 4 **Fig:4a**
Fig: 4, 4a Fronto-parietal type of pterion




Fig: 5 **Fig: 5a**
Fig: 5, 5a Sutural bones in the vicinity of pterion

DISCUSSION:

Various classifications of Pterion have been proposed (Murphy, 1956; Wang et al 2006). The Pterion was first classified into three types (Sphenoparietal, frontotemporal and stellate) by Broca in 1875 (Saxena et al., 2003). Murphy defined four types (sphenoparietal, frontotemporal, stellate and epipetric) While Wang et al gave six classifications (sphenoparietal, frontotemporal, stellate , epipetric, Zygomaticoparietal and Zygomaticotemporal). In the present study only four types were observed as per Murphy's definition.

Previous studies also showed dominance of Sphenoparietal type in different populations. In South Indian, Manjunath *et al*. (1993), reported 93.55% while Praba & Venkatramanah (2012) reported sphenoparietal to be 76.5%; in North Indian, Saxena *et al*. (2003), reported 84.72%; in Western Indian, Zalawadia *et al*. (2010), reported 91.7%. In other Indian studies, Hussain Saheb *et al*. (2011), noted the sphenoparietal type of pterion to be 69.25%. In the present study shows the incidence of spheno-parietal type forms 66% which is closer to Hussain Saheb et al (2011).

With regard to the other three type of pterion, the percentage distribution varies with population. Praba & Venkatramanah, reported that stellate type was 6.0%, epipteric (6.0%) and the least was frontotemporal (3.0%). Others differ. Manjunath & Thomas (1993), reported epipteric (17.3%), frontotemporal (3.52%) and stellate (2.93%). The present study shows the incidence of epipteric (10.6%) & fronto-temporal (2.6%) which is closer to that of Manjunath & Thomas (1993). The incidence of stellate varies from other workers in that it forms the second maximum percentage (11.6%) of incidence observed.

Sutural bones appear in great numbers in hydrocephalic skulls and they have been linked with rapid cranial expansion. The present study shows the presence of epipeteric bones at Pterion and also sutural bone in the viscinity of Pterion. The presence of these wormian bones at Pterion may also complicate surgical orientation, leading to pitfalls.

CONCLUSION: The knowledge of the variations of Pterion and its surgical anatomy, in Indian population are important for surgeons operating in this region. The present study will also contribute additional information of the skull bone about the sutural bones in the near viscinity of the Pterion giving false appearance of fracture radiologically and also during surgical interventions involving burr hole surgeries.

REFERENCES:

1. Standring, S.; Ellis, H.; Healy, J. C. & Johnson, D. Gray's Anatomy- The Anatomical Basis of Clinical Practice. 39th ed. London, Elsevier Churchill Livingstone, 2005. pp.441-84.
2. Saxena, R. C.; Bilodi, A. K.; Mane, S. S. & Kumar, A. Study of pterion in skulls of Awadh area--in and around Lucknow. Kathmandu Univ. Med. J. (KUMJ), 1(1):32-3, 2003.
3. Wang, Q.; Opperman, L. A.; Havil, L. M.; Carlson, D. S. & Dechow, P. C. Inheritance of sutural pattern at the pterion in Rhesus Monkey skulls. Anat. Rec. Discov. Mol. Cell. Evol. Biol., 288(10):1042-9, 2006.
4. Murphy, T. The pterion in the Australian aborigine. Am. J. Phys. Anthropol., 14(2):225-44, 1956.
5. Hussain Saheb, S.; Mavishetter, G. F.; Thomas, S. T.; Prasanna, L. C.; Muralidhar, P, & Magi. A study of sutural morphology of the pterion and asterion among human adult Indian skulls. Biomed. Res., 22(1):73-5, 2011.
6. Manjunath, K. Y. & Thomas, I. M. Pterion variants and epipteric ossicles in South Indian skulls. J. Anat. Soc. India, 42:85-94, 1993.
7. Praba, A. M. A. & Venkatramaniah, C. Morphometric Study of different types of Pterion and It's relation with middle meningeal artery in dry skulls of Tamil Nadu. J. Pharm. Biomed. Sci., 21(21):1-4, 2012.
8. Zalawadia, D. A.; Vadgama, D. J.; Ruparelia, D. S.; Patel, D. S. & Patel, D. S. V. Morphometric study of pterion In dry skull of Gujarat Region. Natl. J. Integrated Res. Med., 1(4):25-9, 2010.
9. Williams, L. P.; Bannister, L. H.; Berry, M. M.; Collins, P.; Dyson, M.; Dussek, J. E.; & Ferguson, M. W. J. Gray's Anatomy. 38th ed. London, Churchill Livingstone, 1998.