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## Original Research

### Evaluation of lingual foramen in patients requiring dental implants- A CBCT study

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#### ABSTRACT

**Background:** Lingual foramen needs careful assessment in mandibular anterior region. The present study was conducted to evaluate lingual foramen with CBCT. **Materials & Methods:** The present study was conducted on 52 partially edentulous patients of both genders. Only those patients who required dental implant in mandibular anterior region were selected. In all patients, CBCT scan was obtained with Planmeca CBCT machine using field of view used of 5X 5cm. The length of the canal, distance from canal to buccal cortical plate, distance from canal to lingual cortical plate, distance from canal to inferior body of mandible, distance from canal to alveolus was calculated. **Results:** There were equal number (26) of males and females. The length of the canal was  $9.02 \pm 1.23$  mm in males and  $8.98 \pm 1.57$  mm in females. Distance from canal to buccal cortical plate found to be  $4.72 \pm 1.56$  mm in males and  $4.20 \pm 1.62$  mm in females. Distance from canal to lingual cortical plate was  $8.72 \pm 0.72$  mm in group I and  $8.26 \pm 1.04$  mm in females. Distance from canal to inferior border was  $8.74 \pm 2.41$  mm in males and  $7.76 \pm 2.32$  mm in females. Distance from canal to alveolus found to be  $11.68 \pm 3.36$  mm in males and was  $12.25 \pm 3.10$  mm in females. The difference was significant ( $P < 0.05$ ). **Conclusion:** The length of the canal, distance from canal to buccal cortical plate, lingual cortical plate, to inferior border and to alveolus found to be more in males than females.

**Key words:** Buccal, CBCT, Lingual foramen

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#### INTRODUCTION

The lingual foramen, though an opening usually present in the midline on the lingual aspect of the anterior part of the mandible, could have variations in number and position.

The branches of the sublingual artery—a branch of the lingual artery—and submental artery—a branch of facial artery—send branches to the peripheral muscles, mylohyoid muscle, mucous membrane, and gingiva.<sup>1</sup> The anastomosis of the two sublingual arteries has been suggested to be the blood supply of the chin. This single artery and its minor branches tend to exit the bone through structures that have been referred to in the literature as the anterior lingual foramina. Racial and ethnic variations in anatomical landmarks are not uncommon. There is little known about the incidence or location of the anterior lingual foramen.<sup>2</sup> Dental implants procedures have increased over a period of time. The high demand of implants may be due to high survival rate. There is need

of careful evaluation of implant site to prevent failure rates. Clinical importance lies in the possibility of injuring the sublingual artery during trauma or in various surgical procedures. The artery is big enough to cause severe bleeding when injured during oral surgery. This risk of hemorrhage can lead to the obstruction of the upper airway because of the hematoma that forms in the floor of the mouth. CBCT provides useful information in deciding best implant site and assessment of lingual foramen.<sup>3</sup> The present study was conducted to assess the position of lingual foramen using CBCT.

#### MATERIALS & METHODS

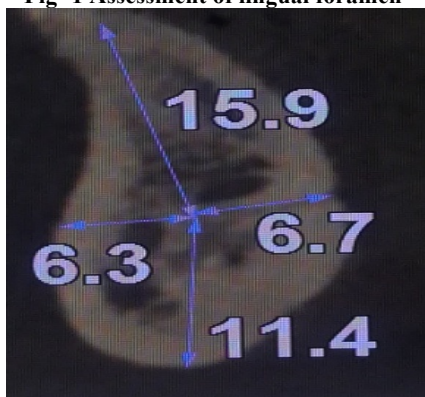
The present study was conducted on 52 partially edentulous patients of both genders. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained

prior to the study. General information such as name, age, gender etc. was recorded. Only those patients who required dental implant in mandibular anterior region were selected. In all patients, CBCT scan was obtained with Planmeca CBCT machine using field of view used of 5X 5cm. Exposure parameters such as 72 kVp, 8 mA and exposure time of 18 seconds were used. All the planes such as axial, coronal and sagittal were constructed. The length of the canal, distance from canal to buccal cortical plate, distance from canal to lingual cortical plate, distance from canal to inferior body of mandible, distance from canal to alveolus in patients were calculated (Figure 1). Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

