

# Study on Morphology and Morphometric of Mental Foramen in Adult Human Mandibles of Kathmandu Valley Population

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**Abstracts:** *The mental foramen (MF) is situated on the anterolateral aspect of the body of mandible. It gives path to mental nerve and vessels. The aim of this study is to providing data on morphology and morphometric of mental foramen helping surgeons to carry out various surgical procedures. A total of 45 human dry mandibles were examined in the Anatomy Department of Kantipur Dental College Teaching Hospital & Research Center, Kathmandu. Parameters like incidence, position, direction, shape and diameters of mental foramen were studied. The mental foramen was present in all the forty five mandibles and is bilateral. The most common shape was round shape in both right and left sides. In the present study the round mental foramen was 75.55% and oval in 24.44% on the right side. Similarly on the left side, it was round in 82.22% & oval in 17.77%. Round mental foramen was present bilaterally in 13.33% cases and oval in 2.22% cases. The accessory mental foramen was found in 11.11 % on the right side and 4.44% on the left side. This study may be useful for the surgeons, anaesthetists, neurosurgeons and dentists to carry out nerve block and surgical procedures preventing injury to the related neurovascular structures.*

**Keywords:** Mental foramen (MF), Accessory Mental Foramen (AMF) and Office pin.

## 1. Introduction

The mental foramen (MF) is situated on the anterolateral aspect of the body of mandible. It gives path to mental nerve and vessels.<sup>1-3</sup> Inferior alveolar nerve enters the mandibular foramen and after passing through the body exits at the mental foramen as mental nerve.<sup>4</sup> The mental nerve emerges at the mental foramen and divided into four branches-angular, medial lateral inferior labial and mental branch.<sup>5</sup> Mental foramen is regarded as a highly suitable model to study bone remodeling activity in the presence of different osteoneurovascular components.<sup>6</sup> Also important in local anesthesia and surgical procedures for effective nerve blocks and to avoid injuries to the neurovascular bundles.<sup>7</sup> A number of variations are there regarding position of mental foramen.<sup>8</sup> It's position is important in osteotomy procedures so that the altered lip sensations can be avoided.<sup>9</sup> Any foramen in addition to the mental foramen is known as the accessory mental foramen. Most common position is below the first molar tooth.<sup>10</sup> Both the mental and accessory mental foramen show ethnic variations. So the knowledge of mental foramen morphometry can help the dental surgeons to apply for nerve blocks in surgeries related to the lower jaw. Accessory mental foramen morphometry will help preventing accessory nerve injury during periapical surgery. If it is not blocked, the paraesthesia will be less.<sup>11</sup> The aim of this study may useful for the surgeons, anaesthetists, neurosurgeons and dentists to carry out nerve block and surgical procedures preventing injury to the related neurovascular structures in Kathmandu valley population.

## 2. Materials and Methods

The present study was conducted in Kantipur Dental College Teaching Hospital & Research Center, Kathmandu, Nepal

during the period from February 2013 to December 2013. The study protocol was approved by the Ethics committee of Kantipur Dental College Teaching Hospital & Research Center, Kathmandu. Randomly selected, 45 dry adult human mandible of unknown sex obtained from the Anatomy Department of Kantipur Dental College Teaching Hospital formed the material for study. We observed the location of the mental as well accessory mental foramina in relation to the mandibular teeth along with following-

- We noticed the incidences and shape of the mental & accessory mental foramina.
- The distances from the sagittal midline to the centre of the mental foramen.
- Distance from the lower border to the centre of the mental foramen
- Also noticed the distance from the alveolar crest and distance from the posterior border of the ramus of the mandible to the centre of the mental foramen.

## 3. Results and Discussion

The average size of the mental foramen was 2.55mm. The minimum diameter was 0.9mm and maximum was 4.9mm. The average size of the accessory mental foramen was 1mm which is not much literature is available for comparison. The minimum diameter was 0.54mm and maximum was 1.65mm. The horizontal diameter of the mental foramen was 2.63mm on right side and 2.51mm on left side. This was less than Oguz and Bozkir<sup>12</sup>(2.93 on right side and 3.14mm on the left side) and was more than Chung et al<sup>13</sup>(2.4mm).

