

## Morphometric Evaluation of Variations in Shape of Coronoid Process of Adult Human Mandible: A Cross-Sectional Study

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Received: 15-01-2022 / Revised: 03-02-2022 / Accepted: 15-02-2022

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Conflict of interest: Nil

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### Abstract

**Aim:** The present study was conducted to identify different morphological variations in shape of coronoid process of adult human mandible.

**Material & Methods:** The present cross-sectional study was conducted in the department of Anatomy at Netaji Subhash Medical College and Hospital, Bihta, Patna, Bihar, India. The present study was conducted upon 60 dry adult human mandibles. Thus, a total of 120 coronoid processes were studied.

**Results:** Study included a total of 120 coronoid processes of both sides from 60 mandibles. 84 of these (42 mandibles) were of males and 18 (36 mandibles) were of females. The difference between male and female mandibles was found to be statistically significant ( $p=0.005$ ).

**Conclusion:** The proper knowledge on the morphological shapes of coronoid process is useful for maxillofacial surgeons as well as to be used as an anthropological marker to assess different populations and races.

**Keywords:** coronoid process, human mandible, anthropological marker

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### Introduction

The coronoid process of the mandible projects upward and slightly forward as a triangular plate of bone. Its margins and medial surface give attachment to temporalis muscle [1]. Literature shows the variations in the shapes of coronoid process is classified into three types as hooked, triangular, and rounded [2]. The morphological variation in the shape of coronoid process may be due to the hereditary or functional changes and has a

correlation with the way of attachment of temporalis muscle. [2]

For maxillofacial surgeons, Coronoid process among the two processes is very useful clinically can be used as graft for various surgeries. Its clinical application is also favourable because its size and morphology fits into the paranasal region, with the additional advantage of biocompatibility, availability and reduced operation time for harvesting. [3]

Previous scientists used various descriptive terms for coronoid process. The coronoid processes, coronoid means crow has been described as one of the bony processes of the ramus of the mandible. [4] Triangular process has been illustrated by Hamilton [5], Romanes [6], Snell [7], and Basmajian [8] et al. Schafer et al described the coronoid process as beak shaped. [9] Presence of double or second coronoid process was also documented by Kansu H. [10]

A coronoid process graft can be used for various procedures like repair of non-union fracture of mandible, orbital floor repair, alveolar defects repair & also in case of maxillary augmentation [11]. This coronoid process is also used as a donor site for sinus augmentation [12].

Therefore, we aim to identify different morphological variations in shape of coronoid process of adult human mandible.

#### **Material & Methods:**

The present cross-sectional study was conducted in the department of Anatomy at Netaji Subhash Medical College and Hospital, Bihta, Patna, Bihar, India.

The present study was conducted upon 60 dry adult human mandibles. Thus, a total of 120 coronoid processes were studied. Intact adult human mandibles available in the department were included. The mandibles which were damaged were excluded from the study.

The morphological analysis of mandibles was done to note the details of coronoid

processes of both sides. Metric and nonmetric analysis was used for determination of sex of the mandible. Chin shape, gonial eversion, bigonial and bicondylar width and flexion on the posterior surface of mandible were considered for the same.

