Original Research Article

EVALUATION OF INTERMENTAL FORAMINA DISTANCE AMONG SOUTH INDIAN POPULATION

ABSTRACT:

Background:

OPG (orthopantomogram) is a cephalogram, a type of a dental x-ray, and has been found that the intermental foramina distance varies at different ethnicities. It has been noted that the commonly seen part is below the 2nd premolar where mandibular foramen has a bony canal formed in the mandible at the two distinct anatomies and its rim is 'v' shaped, that was its common form where the groove separating the anterior and posterior parts are horizontally oriented rim which is an oval shaped rim. The mandibular foramen's location also varies at different ethnicities; the intermental foramina distance is recorded always from the mandibles mid-line.

Materials & Methods:

The OPGs are collected from the private dental college and hospital in chennai. The location of mental foramen is identified and the intermental foramina distance is calculated by adobe photoshop. The collected data is analysed using SPSS software.

Results:

Among the south Indian population, the average distance of the inter mental foramen is 4.93 cm. The average intermental foramina distance however is 4.93 cm. The average distance of the inter mental foramen among the Males is 5.14 cm and in females it is 4.76 cm. . There is a significant difference in the intermental foramina distance between the gender among the south Indian population with p value 0.001.

Conclusion:

From the results of the study within the limitations it can be concluded that there is a significant difference in the intermental foramina distance between the gender among the south Indian population with p value 0.001.The knowledge on the intermental foramina difference is the

important measure for the dentist while performing the implants, orthodontic surgery, and periodontal surgery. It helps the dentist to make the planning for drilling the lower jaw bone

***KEYWORDS*:** Mental foramen; Mandible; South Indian population; intermental foramina distance; OPG; Innovative technique.

Running Title: Intermental foramina distance using OPG

INTRODUCTION:

OPG (Orthopantomogram) is a cephalogram of the type of a dental x-ray that has been found that the intermental foramen varies at different ethnicities. It has been noted that the commonly seen part is below the 2nd premolar. (1) Mandibular foramen has a bony canal formed in the mandible at the two distinct anatomies and its rim is 'V' Shaped. It has been found that the situation of the mental foramen varies in several ethnicities. (2) Mental foramen position is usually seen below the second premolar. However, individual variation exists whereby it is often placed anywhere in between the primary premolar to the mesial different planes, which are the horizontal and therefore the vertical planes. (3) The horizontal position of mental foramen was recorded as either in line with the longitudinal axis of the tooth or lying in between two teeth. (4) The vertical position of the mental foramen to be either situated coronal to the apex, at the apex, or apical to the apex. (5)

Some studies measured the situation of the mental foramen from various landmarks of the mandible. As an example , the foremost commonly used landmarks are symphysis menti,6 posterior borders of the ramus of the mandible (in horizontal plane), and therefore the lower border of the body of the mandible (in vertical plane). (6) To estimate the space of the interforamina, various studies are done by using the midline of the mandible as an anatomical landmark. consistent with Shank-land the mandibular foramen is found 28 mm from the midline of the mandible and 14–15 mm from the inferior border of the mandible. (7). The experience from our previous studies (8) (9,10) (9)(11)(12)(13)(14)(12,14)(15)(16) (17) have led us to focus on the current topic.

In between the inferior and the alveolar margins of the body it is present in the premolars, It also provides the passage for the exit of the mental nerves and vessels, most of them oriented posterio-superiorly. Any foramina which is in the addition or extra to the mental foramen (MF) is considered as an accessory mental foramen (AMF) present below the 1st molar of teeth. The branches of the mental nerves are transmitted by the AMF. (18) The position of the mental foramen are often seen in two midlines of the mandible. For the aim of implant placement within the interforaminal area of a complete edentulous patient, interforaminal distance is crucial in determining the situation and therefore the number of implant placement. (18,19)Our team has extensive knowledge and research experience that has translate into high quality publications. (20–27),(28),(29),(30),(31,32),(33),(34),(35–39)The aim of this study is to evaluate and explore the intermental foramina distance among the south indian population.

