MORPHOMETRIC ANALYSIS OF HARD PALATE INDEX AND ITS RELEVANCE TO DENTAL SCIENCE

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ABSTRACT

AIM: To perform morphometric analysis of hard palate index to analyze its relevance to dental science. **OBJECTIVE**: By analysing the palatine index with the help of palatine length and breadth is measured by using vernier calliper ,the position of greater palatine foramen and lesser palatine foramen can be identified. And the use of hard palate index in dental science. The material for the study contains 50 dry human skulls available in the Department of Anatomy of Saveetha Dental College, Chennai. **RESULT**: The average length of the palate was 39.3 ± 4.5 mm and the width was 25.6 ± 2.9 mm and the average palatine index was 66.03mm. **CONCLUSION**: These observations can be utilised for anthropological studies, ethnic & racial classification of crania, greater palatine nerve block & surgical procedures in hard palates.

KEY WORDS: greater palatine foramen, lesser palatine foramen, palatine index.

INTRODUCTION: Morphometric analysis is the quantitative measurement which has accurate readings. Hard palate is a bony part of the palate which consists of the anterior part of the palate. It is the most important which consists of the palatine process of maxilla and horizontal plates of palatine bone . The palatine bone are attached by cruciform suture which formed at the junction of bones.It is the one which separates the oral and nasal cavity.(1)The palatine foramen is of two types greater palatine foramen and lesser palatine foramen ,the greater palatine foramen is located posterolaterally on either side of palate.The size of the palatine foramen varies due to suture growth.The nasal vascular bundles can pass through the foramina.The pterygopalatine fossa is located between the pterygoid process and the maxillary tuberosity close to the apex of the orbit in which the transmission of greater palatine nerves and vessels.(2)The possible problems experienced that are occurred due to the emergence of greater palatine nerve is of free vascular flap , cleft palate,maxillary air sinus surgery.(3)

The development of palate takes place within first four to eight weeks of pregnancy , the data regarding possible existence of sexual dimorphism are sparse(4).In adults the junction between the primitive and the permanent palate is represented by the incisive fossa, which may be

altered in conditions like cleft palate.(5).The morphometric features that has been analysed in our study gives excellent significance in clinical dental science.There are about many previous studies have been performed in this topic.Authors like AymanG.Mustafa ET al ,used the parameter palatine index as one of the indicators for sex determination ,because of the shape of the palate to differentiate between male and female.(6)study by Vishwa Vidyapeetham, on palatine index states that the knowledge about the palatine index is important , because high and narrow palatine index had been associated with many syndromes like Turner's Syndrome Palate (7) The structural hard palate varies when compared to children and adult.
Similar research was conducted by authors like Yuvaraj Babu, Nur Qistina (8), in their study, the palatine index were not used to differentiate between the sexes, but in our study the main parameter palatine index was used and the sexes were identified. So the aim of our study is the find the morphometric analysis of hard palate index and its relevance to dental science.

MATERIALS AND METHODS:50 dried human skulls had been received and studied from the Department of Anatomy,Saveetha Dental college Chennai,India.
The measurements were measured by Vernier Calliper to the nearest millimeter.
LENGTH:From central incisor to posterior nasal spine.
WIDTH:Between third molars

$$\text{PALATINE INDEX} = \frac{\text{PALATINE WIDTH}}{\text{PALATINE LENGTH}} * 100$$

Fig: 1. Shows the length of the palate.