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**Table 1:** Incidence and shape mental foramen (MF)

	Shape	Right	Left	Bilateral
Incidence	-	45	45	45
Mental Foramen (MF)	Round	34(75.55%)	37(82.22%)	6(13.33%)
	Oval	11(24.44%)	8(17.77%)	1(2.22%)
Accessory Mental Foramen (AMF)		5(11.11%)	2(4.44%)	Nil

Table-1 showed the mental foramen was present in all the forty five mandibles and is bilateral which is similar to Oliveria et al.<sup>14</sup> The most common shape was round shape in both right and left sides. In this study the round mental foramen was 75.55% and oval in 24.44% on the right side. Similarly on the left side, it was round in 82.22% & oval in 17.77% which was similar to that of Al-Khateeb et al.<sup>15</sup> Round mental foramen was present bilaterally in 13.33% cases and oval in 2.22% cases. The accessory mental foramen was found in 11.11 % on the right side and 4.44% on the left side. It was higher than Asian population,<sup>16</sup> North Americans<sup>17</sup> and Thais<sup>18</sup> but similar to that found by different workers as 2.8% in Israeli, 1.8% in American whites and 12.5% in Polynesians.<sup>19</sup> No specimen should bilateral accessory mental foramen.

**Table 2:** Position of mental foramen (MF)

Position	Right (45)	Left (45)	Bilateral (45)
Anterior to the 1 <sup>st</sup> premolar	Nil	2(4.44%)	Nil
Below 1 <sup>st</sup> premolar	Nil	Nil	Nil
Between 1 <sup>st</sup> & 2 <sup>nd</sup> premolar	10(22.22%)	18(40.00%)	3(6.66%)
Below the 2 <sup>nd</sup> premolar	3(6.66%)	8(17.77%)	2(4.44%)
Between 2 <sup>nd</sup> premolar & 1 <sup>st</sup> molar	32(71.11%)	17(37.77%)	5(11.11%)
Below the 1 <sup>st</sup> molar	Nil	Nil	Nil

Table-2 showed the most prevalent position was between 1<sup>st</sup> & 2<sup>nd</sup> premolar teeth in case of left side mandibular foramen which is found in North Americans<sup>20</sup> & British<sup>8</sup> and between 2<sup>nd</sup> premolar & 1<sup>st</sup> molar teeth for right side mental foramen which is found in Negroid<sup>21</sup> & Kenyan subjects.<sup>22</sup> The next common position was second premolar tooth of the mental foramen which is similar to that seen in Caucasians<sup>21</sup>, in Thais<sup>18</sup> and in Malaysians<sup>23</sup>. Position of the accessory mental foramen was most commonly below the apex of the 1<sup>st</sup> molar tooth which was similar to Cagiranbaya and Kansu.<sup>10</sup>

**Table 3:** Direction of mental foramen (MF)

Direction	Right (45)	Left (45)	Bilateral (45)
Anteriorly	27(60.00%)	26(57.77%)	6(13.33%)
Anterosuperiorly	Nil	Nil	Nil
Posteriorly	14(31.11%)	19(42.22%)	3(6.66%)
Posterosuperiorly	4(8.88%)	Nil	Nil
Superiorly	Nil	Nil	Nil

The direction of the mental foramen was measured by inserting an office pin into the foramen from the lateral part of the mandible. The direction to which the office pin pointed was visually inspected. The results of the different directions or courses of the foramen were then grouped in table-3.

**Table 4:** Distance of mental foramen from various parts of mandible

Landmarks	Mean Distances on Right Sides	Mean Distances on Left Sides
Symphysis menti	2.76	2.95
Posterior border of ramus of mandible	7.05	8.13
Alveolar creast	1.70	1.06
Base of mandible	1.64	1.27

The distance between the mental and accessory mental foramen was 0.65mm which was similar to Toh et al.<sup>24</sup>

#### 4. Conclusion

These findings suggest that the morphometric measurements of mental foramen in Kathmandu valley population may be useful for the surgeons, anaesthetists, neurosurgeons and dentists to carry out nerve block and surgical procedures preventing injury to the related neurovascular structures.

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