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ANATOMY

A STUDY OF ZYGOMATICO TEMPORAL FORAMEN IN ADULT DRY SKULLS IN SOUTH INDIAN POPULATION

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ABSTRACT In the present study, the variations in the position and number of zygomatico temporal foramina were studied in 25 adult dried skulls in the Department of Anatomy, Sri Ramachandra University. The results proved the existence of differences between the left and right side of the skull. The distance between zygomatico temporal foramina and frontO zygomatic suture had the maximum dissimilarities. All these data will be useful to the surgeons for making bone cuts across the zygoma.

KEYWORDS : ZYGOMATIC BONE - ZYGOMATICo TEMPORAL FORAMEN – FORAMEN

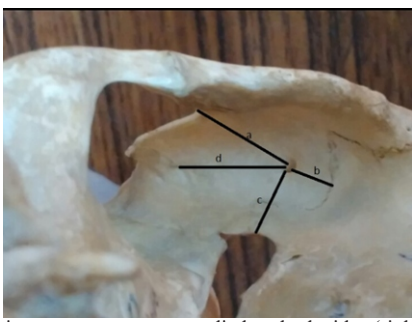
INTRODUCTION

Zygomatico temporal foramen which is situated on the lateral wall of orbit and on the temporal surface of norma lateralis ,transmits the zygomatico temporal branch of the zygomatic nerve which is a branch of maxillary nerve. This zygomatico temporal nerve supplies the skin of the temporal fossa by piercing the temporalis and temporal fascia. The study about the variations in the presence and position of the zygomatic temporal foramen will be useful to the clinicians and surgeons to perform or carryout any anaesthetic block to that particular area or to preserve the nerve in case of any surgical interventions in these areas.

MATERIALS AND METHODS

The number and position of the foramina on both sides of 25 adult dry skulls was carried out in the Dept of Anatomy,Sri Ramachandra University.

Figure1 shows variable distance from zygomatico temporal foramen.



The following parameters were studied on both sides (right and left) using divider and vernier caliper

- Number of foramina
- Distance between zygomatico temporal foramen and inferior orbital fissure ©
- Distance between zygomatico temporal foramen and fronto zygomatic suture
- Distance between zygomatico temporal foramen and zygomatico maxillary suture (b)
- Distance between zygomatico temporal foramen and postero superior border of zygomatic bone (a)
- Distance between zygomatico temporal foramen and sphenozygomatic suture (d)

The inclusion criteria for the study were skulls with absence of foramina, skulls with presence of one or two foramen, skulls with abnormal foramen, skulls with huge foramen

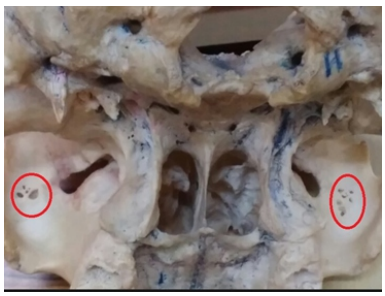
The exclusion criteria were skulls with lateral and orbital walls damaged, skulls with zygomatic arch damaged, skulls with frontal process of zygomatic bone damaged, skulls with artificially made holes; if already present.

RESULTS

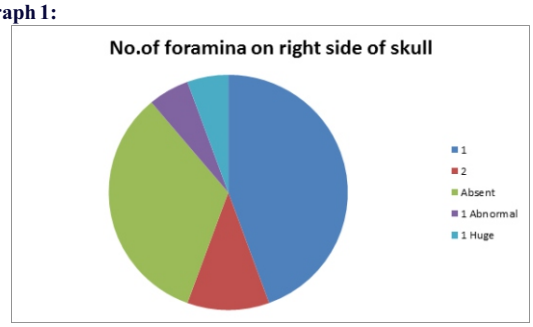
Number of foramina (Graph 1 and 2)

Out of the skulls observed a vast majority of skulls showed the presence of one foramen. A few had absence of foramina. Two to three skulls showed the presence of two foramina. Rarely there was an abnormal placement of foramen one in number abnormally placed or with a huge foramen. In a still rarer case one skull showed absence of zygomaticO temporal foramina on both sides but the presence of multiple zygomaticO facial foramina. Out of 25 skulls only one skull showed multiple foramina on both sides as seen in figure 2.

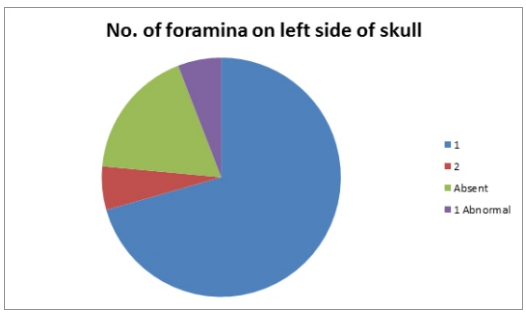
Figure 2: Multiple foramina seen on both sides



Graph 1:



Graph 2:



Distance between zygomatico temporal foramen and inferior orbital fissure (Graph 3)

The distance between zygomatico temporal foramen and inferior orbital fissure in the right side of skull is in the range of 8-19.8 mm. The distance between zygomatico temporal foramen and inferior orbital fissure in the left side of skull is in the range of 3.4-14 mm.

