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## A Study on the shape of the coronoid process and its variations in the south Indian adult human mandibles

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### Abstract

Present study carried out on anatomical and morphological analysis of the shape of the coronoid process. This study was undertaken in 250(500 sides) adult south Indian dry mandibles. Out of 250 mandibles 155 males 95 females, three types of coronoid process were found. Hook, Triangular and Round shaped. Out of 500 sides mandibles in 140(28%) cases were hook shaped, 242(48.4%) sides were triangular, 118(23.6%) side were rounded. Bilaterally hook shaped were found in 110 sides, triangular 188 side, rounded in 76 sides. Unilaterally hook shaped were found in 30 sides, triangular in 54 sides and rounded in 42 sides. The incidence of the hook shaped and triangular were more in males than females and almost same in rounded type.

Key words - Mandible, Coronoid process, Hook shaped, Triangular shaped, Rounded shaped.

### Introduction

There is a great variety in the size and shape of the mandible. The shape of the adult mandible results from the interaction of genetics functional and environmental factors. The forces exerted on the different parts of the mandible through the lever arm the mandibular body are proportioned in accordance with those functions(1). The coronoid process can be divide in to two functional compartments anterior and posterior, that differ in their shape, associated tooth type and function. The anterior part which in most mammals participates

in catching prey, grasping, cutting, digging, grazing and other significant function, connects the masticatory systems to the environment, the posterior part prepares food for swallowing and digestion. The coronoid process margins and medial surface give attachments to temporalis muscle. The coronoid process is of clinical significance to the maxillofacial surgeons for reconstructive purpose(2,3). The study was undertaken for study to classify the variations in the shape of coronoid process.

## Materials and methods

Two hundred and fifty normal adult dry mandibles were procured from department of anatomy, JJM Medical college, Davangere, Karnataka, India. The shapes and variations of coronoid process of mandibles were observed. Differences in the shapes were analyzed.

## Results

The shape of the coronoid process varied and classified in to three types hooks, triangular and rounded shape. The hook shape coronoid process had a tip which was pointing backwards. This was present in 140(28.2%) sides, in 55 (110sides) mandibles it was present bilaterally, while in 15(30sides) was unilaterally. The triangular shape coronoid process with a tip pointing straight upward was present in 242(48.6%)sides, in 94(188 sides) mandibles it was present bilaterally, while in 27(54sides) was unilaterally. The type coronoid process had a rounded tip and was present in 118(23.6%)sides, in 38(76sides)mandibles it was present bilaterally, while in 21(42 sides) was unilaterally.

The distribution and incidence of the various type of coronoid process were noted in male and female(Table-1). In total 250 mandibles 154

were male and females. In out of 154(308sides) male mandibles, the hook shaped was found in 96(31.16%)sides, triangular in 142(46.12%)sides and rounded in 70(22.72%)sides. In out of 96(192 sides) female mandibles, the hook shaped has found in 44(22.92%) sides, Triangular in 100(52.08)sides and rounded in 48(25%) sides.

## Discussion

Alterations in muscular tension can influence the morphology and internal architecture of the already developed bone. Its structure and shape are altered in order to adapt to its new function(4). From the phylogenetic point of view, it is accepted that bone morphology reflects a variation in the mandibular morphology among species reflects a variation in their requirements(5). Cells may feel mechanical changes and can make alterations and adaptations in the structure of the tissues and their functions. Mechanical stimuli govern processes such as cellular division and differentiation and determine the form of the tissues(6). Thus alterations in any of the components of the masticatory system cause reactions and adaptations in the others and this may lead to a functional unbalance in the system, affecting temporo mandibular joint function and others craniomandibular structures involved in

Table 1. Distribution and incidence of the coronoid process in males and females, bilateral or unilateral (500 sides)

Shape	Male (308)		Females (190)		Total(sides)
	B.L	U.L	B.L	U.L	
Hook shaped (n=140)	74(24.19%)	22(7.09%)	36(18.94%)	8(4.22%)	140(28.2%)
Triangular (n=242)	114(36.77%)	28(9.36%)	74(38.95%)	26(13.68%)	242(48.2%)
Rounded (n=118)	50(16.46%)	20(6.13%)	26(13.15%)	22(11.06%)	118(23.6%)
Total	238(77.42%)	70(22.58%)	136(71.04%)	56(28.96%)	500



the mastication(7). The mandible is formed by the distinct morphogenetic and functional units, such as the mandibular body, alveolar process, gonial region, condyle and coronoid process(8). The largest portion of the temporal muscle is inserted in the middle part of the coronoid process of the mandible and these elements show morpho functional dependence right from the embryonic period in human beings, differentiation and development of the coronoid process of the mandible during this period are linked to the differentiation of the temporal muscle(9). The mandible undergoes morphological and spatial alterations during the growth of the craniofacial complex and these alterations vary, depending on the maxilla-mandibular relationship individual(10,11). The coronoid process, coronoid meance 'crow' has been described as one of the bony process of the ramus of the mandible(12). Williams et al described the coronoid process as a flat triangular process(13). Traiangular coronoid process have been illustrated by Hamilton, Romanes, Snell and Basmajian et al, Schafer et al described the coronoid process as beak-shaped(14,15,). Knowledge of the morphological shapes of the coronoid process is useful for the maxillofacial surgeons. The coronoid process makes an excellent donor graft site for reconstruction of orbital floor deformities(16), Clauser et al reported the use of a temporalis myofascial flap both as a single and as composite flap with craniomaxillofacial surgery including trauma, deformities, tumors, temporomandibular joint ankylosis and facial paralysis(17). The study of the inherent morphology of the coronoid process of mandible is of great relevance for interactions among specialists in dentistry and physiotherapy aiming at a more efficient rehabilitation of patient with temporomandibular dysfunction.

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