MATERIALS AND METHOD:

This is a retrospective panoramic radiography study conducted in a private dental college and hospital in Chennai and the study was approved by the institutional review board. Random sampling was done to select the participants for this study. A total of 100 panoramic radiographs orthopantomogram (OPG) of South Indian population of both sexes having visible mental foramina were collected. All panoramic radiographs were taken using Siemens Orthophos (Sirona) with magnification of 1.2. The radiographs were chosen consistent with the following inclusion and exclusion criteria. South Indian ethnicity, High quality with reference to geometric accuracy and contrast of the image, Panoramic radiographs having bilaterally visible mental foramina are taken as the inclusion criteria. poor quality of OPG, Radiopaque or radiolucent lesion within the lower arch, fractured mental foramen region, Fractured Lower jaw was removed are the exclusion criteria followed in making this study. Presence of supernumerary or unerupted teeth because the unerupted teeth might obscure the appearance of the mental foramen.

Any radiographic exposure or processing artifacts. Adobe photoshop was used to view the x-ray, the magnification was 1.2, to calculate the intermental foramen the ruler option is selected on adobe photoshop and the vertical and horizontal markings have to be done and the distance should be measured on each side of the mental foramen region. A vertical line marking the midline was drawn passing between the maxillary central incisors (as first preference), the

mandibular central incisors, or the septum (if the maxillary and mandibular central incisors were missing) by employing a ruler. The Collection of OPG's of mandibles is done, identifying the location of mental foramen in it and evaluating the intermental foramina distance and then entering the collected data into microsoft excel and analysing the data using the IBM SPSS software.

RESULTS:

As many as 100 OPGs were selected out of 126 OPGs based on the exclusion criteria. Of these, 47% were males and 53% were females. (figure 1) The youngest patient was 11 years old and the oldest was 87 years old. Gender analysis showed a higher female percentage (53%). the age group distribution of the people who are participated in this study age group of 1-15 belongs to category 1 for 14%; age group of 16-30 belongs to category 2 for 29%; age group of 31 to 45 belongs to category 3 for 21%; age group of 46 to 60 belongs to category 4 for 25%; people who were aged 65 & 65+ belongs to category 5 for 11%. It is clear that the age group of 16 to 30 present more on this study. (figure 2) Among the South Indian population, the average distance of the inter-mental foramen is 49.93 ± 2.79 mm. (Figure 3) The average distance of the inter mental foramen among the Males is 5.14 cm and in females it is 4.76 cm. There is a significant difference in the intermental foramina distance between the gender among the south Indian population with p value 0.001.

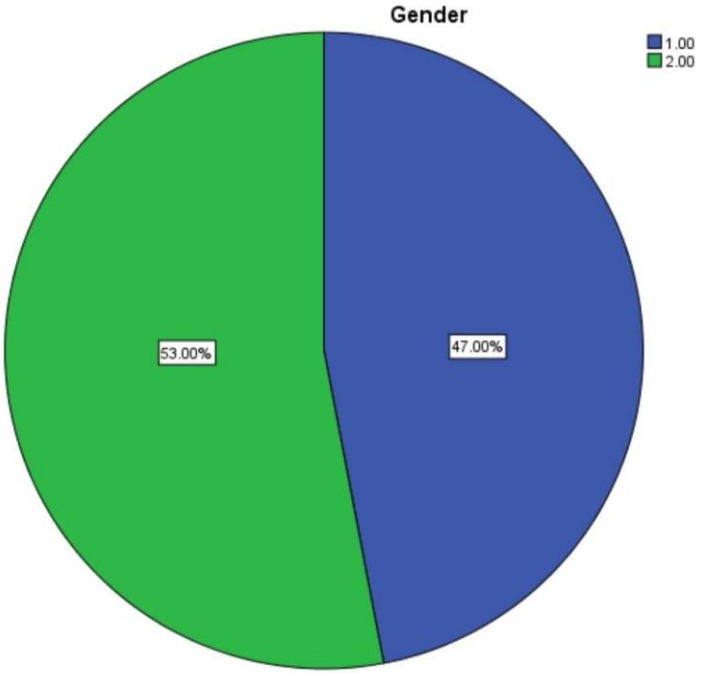

Fig 1: This pie chart represents the distribution of males and females who participated in this survey. Blue denotes male (1) for 47% and green denotes female (2) for 53% and Females participated more in this study.

