

VARIATIONS IN THE MORPHOLOGICAL APPEARANCE OF THE CORONOID PROCESS OF HUMAN MANDIBLE

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ABSTRACT

The morphological appearance of the coronoid processes (processus condyloideus) of both sides of 120 dry adult human mandibles, 75 males and 45 females of Gujarat region origin, were studied in order to classify the variations. Three types were evident: 1. Triangular 2. Rounded and 3. Hook shaped. Triangular coronoid processes were found in 130 (54.17%) sides, rounded in 59 (24.58%), and Hook shaped in 51 (21.25%) sides. Triangular coronoid processes were found bilaterally in 108, Rounded in 46 and Hook shaped in 38 sides of mandibles. The incidence of the hook shaped type was almost equal in male and female mandibles; in the triangular type it was slightly more in the male mandibles and for the rounded type it was slightly more in the female mandibles. Coronoid process is an easily harvested bone that can be used for Faciomaxillary Surgeries.

Key-words: Coronoid process, Faciomaxillary surgery, Mandible

INTRODUCTION

The term **Coronoid process** is given to entirely two different structures that are found inside the human body. The first structure is seen in jawbone referred as mandible. The other **Coronoid process** is seen in ulna, a long bone which is found in forearm. In each and every location **Coronoid process** has an appearance of triangular shape. The mandible's **Coronoid process** (from Greek korone, "like a crown") is a thin, triangular eminence, which is flattened from side to side and varies in shape and size. The process projects upwards and slightly forwards. It has a top border and it is convex in its shape, while its lower part is concave in shape. Its margins and medial surface give attachments to temporalis muscle. The Coronoid process is of clinical significance to the maxillofacial surgeons for reconstructive purposes. This study was undertaken to note the forms of presentation and their prevalence in dry adult human mandibles.

MATERIAL AND METHODS

The present study was undertaken on 120 dry adult human mandibles (240 sides) from the collection of Anatomy departments of various Medical Colleges of Gujarat. Out of 120 mandibles 75 were of males and 45 females. Dried adult Indian mandibles of either sex were examined for the variations in the shape of the

coronoid processes among the mandibles and also between the two processes of the same mandible.

RESULTS:

Table-1: Incidence of various shapes of Coronoid process and its percentage

Type	Shape	%	Bilateral	Unilateral	
				Right	Left
1	Triangular (n=130)	54.17	108	10	12
2	Rounded (n=59)	24.58	46	8	5
3	Hook (n=51)	21.25	38	6	7

Depending on the shapes of the coronoid processes, they were classified into 3 types: 1. Triangular 2. Rounded and 3. Hook shaped (Table I).

The triangular coronoid process (type 1) with a tip pointing straight upwards was seen in 130 sides that is; in 54 mandibles bilaterally while in 22 mandibles it was found unilaterally. The 10 mandibles, which had a triangular coronoid process on the right side, the corresponding sides had 7 hook shaped and 3 round shaped coronoid process. The 12 mandibles which had a triangular coronoid process on the left side, the

corresponding sides had 6 hook shaped and 5 round shaped coronoid process .



Fig 1: Triangular Coronoid Process

The type 2 coronoid process had a rounded tip and was present in 59 sides. In 23 mandibles the rounded coronoid process was present bilaterally and in 13 mandibles it was present unilaterally. Of the 8 mandibles which had a rounded coronoid process on the right side, all the corresponding sides had triangular shaped coronoid process on the left side. The same was observed for the 5 mandibles which had a rounded coronoid process on the left side.



Fig 2: Rounded Coronoid Process

The hook shaped coronoid process (type 3), had a tip which was pointing backwards. This was present in 51 sides. In 19 Mandibles it was present bilaterally, while in 13 mandibles it was present unilaterally. Of the 6 mandibles which had a hook like coronoid process on the right side, corresponding sides showed 4 triangular shaped and 2 rounded coronoid process. Out of the 7 mandibles which had a hook like coronoid process on the left side, the corresponding sides showed 5 triangular and 2 round coronoid processes.



