Morphological study of various shapes of coronoid process of known sex in dry human mandible in Saurashtra region

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Abstract

The mandible, the largest and strongest bone of the face, serves for the reception of the lower teeth. It consists of a curved, horizontal portion, the body, and two perpendicular portions, the rami, which unite with the ends of the body nearly at right angles¹. The coronoid process of the mandible is anterior projection process gives attachment of muscles of mastication. This study was done to identify various shapes of coronoid process of dry human mandible in Saurashtra region in reference to gender without considering age. The material for this study comprised of 131 (262 sides) dry human mandibles out of which 79 are male (158 sides) and 52 are female (104 sides) from the osteology bank of Anatomy Department, M P Shah Govt. Medical College, Jamnagar, Gujarat, India. We observe three different variants of coronoid process namely triangular, rounded and hook shaped. We got 64.56% and 32.69% of triangular shaped, 12.66% and 28.85% of hook shaped and 22.78% and 38.46% of rounded shaped in male and female mandibles respectively. This study of shape of coronoid process will be beneficial for the Anthropologists, Forensic scientists and Reconstructive surgeons

Key Word: Mandible, Coronoid process, Triangular, Rounded, Hook

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INTRODUCTION

The mandible, the largest and strongest bone of the face, serves for the reception of the lower teeth. It consists of a curved, horizontal portion, the body, and two perpendicular portions, the rami, which unite with the ends of the body nearly at right angles¹. The rami bear the coronoid and condylar processes. The coronoid process projects upwards and slightly forwards as a triangular

plate of bone. Its posterior border bounds the mandibular notch, and its anterior border continuous into that of the ramus. The coronoid process is derived from a Greek word "korone" meaning "crow's beak"2. The mandible or the submaxilla is a U shaped bone having curve shaped body with 2 rami. Each rami has coronoid and condylar processes. The coronoid process develops as a discrete entity within the mass of temporalis muscle. This process gives attachment to important muscle of mastication -Temporalis muscle attached to apex whole of the medial surface and anterior border and enchroching partially on its lateral surface. Rest of the lateral surface gives attachment to masseter³. Clinically, it is important as it is a membranous bone which can be removed intraorally without anv functional deficiency and facial disfigurement for reconstruction of orbital floor paranasal deformities, alveolar defects, sinus augmentation, non-union fractures of mandible, osseous defect reconstruction, and other repairing procedures in craniomaxillofacial surgeries⁴. There exist variations in

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the shape of the coronoid process. The shape of the coronoid process is considered to be very useful in the field of anthropology and forensic science as it acts as an evolutionary marker⁵. The aim of this study is to note the incidence of the shapes of coronoid process in male and female mandibles.

MATERIAL AND METHOD

The present study was carried out in the Department of Anatomy, M P Shah Govt. Medical College, Jamnagar. A total of 131 dry adult human mandibles were included in the study which consisted of 79 male and 52 female mandibles. The mandibles with damaged coronoid process were excluded from the study. The coronoid process of both the sides were included, a total of 262 sides. Variations in the shapes of the coronoid process were noted down. Three different variants of the shapes were observed and were classified into triangular, hook, rounded shaped. The shapes were studied bilaterally and in both the genders. The gender of the mandible was determined using non- metric analysis. The heaviness, muscular markings, chin shape and gonial eversion were considered in the determination of gender.

OBSERVASIONS AND RESULTS

Three types of coronoid process were observed.

- 1. Triangular tip pointing upward
- 2. Hook tip pointing backward
- 3. Rounded tip rounded

Triangular shape was observed in 102 (64.56%) sides in male and 34 (32.69%) sides in female as per figure 1. Hook shape was observed in 20 (12.66%) sides in male and 30 (28.85%) sides in female as per figure 2. Rounded shape was observed in 36 (22.78%) sides in male and 40 (38.46%) sides in female as per figure 3.



Figure 1: Triangular coronoid process

Figure 2: Hook shape coronoid process

Figure 3: Rounded coronoid process



Figure 4: Bar diagram showing gender wise distribution of various shapes of coronoid process

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Types of coronoid process	Triangular (%)		Hook (%)		Rounded (%)	
	Male	Female	Male	Female	Male	Female
Isaac (2001)	46.5	53.5	30	22.8	23.5	23.6
Akram Hossain <i>et al</i> .2011)	27.27	35.37	44.95	45.12	27.78	19.51
Vipul <i>et al</i> (2014)	56	51.11	21.33	21.11	22.66	27.77
Pradhan <i>et al.</i> (2014)	45.83	47.72	21.87	13.63	32.29	38.63
Present study (2019)	64.56	32.69	12.66	28.85	22.78	38.46

Table 2: Comparison of various studies on the shapes of coronoid process in relation to gender with other studies

DISCUSSION

As per Table 2 we compare our study with Issac $(2001)^6$; Akram Hossain et $al(2011)^7$; Vipul et $al(2014)^8$ and Pradhan et al.(2014)9. In all above study except Akram Hossain et $al(2011)^7$, most common shape of coronoid process in male and in female is triangular and least common is hook shaped. In Akram Hossain et $al(2011)^7$ most common in male and female is hook shaped. In our study we reported triangular shape as most common in male which is correlated with the most of the studies mentioned here except Akram Hossain et $al(2011)^7$. In our study we reported hook shaped as least common in male which is correlated with Vipul et at $(2014)^8$ and Pradhan et al. $(2014)^9$. In our study we reported round shaped as most common in female which do not correlate with the above compared studies. In our study we reported hook shape as least common in female which is correlated with Vipul et at $(2014)^8$ and Pradhan et $al.(2014)^9$.

CONCLUSION

In the present study most common shape in male is triangular followed by rounded and least common is hook shaped. While in female most common is rounded followed by triangular and least common is hook shaped. So hook shaped coronoid process is least common in both male and female. Detailed knowledge of variant morphological shapes of coronoid process is important got anatomist, anthropologist and forensic researchers. It is also helpful for reconstructive surgeons as it is used as graft and as donor site for sinus augmentation.

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