

Analysis of angle of mandible in dry human mandibles

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Abstract

Background: Mandible is the strongest and lowest bone of the facial skeleton. Normal angle of mandible is 110° to 115° in adults. Inferior alveolar nerve block which is commonly referred as mandibular nerve block is given by Halstead approach in different maxillofacial surgeries. The approach for mandibular nerve blocks depends on the value of angle of mandible. **Aim:** aim of the current study is to analyse the value of angle of mandible in 86 (43 male and 43 female) dry human mandibles and compare the angle in male and female mandibles. **Methods and Material:** Angle of mandible is measured with the help of protractor by drawing two tangents. **Result:** We had not found significant difference in angle of mandible in male and females. The mean angle in male mandibles was 132.75 while in female mandibles was 132.97. **Conclusion:** Approach of mandibular nerve block depends on value of angle of mandible which should be known to maxillofacial surgeons. We had not found any significant difference in value of angle mandible in male and female **Key Word:** dry human mandibles.

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INTRODUCTION

Mandible, the lower jaw bone is the strongest and lowest bone of the facial skeleton.¹ Developmentally the first pharyngeal arch cartilage - Meckel's cartilage forms mandible.^[2] In the newborn, the body of the mandible is composed of two halves united at the symphysis menti by a fibrous joint. This is replaced by a bone after two years. The gonial angle or the angle of mandible is formed by the line tangent to the lower border of the mandible and the line tangent to the distal border of the ascending ramus and condyle - the lower jaw angle is formed by the ramus line

(RL) and the mandibular line (ML), where RL is the tangent to the posterior border of the mandible and ML is the lower border of the mandible through the gnathion. Normal angle of mandible is 110° to 115° . Angle of mandible varies with age. In the newborn, it is obtuse 140° as the coronoid process lies at the higher level than condylar process. In adults the growth of rami take place vertically and posteriorly reducing the angle to 110° while in old age, after the eruption of teeth, it is again increased to 140° .^[2] Izard G in 1927 cited different variability in the gonial angle. As the gonial angle varies with age, it can be a tool in estimating near age in forensic medicine when only skeletal remains are available.³ As after pelvis, skull is preferred bone for identification in forensic medicine. Mandible, maxilla and teeth are best preserved parts of the body after death.⁴ On the medial surface of ramus of mandible, mandibular foramen is located which passes Inferior alveolar nerve and vessels. Inferior alveolar nerve block which is commonly referred as mandibular nerve block is given by Halstead approach in different maxillofacial surgeries. The approach for mandibular nerve blocks depends on the value of angle of mandible. So its important to know the variations in the gonial angle.

MATERIALS AND METHOD

The study was carried out on 86 dry human mandibles. Dry human mandibles were procured from tertiary health care centers of Mumbai. Mandibles with fracture, trauma or eruption were excluded from the study.

Angle of mandible – it is measured with the help of protractor by drawing two lines. One horizontal line at the base of mandible and another line at the posterior border of the ramus of mandible

DISCUSSION

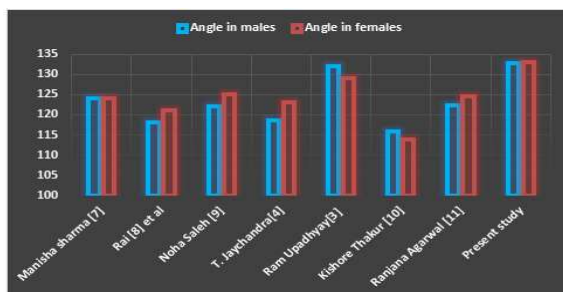
Table 1: Angle of mandible in male and females in present study

| | Male | Female |
|--------|--------|--------|
| Mean | 132.75 | 132.97 |
| Median | 134 | 134 |
| Mode | 135 | 135 |

M. Punarjeevan Kumar⁵ studied 22 parameters which can help in understanding nature of mandible and will help in deciding sexual dimorphism in mandible. Out of total 22 parameters studied, six parameters were more significant and had played predominant role in distinguishing the male mandibles from female ones. Angle of mandible was one of them. As per author Shalini⁶, the angle of mandible is in inverse relation with the width of mandibular ramus and with the distance of mandibular foramen from the base of mandible. The author also mentioned that the approach of mandibular nerve block depends on the value of the angle of mandible. In case of wide angle, the nerve block procedure is done at the lower level than conventional location with short needle while in case of small gonial angle higher level is preferred with the long needle.

Table 2: showing angle of mandible in different studies in male and female

| Studies | Angle in males | Angle in females |
|-------------------------------|----------------|------------------|
| Manisha sharma ⁷ | 124 | 124.03 |
| Rai ^[8] et al. | 118 | 121 |
| Noha Saleh ⁹ | 122.2 | 125.1 |
| T. Jaychandra ⁴ | 118.6 | 123 |
| Ram Upadhyay ³ | 132 | 129 |
| Kishore Thakur ¹⁰ | 115.9 | 114 |
| Ranjana Agarwal ¹¹ | 122.24 | 124.61 |
| Present study | 132.75 | 132.97 |



Graph 1: showing angle of mandible in different studies in male and female

In our study, we did not find any significant difference in value of angle of mandible in male and female. This was in agreement with study by Ram Upadhyay^[3], Vinay Noha Saleh^[9] Kishore Thakur¹⁰, Ranjana Agarwal¹¹, Raustia^[12] and Ceylan¹³. When reviewed literature, Noha saleh²³, Rai²², T Jaychandra^[8], found greater angle of mandible in females than in males. Noha saleh⁹ mentioned in the study of mandible in Egyptian population that ramus measurements were higher in females than in males while gonial angle is higher in females than males. The author justified the increase in angle in female saying it is due to downward and backward rotation of mandible in females compared with forward rotation in males. The mean gonial angle in this study was 126⁰. The author also mentioned different gonial angles in different human population groups - the average values were - 119⁰ in Indian, chinese and Peruvian, 110⁰ in Neanderthals, 128⁰ in European population 124⁰ in Jordanians. The author added that the large difference in the gonial angle in some of the population groups can be considered as racial identification while small difference in gonial angle in some might be due to homogeneity between different groups. Srineerija¹⁴ in her study mentioned that reason behind increase in thine gonial angle in male compared to females may be due to greater masticatory force in male than females. The author added that structure of gonial region is maintained by muscles like medial pterygoid and masseter and these muscles preserves the bone at the point of their insertion. Author Maneesha sharma⁷ in her study found average mean angle of mandible in females (124.03 ± 5.3) is higher than in males (124.13 ± 5.18). Author considered this difference as insignificant as on statistical analysis P value was not higher than 0.05

CONCLUSION

After pelvis, Mandible is the bone preferred for sex determination in forensic medicine. The information of sexual dimorphism in gonial angle will be helpful to the forensic experts and maxillofacial surgeons. In case of wide angle, the nerve block procedure is done at the lower level than conventional location with short needle while in case of small gonial angle higher level is preferred with the long needle. So the approach for mandibular nerve block depends on value of gonial angle . We had not found any significant difference in the value of angle of mandible in male and female.

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