Fig 3: Hook shaped Coronoid Process

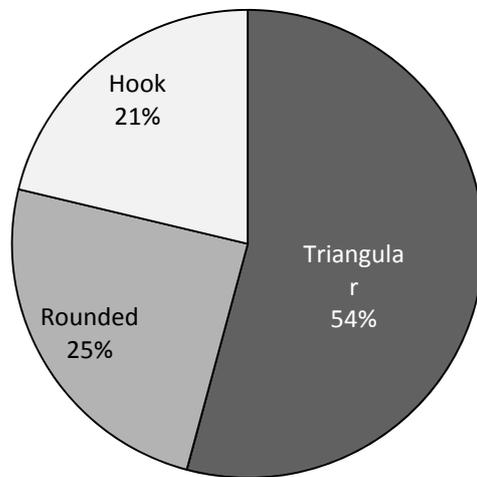


Fig 4: Prevalence rate of shapes of coronoid process

The distribution and incidence of the various types of coronoid process were noted in male and female mandibles (Table II). Of the 150 sides of mandibles belonging to males, triangular was found in 84, rounded in 34 and the hook shaped type was noticed in 32. Of the 90 sides of mandibles of females triangular was found in 46, rounded in 25 and hook shaped type was found in 19.

Table 2: Gender wise distribution of various shapes of Coronoid process - Unilateral & Bilateral

Type	Male		Female	
	Bilateral (%)	Unilateral (%)	Bilateral (%)	Unilateral (%)
Triangular (n=130)	72 (48)	12 (8)	36 (40)	10 (11.1)
Rounded (n=59)	26 (17.3)	8 (5.3)	20 (22.2)	5 (5.6)
Hook (n=51)	22 (14.7)	10 (6.7)	16 (17.8)	3 (3.3)

DISCUSSION

The coronoid process, coronoid meaning 'crow', has been described as one of the bony processes of the ramus of the mandible (Field et al., 1947). Triangular coronoid processes have been illustrated by Hamilton (1976), Romanes (1986) Snell (1986), and Basmajian et al. (1989). Schafer et al. (1890) described the Coronoid process as beak-shaped. In the present study the triangular and hook shaped types were the most and the least prevalent in males (56% and 21.34%) as compared to Isaac and Holla where triangular and rounded were most and least prevalent (46.5% and 30.03%) respectively. While in females the triangular is most prevalent and hook type least prevalent, the coronoid process is a membranous bone and has a thick cortical portion. Because the coronoid process is a membranous bone, it also shows less resorption. Autogenous bone grafts can be obtained from ilium, rib and calvarias; but each site has its own associated morbidity. A local bone graft from Coronoid process of mandible can be used as it can be harvested easily, minimal morbidity, no cutaneous scarring as bone is harvested intraorally. A Coronoid process graft can be used for alveolar defects repair, orbital floor repair, maxillary augmentation, repair of non-union fracture of mandible. The grafts are widely used in reconstruction of osseous defects in oral and facio-maxillary region. The Coronoid process makes an excellent donor graft site for reconstruction of orbital floor deformities, (Mintz et al., 1998). Clauser et al. (1995) reported the use of a temporalis myofascial flap both as a single and as composite flap with cranial bone, as the arteries supplying the coronoid process, arise from vessels that supply the muscles attaching to these processes, and generally not from the inferior alveolar artery which primarily supplies the mandibular body and teeth. Coronoid process skin island can be used in all aspects of reconstructive craniomaxillofacial surgery including trauma, deformities, tumors, temporomandibular joint ankylosis and facial paralysis. No functional limitations were apparent after removing the coronoid process.

CONCLUSION

In the present study 91 mandibles out of 120 show similar shaped Coronoid process bilaterally and only in 29 mandibles did the presentation differ between sides. Knowledge of the morphological shapes of the

Coronoid process is useful for the maxillofacial surgeon. The Coronoid process can be easily harvested as a donor bone. The coronoid process seems to be suitable for paranasal augmentation. Its clinical application is also favorable because its size and morphology fits into the paranasal region, with the additional advantages of biocompatibility, availability, and reduced operation time for harvesting.

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