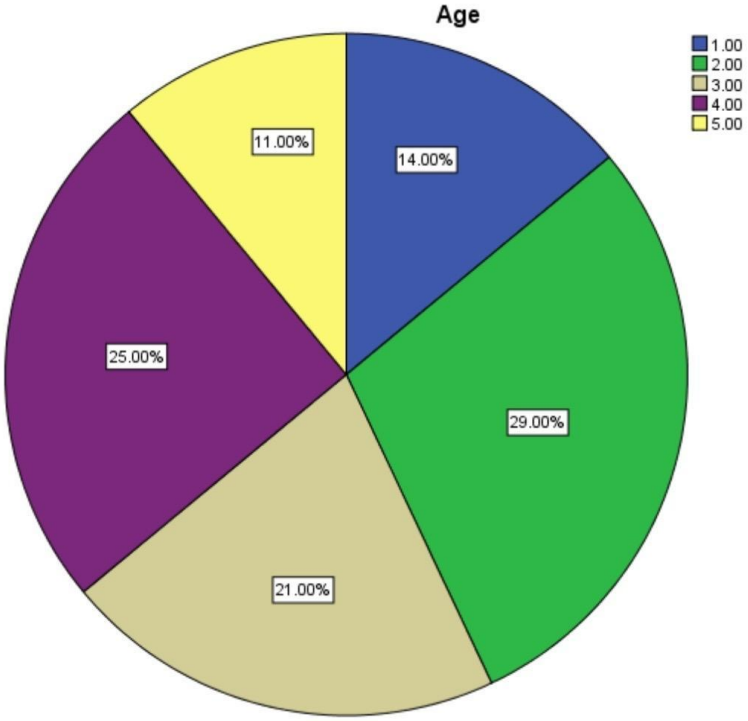

Fig 2: This pie chart represents the age group distribution of the people who are participated in this study age group of 1-15 belongs to category 1, blue denotes 1 for 14%; age group of 16-30 belongs to category 2, green denotes 2 for 29%; age group of 31 to 45 belongs to category 3, sandal colour denotes 3 for 21%; age group of 46 to 60 belongs to category 4, violet colour denotes 4 for 25%; people who were aged 65 & 65+ belongs to category 5, yellow colour denotes 5 for 11%. It is clear that the age group of 16 to 30 present more on this study.