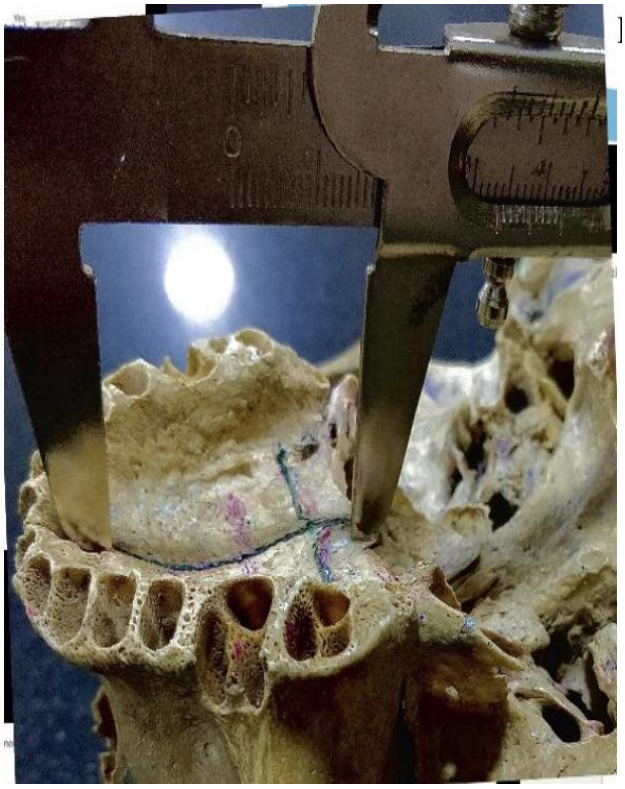


Fig:2 show the width of palate

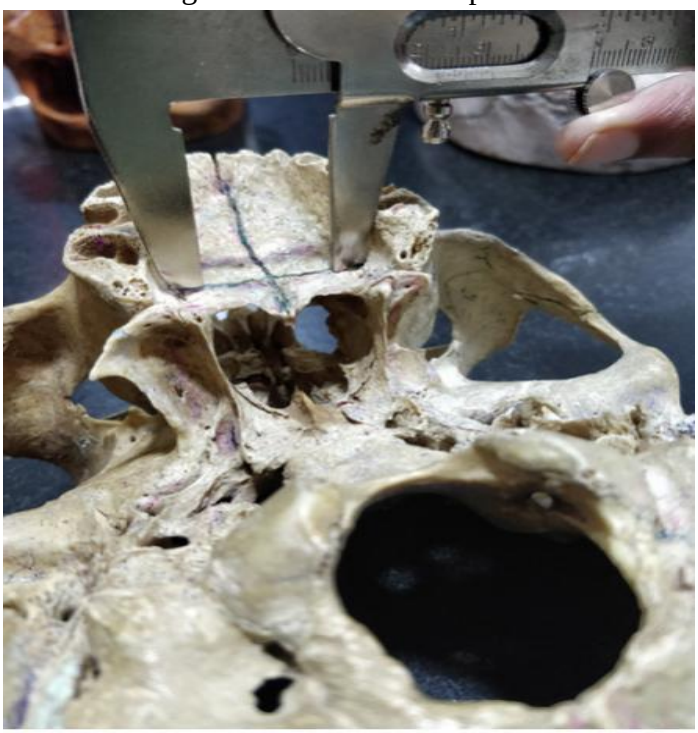


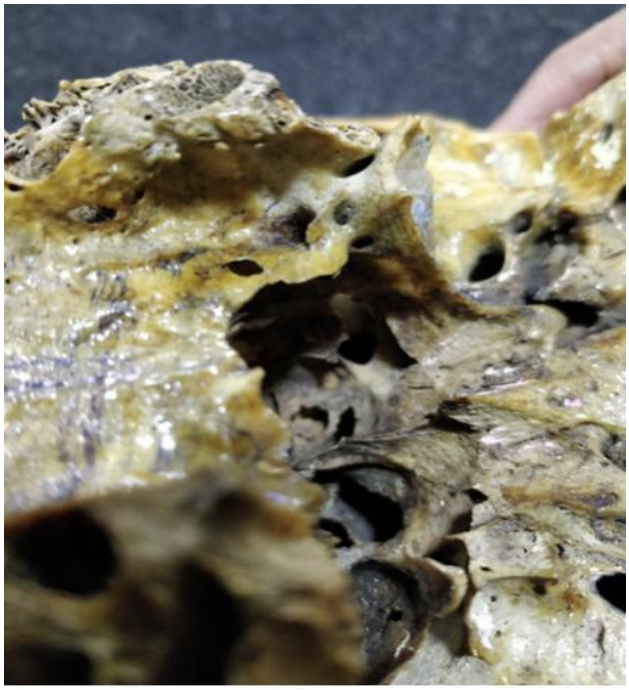
Fig:3 The palate

RESULTS: From the measurement that had been identified by using the formula,
The average length of the palate was 39.3 ± 4.5 mm and the width was 25.6 ± 2.9 mm and the average palatine index was 66.03mm.

TABLE:1 SHOWS THE NUMBER OF GREATER PALATINE AND LESSER PALATINE FORAMEN IN THE PALATE.

GREATER PALATINE FORAMEN	NUMBERS PRESENT IN SKULLS	LESSER PALATINE FORAMEN	NUMBERS PRESENT IN SKULLS
0	1	0	12
1	47	1	25
2	2	2	9
3	0	3	4
TOTAL= 50.		TOTAL = 50	

FIG :4 Presence palatine foramina



Based on our study that had been conducted with 50 skulls . By using the formula of palatine index we have found that around 86% of the skulls were narrow (chamestaphyline), 8% had wide (brachystaphyline) and the remaining 6% had intermediate size (orthostaphyline).