**RESULTS**

Table I shows that there were equal number (26) of males and females. Table II shows that the length of the canal was 9.02±1.23 mm in males and 8.98±1.57 mm in females. Distance from canal to buccal cortical plate found to be 4.72±1.56 mm in males and 4.20±1.62 mm in females. Distance from canal to lingual cortical plate was 8.72±0.72 mm in group I and 8.26±1.04 mm in females. Distance from canal to inferior border was 8.74±2.41mm in males and 7.76±2.32 mm in females. Distance from canal to alveolus found to be 11.68±3.36 mm in males and was 12.25± 3.10 mm in females. The difference was significant (P< 0.05).

**Fig- 1 Assessment of lingual foramen**



**Table I: Distribution of patients**

Total- 52		
Gender	Males	Females
Number	26	26

**Table II: Measurements of lingual foramen**

Parameters (mm)	Male	Female	P value
Length of the canal	9.02±1.23	8.98±1.57	0.05
Distance from canal to buccal cortical plate	4.72±1.56	4.20±1.62	0.01

Distance from canal to lingual cortical plate	8.72±0.72	8.26±1.04	0.02
Distance from canal to inferior border	8.74±2.41	7.76±2.32	0.01
Distance from canal to alveolus or crestal bone	11.68±3.36	12.25± 3.10	0.001

**DISCUSSION**

There are many unnamed accessory foramina present in the mandible, especially on the lingual side. They are very variable in their distribution and may be of significance in relation to the effectiveness of local anaesthetic solutions administered for dental procedures. The lingual foramen is situated in the midline, level with or superior to the genial tubercles. McDonnell et al<sup>4</sup> found a median lingual foramen in 88.9 % in 126 specimens.

Many anatomical landmarks are present in the anterior mandible, which include the canals and the foramens. The anterior mandibular region between the mental foramens is considered to be safe and has a low risk with regard to causing damage to the vital structures.<sup>5</sup> The present study was conducted to assess the position of lingual foramen using CBCT.

We found that length of the canal was 9.02±1.23 mm in males and 8.98±1.57 mm in females. Distance from canal to buccal cortical plate found to be 4.72±1.56 mm in males and 4.20±1.62 mm in females. Distance from canal to lingual cortical plate was 8.72±0.72 mm in group I and 8.26±1.04 mm in females. Distance from canal to inferior border was 8.74±2.41mm in males and 7.76±2.32 mm in females. Distance from canal to alveolus found to be 11.68±3.36 mm in males and was 12.25± 3.10 mm in females.

Yildirim et al<sup>6</sup> in their CT study assessed the location of lingual foramen and finds that 75.6% of the canals had diameter less than 1mm. In present study we observed that diameter of the canal, length of the canal, distance from canal to buccal cortical plate, lingual cortical plate and to inferior border of mandible was more in dentate patients as compared to edentulous patients. Similarly, the angle of canal to Frankfurt horizontal plane was 26.12±21.4 degree in group I and 29.14±22.08 degree in group II.

A cone beam computed tomography provides three-dimensional radiographic imaging with greatly reduced doses of radiation (as compared to traditional CT) and is becoming a routine diagnostic tool in implant planning. Cone-beam computed tomography (CBCT) provides all three dimensions and has been proved as diagnostic tool in radiology especially in the success of implant.<sup>7</sup> It provides high spatial resolution and offers less patient exposure as compared to full mouth radiographs and computer tomography (CT). The main drawback of conventional medical CT is the much higher dose that the patient receives and higher cost of the examination in comparison with panoramic radiographs and CBCT images.<sup>8</sup>

**CONCLUSION**

The length of the canal, distance from canal to buccal cortical plate, lingual cortical plate, to inferior border and to alveolus found to be more in males than females.

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