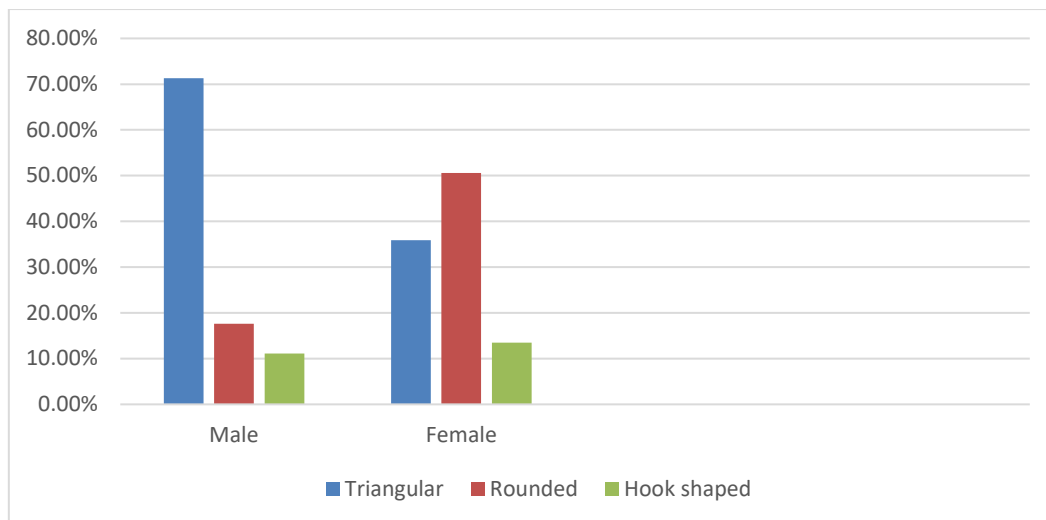
The morphological forms of coronoid process were noted. If the apex pointed straight upwards with straight anterior and posterior border, it was considered to be triangular. If the apex was blunt with straight anterior and posterior border, it was rounded. If the tip was pointing in backward direction with convex anterior and convex posterior border, it was taken as hook-shaped.

Data was entered in Microsoft Excel and analyzed using SPSS v 20. Percentage and proportions were used for summarization of the data. P-value <0.05 was considered as statistically significant.

#### **Results:**

Study included a total of 120 coronoid processes of both sides from 60 mandibles. 84 of these (42 mandibles) were of males and 18 (36 mandibles) were of females.

Figure 1: Among the mandibles of males, 71.3% were triangular in shape, 17.6% were rounded and 11.1% were hook shaped. Among the mandibles of females, 35.9% were triangular in shape, 50.6% were rounded and 13.5% were hook shaped. The difference between male and female mandibles was found to be statistically significant ( $p=0.005$ ).



**Figure 1: Among the mandibles of males, and mandibles of females.**

### Discussion:

After comparing and evaluating findings of the present study with that obtained by the various workers, several differences as well as similarities found. We reported most common shape of coronoid process is triangular while round shape is least common, which is very much similar to findings of Issac B et al [11], Khan TA et al [12], Prajapati VP et al [13], Nirmale et al [14], Desai VC et al [15], Sanmugam K. [16] & Kadam SD et al [17]. While Hossain SMA [18] & Mouna S et al [19] observed that hook shaped coronoid process was most commonly found.

Clauser et al reported the use of temporalis myofascial flap both as a single and a composite flap with cranial bone, as the arteries supplying the coronoid process, aris vessels that supply the muscles attaching to these processes, and generally not from the inferior alveolar artery which primarily supplies mandibular body and teeth. [20]

Quadri et al. (2016) observed that overall triangular type of coronoid process (67%) was more prevalent than hook shape (30%) and rounded (3%). Triangular type was more prevalent in males (72.2%) than females (51.1%), whereas hook shape was more prevalent in females (44.9%) than

males (25.2%). Rounded shape was more prevalent in females (4.1%) than males (2.6). [21]

Sheela et al. (2015) reported that triangular shape coronoid process was found in 64.97%, hook shape in 21.02% sides and rounded in 14.01% sides of mandibles. Mean intercoronoid distance among males was found to be 9.2000 and 9.100 in females. [22]

Sahithi et al. conducted a study of 200 digital OPG images, corresponding to 400 sides among which, 84 (168 sides) were of males and 116 (232 sides) were females. The most common shape for coronoid process was observed as triangular (215) which was distributed as 105(48.8%) on the right side and 110 (51.2%) on the left side. The next shape was found to be the round (143), of which 75 (52.4%) were on the right side and 68 (47.6%) were on the left side followed by the beak shape (34), of which 16 (47.1%) were on the right side and 18 (52.9%) on the left side. The least common shape observed for the coronoid process was flat (8), which was equally distributed on both sides. The distribution of the shapes of the coronoid process among the right and left sides had shown no statistical significance (p value = 0.90). [23,24]

**Conclusion:**

The proper knowledge on the morphological shapes of coronoid process is useful for maxillofacial surgeons as well as to be used as an anthropological marker to assess different populations and races.

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