

Morphometric Study of Greater Palatine Canal Variations in Population of Darbhanga, Bihar

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I. Introduction

The greater palatine canal communicates with the oral cavity through the greater palatine foramen, which is located opposite the 3rd molar teeth . The greater palatine canal continues in a postero- superior direction and terminates at a inverse pyramid- shaped space called pterygopalatine fossa .

Through this fossa Greater palatine canal communicates with Middle cranial fossa - foramen rotundum .

Nasal cavity- Sphenopalatine foramen

Orbit - inferior orbital fissure

Greater palatine canal is situated at the posterior end of medial surface of the body of maxilla as groove converted by perpendicular plate of palatine bone into Greater palatine canal . (1)

Through the Greater palatine canal passes the descending palatine artery

Greater and lesser palatine nerves

Posterior inferior nasal branches

(2)

The anatomy of these structures is of great importance to dentists, Maxillofacial surgeons, Otorhinolaryngologist and other specialists performing medical procedures in area of the Greater palatine canal.

Using Greater palatine canal approach clinician are able to achieve a maxillary division nerve block (for dental or maxillofacial procedure) haemostasis (for endoscopic sinus surgery, septorhinoplasty or to control posterior epistaxis) and/ or relief of Sphenopalatine neuralgia (3)

To produce a successful maxillary nerve block and to minimise the risk of complications, a clinicians require a knowledge of Greater palatine canal anatomy.

The anatomy of Greater palatine canal has been investigated from the middle of the 20th century onwards (4)

AIM OF STUDY

To evaluate the length and breadth and direction of Greater palatine canal in both sex , the knowledge of which will help the Dentist, Maxillofacial , otorhinolaryngologist and other specialists performing medical and surgical procedure in this area .

II. Material And Methods

60 dry human skull (42 males (70%) and 18 Females (30%) were taken from Darbhanga Medical college Anatomy and Forensic Deptt between September 2020 to December 2021 .

Canals were viewed and analysed in the Sagittal plane only as it was difficult to visualise of the coronal plane view.

A digital Vernier caliper was used to take measurements of length and the mean diameter of the oral end of the greater palatine canal.

The length and anatomical paths traveled by both the right and left greater palatine canal (N= 60) were determined. While both the foramen rotundum and Pterygoid canal enters the pterygopalatine fossa from the posterior aspect, their location are variable (5) For this study , the opening of Pterygoid canal at pterygopalatine fossa was selected as the superior limit instead of foramen rotundum due its ease of identification in relation to greater palatine canal. So the length of the greater palatine canal was defined as the bony portion of the greater palatine canal measured from the Center of the pterygopalatine fossa close to Pterygoid canal to a greater palatine foramen on the inferior surface of the hard palate . The greater palatine canal was then measured by the digital vernier caliper , one end of which was kept at middle of the pterygopalatine fossa and other end at the greater palatine foramen. The length of the canal was measured in millimetres .

III. Results

Of the 60 dry skull bones 42 (70%) were males and 18 (30%) were female. The directional pathways observed in the Sagittal plane view only as it is difficult to assess it with naked eyes in the coronal plane view , are summarised in Figures 1 & 2

Figures 1



Figures 2



In this plane view two pathways were observed

- 1) Greater palatine canal travels from in an anterior- inferior direction from pterygopalatine fossa to the greater palatine foramen
- 2) the greater palatine canal travels directly inferior for a short distance and then changes direction to pass anterior- inferior for the remainder of the canal.

In Sagittal plane view the most common pathway was the greater palatine canal travel in an antero-inferior direction from the pterygopalatine fossa (90% of cases)

In remaining 10% of cases the greater palatine canal traveled directly inferior for a distance and then changed direction to pass anterior- inferior for the remainder of the canal .

The length of Greater palatine canal measured by Digital vernier caliper in dry skull bone and in isolated Maxilla with portion of palatine bone intact

Among the 60 skulls , 42 were male and 18 were female.

The minimum length recorded was 17.86 mm and maximum was 28.87 mm

The mean length of all Greater palatine canal was 25.24 mm, and standard deviations of 4.21

The mean length of greater palatine canal in male was 25.24 mm , standard deviations of 4.41

The mean length of greater palatine canal in female was

24.10 mm ,with standard deviations of 4.04

The length was slightly higher in male bone than female bones , which is negligible (P- valve > 0.05)

TABLE

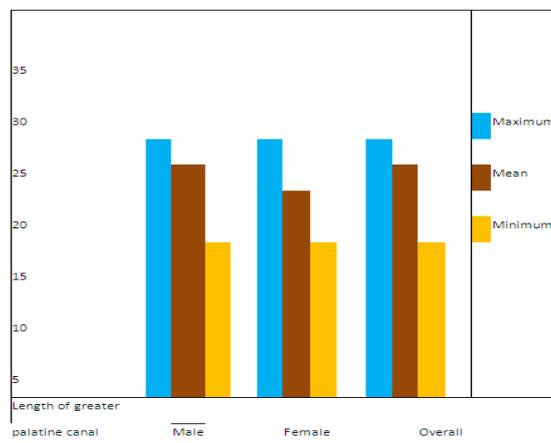
Table 1 showing the result of length of greater palatine canal

	N	Minimum	Maximum	Mean	Std deviation
Length of greater palatine canal	60	17.86 mm	28.87 mm	25.24 mm	4.21

Table 2 Comparison of mean and standard deviation of length of greater palatine canal in male and female

	Sex	N	Mean	Std deviation
Length of Greater palatine canal	Male	42	25.20	4.41
	Female	18	24.10	4.04

Graph showing length of greater palatine canal in both sex and overall



IV. Discussion

The greater palatine canal can be used to achieve a maxillary block and to minimise bleeding during endoscopic surgery or septorhinoplasty . So to avoid complications during procedure it requires a through knowledge of the anatomy of Greater palatine canal and structures passing through it . Our study has shown that in a population of Darbhanga, Bihar the mean length of the greater palatine canal is 27.5 mm with a range of 17.86 mm to 28.87 mm .

The greater palatine canal most often descends from the pterygopalatine fossa inferiorly, then changes its direction to an antero-inferior direction in Sagittal plane and inferior- lateral and inferior- medial direction in coronal plane .

The suggested recommended length of insertion of the anaesthesia needle into Greater palatine canal ranges between

25 mm for haemostasis to 39 mm for maxillary nerve Anaesthesia (6)

There are numbers of studies by the scholars such as studies by McKinney et al (2010) with 15 subjects the mean length was 40.4 mm

Douglas and wormald (2006) having mean Greater palatine canal length with 21 subjects was 40.4 mm .

It is difficult to compare the greater palatine canal length among the studies due to not only the different estimation methods used by the authors but also because some measurements were based on dry skulls as well as head CT scans

V. Conclusion

Using the greater palatine canal approach clinicians are able to achieve a maxillary nerve block (for dental or Maxillofacial procedures) haemostasis (for endoscopic sinus surgery, septorhinoplasty or to control posterior epistaxis.

So the knowledge of length of greater palatine canal will help the surgeon to avoid complications to during any procedure through the greater palatine canal.

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