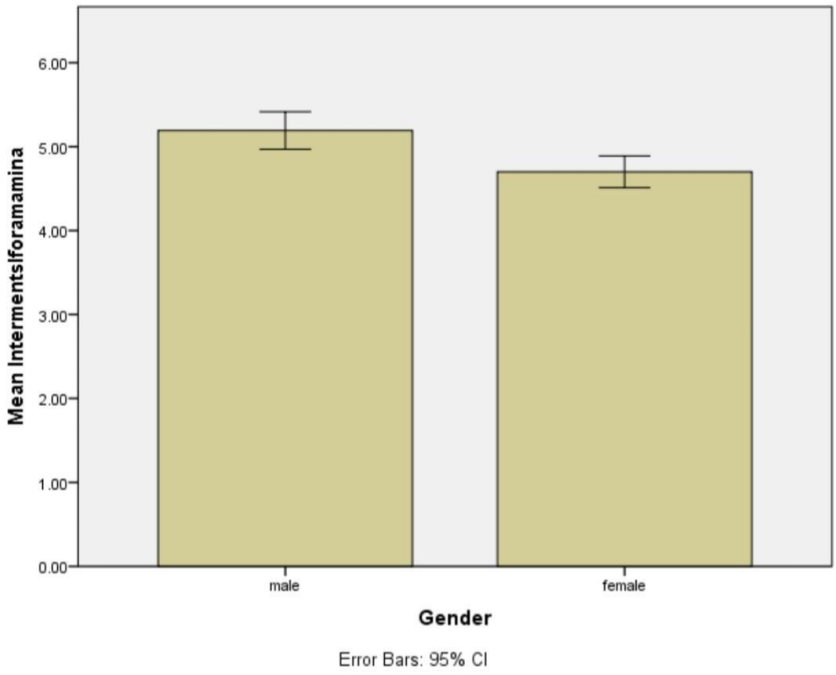

Fig 3: This bar chart represents the association between the gender and their intermental foramina distance. X axis represents gender and Y axis represents the mean intermental foramina distance. There is a significant difference in the intermental foramina distance between the gender with Males 5.14 cm and females it is 4.76 cm. with p value 0.001.

DISCUSSION:

This study has shown that the evaluation of the intermental foramina distance among the South Indian population has some little variations but it is statistically significant. The intermental

foramina distance among the south Indian population varies from person to person and also has a huge difference between the geographical population when compared.
The determination of the intermental foramina distance among the various population has an important landmark for anatomical intrusions, there are little variations in different populations are proven by the failures of the anaesthesia in the mental foramen region, our study has demonstrated the most common position, which was similar to the North Americans, North Indians and Zimbabweans. (7,40,41)

Our study findings have coincided with those of Mohammed Jasim Al-Juboori and K.Udhaya., et al in different populations. These findings were significant with the higher prevalence of the position. The Nigerians and Kenyans have shown us the most common position followed by the Malays and Srilankan populations. They have shared the most similar intermental foramina distance. (42). The distance between the intermental foramina distance among south Indian population in males showed us 5.3 cm and in females it is 4.4 cm as the average distance and it is not significant for the both genders. (43)

In the previous study, 3.33% of the mandible showed accessory mental foramen on the left side and 2.22% showed accessory mental foramen on the other side. Our results were in contrast with those of Singh and Srivastava, where they found 8% AMFs on the left side and 5% on the proper side. (43,44) Cag Irankaya and Kansu, Singh et al., reported AMFs below the first molar. But in our study, each AMF showed a variable position viz., between the 2nd premolar and the 1st molar, followed by between the first molar and therefore the 2nd premolar (left side); between the 2nd premolar and the first molar then between the first premolar and the 2nd premolar (right side). The literature on this is very sparse in Indian studies.The literature on the dimensions of the AMF is hardly available, to match with ours. Singh et al., recorded a mean diameter of 1mm, but our study recorded a vertical diameter 2.26 mm with an HD of 1.58 mm on the left side. The data collected were divided based on the ethnicity for each sex. Fishel et al and Greenstein et al have proposed the foremost popular method for the identification of mental foramen. (45)

Neiva et al has also studied the intermental foramina distance and found that the space between the left and right foramen was 55.23±5.34 mm. Another study that was done by Apinhasmit et al8 found that the mental foramen was a mean of 28.52 ± 2.15 mm from the root

of the primary molar. (46) The clinician should always take this into the consideration that the IMF distance must not be determined based upon their ethnicity / independent variables.

Limitations of this study are low case study, random sampling, lesser time limit, ethical issues in identifying opg's and names that can't be revealed. The data collected are highly confidential. Dental implants and other major/minor surgery can be easily done with the identification of the intermental foramina distance, preparation for the surgery can be easily made according to the requirements. Future studies with large sample size should be conducted for more reliable results and to make the context evident.

CONCLUSION:

From the results of the study within the limitations it can be concluded that there is a significant difference in the intermental foramina distance between the gender among the south Indian population with p value 0.001.The knowledge on the intermental foramina difference is the important measure for the dentist while performing the implants, orthodontic surgery, and periodontal surgery. It helps the dentist to make the planning for drilling the lower jaw bone

- **COMPETING INTERESTS DISCLAIMER:**
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- Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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