Distance between zygomatico temporal foramen and fronto zygomatic suture (Graph 3)
The distance between zygomatico temporal foramen and fronto zygomatic suture in the right side of the skull is in the range of 13.1-40 mm. The distance between zygomatico temporal foramen and fronto zygomatic suture in the left side of the skull is in the range of 20.1-27.1 mm.

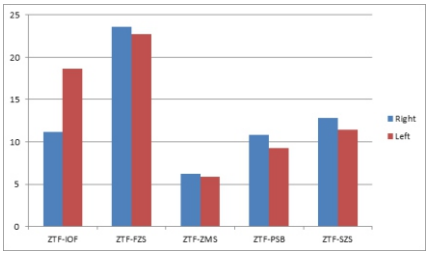
Distance between zygomatico temporal foramen and zygomatico maxillary suture (Graph 3)
The distance between zygomatico temporal foramen and zygomatico maxillary suture in the right side of the skull is in the range of 3.5-12 mm. The distance between zygomatico temporal foramen and zygomatico maxillary suture in the left side of the skull is in the range of 4-11 mm.

Distance between zygomatico temporal foramen and postero superior border of zygomatic bone (Graph 3)
The distance between zygomatico temporal foramen and postero superior border of zygomatic bone in the right side of the skull is in the range of 8-20.4 mm. The distance between zygomatico temporal foramen and postero superior border of zygomatic bone in the left side of the skull is in the range of 3-13 mm.

Distance between zygomatico temporal foramen and sphenozygomatic suture (Graph 3)
The distance between zygomatico temporal foramen and sphenozygomatic suture in the right side of the skull is in the range of 8.9-19 mm. The distance between zygomatico temporal foramen and sphenozygomatic suture in the left side of the skull is in the range of 10-14 mm.

Graph 3 shows the comparison of the average distances between the right and left sides of the skull.

Graph 3:



Abbreviation
ZTF- zygomatico temporal foramen
IOF- inferior orbital fissure
FZS- fronto zygomatic suture
ZMS- zygomatico maxillary suture
PSB- postero superior border of zygomatic bone
SZS- sphenozygomatic suture

DISCUSSION

Out of 25 skulls, comparison of percentage of no. of foramina from the study done by a few researchers is shown below

Present study		Krishnamurthy.A	Loukas.M
Right	Left		
55.5	72.22	44	30
11.11	5.55	12	15
33.33	16.66	44	50

The study also revealed the average distance between zygomatic temporal foramen and inferior orbital fissure on right side to be 11.2mm whereas on the left side it was found to be 18.6mm, the average distance between zygomatico temporal foramen and fronto zygomatic suture in the right side of the skull is 23.6mm whereas on the left side it is 22.7mm, the average distance between zygomatico temporal foramen and zygomatico maxillary suture in the right side of the skull is 6.2mm whereas on the left side it is 5.9mm, the average distance between zygomatico temporal foramen and postero superior border of zygomatic bone in the right side of the skull is 10.8mm whereas on the left side it is 9.3mm, the average distance between zygomatico temporal foramen and sphenozygomatic suture in the right side of the skull is 12.8mm whereas on the left side it is 11.4mm.

The above report shows that the least distance is the distance between zygomatico temporal foramen and zygomatico maxillary suture and the longest distance is the distance between zygomatico temporal foramen and fronto zygomatic suture.

All these measurements will be useful to anaesthetians for precise introduction of anaesthetics into their foramen to anaesthetize the zygomatico temporal nerve which supplies the skin over that area. Further this nerve maybe damaged when elevating periorbita from lateral wall during orbital surgery. In the procedure, lateral orbitotomy is done to approach intra orbital soft tissue tumours (Loukas M et al 2008)

Injury to zygomatico temporal nerve causes paresthesia in its distributed area and its entrapment induces protractive pain in case of manipulation of orbital lateral wall, a Gillies or Dingman reduction procedure for a zygomatic fracture or an endoscopic subperiosteal facelift. Zygomatic temporal nerve where it appears at the margin of zygomatic bone is defined as vulnerable point (Hwang K et al 2004)

Musculofacial and vascular entrapments of peripheral branches of the trigeminal nerve have been thought to be trigger points for migraine headaches. Surgical decompression of these sites has led to complete resolution in some patients. The zygomatico temporal nerve clinically shows sites of entrapment within temporalis. This nerve is the site for migraine genesis. Surgical decompression or chemodenervation of the surrounding temporalis can aid in alleviating migraine headache symptoms. It also helps in more effective surgical decompression (Janis JE et al 2010)

CONCLUSION

The position of zygomatico temporal foramen is an important landmark for the surgeon to approach the orbit from the lateral wall and it is also significant for the anaesthetics to block the nerve to relieve migraine headaches. The data collected about this foramen will be a useful guide for the various surgeries done in this area.

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