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Morphometric Analysis of Infraorbital Foramen in South Indian Population

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Abstract*: Background: Infraorbital foramen (IOF) is located on the maxillary bone 1 cm inferior to the infraorbital margin. IOF transmits infraorbital vessels and nerve. Infraorbital nerve supplies the skin of the cheek, upper lip and side of the nose. The knowledge of location of IOF gives important data in giving local anaesthesia in maxillofacial and plastic surgeries. Aims and objectives: To study the shape of IOF and the mean distance between IOF and maxillary midline. Materials and methods: 42 dried human skulls with unknown age and sex at the Department of Anatomy, Kurnool Medical College, Kurnool. Observations were made by direct inspection for shape and distance between IOF and maxillary midline measured using sliding Vernier calipers and mean distance was calculated. Results: Most common shape of IOF was oval followed by semicircular and then circular. The mean distance between IOF and maxillary midline was 27.7 mm. Conclusion: Infraorbital nerve, emerging through the IOF, is the nerve of choice for regional nerve block during maxillofacial surgeries. Exact knowledge of location of IOF is essential to avoid injury to infraorbital nerve. Therefore, the results of present study have clinical importance while performing surgical procedures in the infraorbital region to prevent iatrogenic complications.*

Keywords: Skull, infraorbital foramen, infraorbital nerve, maxillofacial surgery

1. Introduction

Above the canine fossa, a little below the lower border of orbit, is the large infraorbital foramen. This transmits the largest branch of maxillary nerve i.e. infraorbital nerve, as it comes out onto the face to supply skin of the cheek, upper lip and side of the nose [1]. Infraorbital foramen is sometimes double, even multiple, accessory foramina being usually smaller and recorded at incidences of 2 to 18 % in various populations [2]. The knowledge of location of infraorbital foramen gives important data in giving local anaesthesia in maxillofacial and plastic surgeries [3,4]. IOF is an important anatomical landmark that provides excellent analgesia for the closure of simple lacerations, biopsies, scar revisions, maxillofacial procedures as well as various endoscopic and cosmetic cutaneous procedures [5].

2. Materials and Methods

42 dried human skulls with unknown age and sex from Dept. of Anatomy, Kurnool Medical College, Kurnool. Observations were made by direct inspection for shape. A vertical line was drawn from the centre of IOF downwards, another vertical line drawn along the maxillary midline and a horizontal line was drawn connecting these two lines which gives the distance between IOF and maxillary midline, measured using sliding Vernier calipers and mean distance was calculated (Fig. 1).

Figure 1: Method of measuring distance between IOF and maxillary midline

3. Results

42 skulls were used in the present study. A single IOF was observed bilaterally in all 42 skulls. The shape of IOF was observed by direct inspection. Out of 42 skulls, IOF was oval in shape (Fig. 2) in 23 skulls (55%), semicircular in 11 skulls (26%) and circular in 8 skulls (19%) on the right side (Table. 1). On the left side IOF was oval in shape in 21 skulls (50%), semicircular (Fig. 3) in 12 skulls (28.6%) and circular (Fig. 4) in 9 skulls (21.4%) (Table 2). On both sides (right & left), the IOF was oval in 52.4%, semicircular in 27.4% and circular in 20.2% (Table. 3).

Figure 2: Oval IOF

Figure 3: Semicircular IOF

Figure 4: Circular IOF

The mean distance from maxillary midline was measured by Vernier calipers and it was found to be 27.6mm on right side and 27.8mm on left side. When combined on both sides (right & left) the mean distance from maxillary midline was 27.7mm.

Table 1: Frequency and percentage of shape of IOF on right side

Shape	Number	Percentage
Oval	23	54.8%
Semicircular	11	26.2%
Round	8	19%

Table 2: Frequency and percentage of shape of IOF on left side

Shape	Number	Percentage
Oval	21	50%
Semicircular	12	28.6%
Round	09	21.4%

Table 3: Frequency and percentage of shape of IOF on both sides

Shape	Number	Percentage
Oval	44	52.4%
Semicircular	23	27.4%
Round	17	20.2%

4. Discussion

The infraorbital nerve and vessels pass through the IOF and hence the exact knowledge of its location is essential for various surgical procedures. In the present study the shape of IOF was oval in 52.4% as compared to the study conducted by, Apinhasmit et al (50%) and Ilayaperuma et al (57%) [6,7]. In the present study semicircular shape was found to be 27.4% as compared to the study of Apinhasmit et al (29.2%) and Ilayaperuma et al (31.48%). In the present study circular shape of IOF was found to be (20.2%) as compared to the study of Apinhasmit et al (20.8%). Therefore in the present study the most common shape of IOF was oval which is similar to that of previous studies (Table. 4) whereas the observations of present study do not correlate with the study conducted by Ezzeddin et al where semicircular shape was most common finding [8].

Table 4: Comparison of shape of IOF with previous studies

Study	*Oval (%)*	*Semilunar (%)*	*Round (%)*	*Most common*
Apinhasmit et al	50	29.2	20.8	oval
Ilayaperuma et al	57.41	31.48	11.11	oval
Ezzeddin et al	10.16	54.24	35.60	semilunar
Present Study	52.4	27.4	20.2	oval

In the present study the mean distance between maxillary midline and IOF was 27.7mm which was very close to that of Cutright et al (27mm) [(9)] as shown in Table. 5 whereas in the study conducted by Chrcanovic et al [(10)] was 25 mm which vary from the findings of present study. In the present study a single IOF was observed on both sides of all skulls when compared to incidence of more than one IOF in 10 % of skulls in the study conducted by Kazkayasi M et al [(11)].

Table 5: Comparison of mean distance between IOF and maxillary midline with previous studies

Study	*Country*	*No of samples*	*Distance to the maxillary midline (mm)*
Agthong et al	Thailand	110	24.4+_ 0.3 rt 25.1+_0.4 lt
Apinhasmit et al	Thailand	106	28.43+_2.29
Chrcanovic et al	Brazil	80	25
Cutright et al	USA	80	27
Present study	INDIA	42	27.7

5. Conclusion

The infraorbital nerve, emerging through the IOF, is the nerve of choice for regional nerve block during maxillofacial surgeries. The exact knowledge of location of IOF is essential to avoid injury to the infraorbital nerve. Therefore, the results of present study in South Indian population have clinical importance when performing surgical procedures in the infraorbital region in order to prevent iatrogenic complications.

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