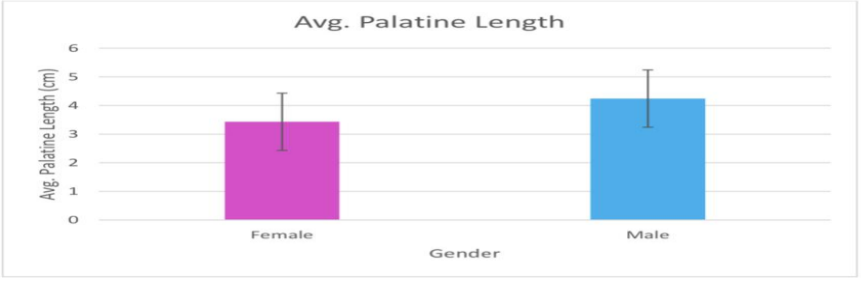
TABLE:2 SHOWS THE Palatine index

TABLE: 2

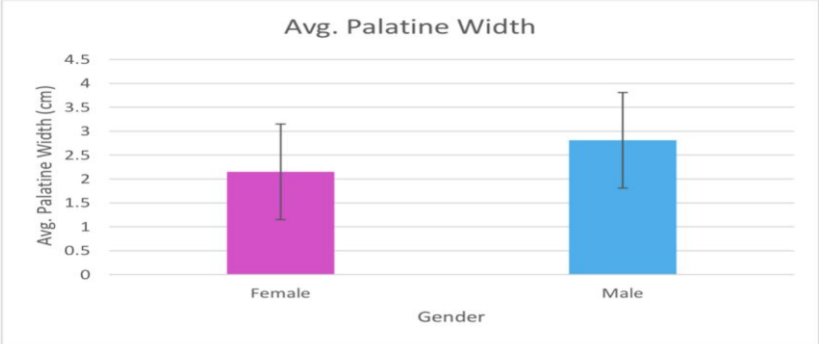
PALATINE INDEX RANGE	NUMBERS	PERCENTAGE
Less than 79.9	43	86%
80.0-84.9	3	6%
Greater than 85	4	8%

TOTAL= 50. 100%

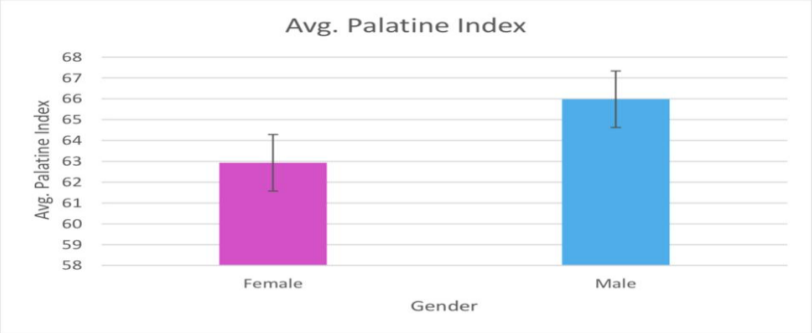
GRAPH: 1 PALATINE LENGTH



GRAPH :2 PALATINE WIDTH



GRAPH:3 PALATINE INDEX



DISCUSSION:

Comparing to other research that were done,in regards to palatine index the sort of palate is 73.08%of the skulls was Leptostaphyline, 15.39% of the skulls was Mesostaphyline and 11.53% of the skulls was Brachystaphyline .(9)Whereas in regards to presence of palatine foramen Ajmani have found that only 64% of the foramen had been positioned to opposite of that of third molar (10). In the research done by A.ortug and M.Uzel have identified in their results as 50% of the palates where Brachystaphyline type,43.8% where leptostaphyline type which was mainly observed in female palate.(11).

In the study made by Hassan Ali et al; about 37.5% of the palates where narrow,22.5% of the palates where of intermediate size and 40% of the palates where wide.(12). Authors like Erli Sarilita,Roger Soames in their study 84% of skulls had narrow palate 8% where of intermediate size and 8% had greater palatine size.(13) In other study the distance of GPF was more on right side as of (37.9)mm than left, it was observed by N.Vidulasri and M.S.Thenmazhi.(14).In the study done by Masroor Badshah,Roger Soames ,Muhammed Jaffar Khan, Jamshaid Hasnain had identified that presence of single lesser palatine foramen where 44.1% and multiple lesser palatine foramen where 50.7% that which had two as well as three palatine foramina.(15).

Bruno identified that 63% where leptostaphyline type of palate, 13% were brachystaphyline and the remaining 24% were mesotaphyline in his study.(16)

Based upon our study we have identified that 86% were chamestaphyline,8% where brachystaphyline and the remaining 6% where orthostaphyline.Morphometric parameters measured and analysed in the present examine is very critical and it is beneficial for surgical repair of cleft palate, for maxillary nerve block for the maxillofacial surgeries and for

orthodontic procedures. Location of the greater palatine foramen may vary due to the sutural growth occurring between the maxilla and palatine bones and also the anteroposterior dimension of the palate increases with the eruption of the posterior teeth. The average length of the palate was 39.3 ± 4.5 mm and the width was 25.6 ± 2.9 mm and the average palatine index was 157.46 ± 48.

CONCLUSION: The quantitative assessment that has been identified in our study has excellent clinical significance which include operation of cleft lip, cleft palate,orthognathic surgeries, dental and maxillofacial surgeries. The presence of foramina in its position is used for maxillary nerve block during surgeries.

Acknowledgement: We would like to thank our college and management for their constant support in completing this research work.

Conflict of interest: The author declares that there were no conflicts of interest.

Source of funding:

The funds were provided by:

- Sheik steels syndicate.

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