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Original Research

Morphological investigation of differences in shape of coronoid process of adult human mandible

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ABSTRACT:

Aim: The aim of this study to evaluate the morphological investigation of differences in shape of coronoid process of adult human mandible. **Material and methods:** After receiving clearance from the protocol review committee and the institutional ethics committee, this prospective, randomised investigation was carried out in the Department of Anatomy. The coronoid processes of 50(100 sides) dry adult human mandibles were investigated, including 28(56 sides) men and 22(44 sides) females. Male and female bones were distinguished by observing typical morphological characteristics. **Results:** In the current research, the triangular form of the coronoid process was found in 50 mandibles, 67% of which were bilateral and 33% of which were unilateral. As a result, observation leads to the conclusion that the triangle form of is more typically bilateral. In the instance of unilateral surgery, 10 coronoid processes on the right side were triangular (corresponding side have 3 rounded shaped & 3 hook shaped coronoid process). It was the left side with four mandibles. It was round in 20 of the mandibles, with bilateral mandibles in 40% of the cases and unilateral mandibles in 60% of the cases. It is seen on three right and nine left sides of the mandible in unilateral occurrences. The remaining 30 mandibles were discovered to be hooked shaped, with 76.67% being bilateral and 23.33% being unilateral. 28 (56 sides) of the 50 (100 side) mandibles were male. Male mandibles were found to be triangular shaped in 9 (32.14%), rounded in 7 (25%), and hook shaped in 42.86%. While examining 22(44 sides) female mandibles, 13(59.10%) had triangular shapes, 3(13.64%) had rounded shapes, and 6(27.27%) had hook shapes. **Conclusion:** It was discovered via this investigation that the coronoid form most often seen in male mandibles is a hook, followed by a triangular and rounded coronoid. The most prevalent form for a woman's mandible is a triangular one, followed by a hook and a rounded one.

Keywords: Morphological, Coronoid, Mandible

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INTRODUCTION

The coronoid process refers to a pair of anatomical structures in the human body. The mandible (the bone that forms the floor of the mouth) and the ulna (the long bone in the forearm) are the two locations of the molar teeth. At both ends, it takes the shape of a triangle. The coronoid process of the mandible is a small, irregularly shaped triangular prominence that is flattened on either side. The coronoid process can take on several different forms, such as a sphere, a triangle, or a hook.[1] The scope of this method includes the forward and upward directions. There's a convex upper edge and a concave lower half. Attachments can be found along the muscle's edges as well as its medial surface. These variations in coronoid process shape are associated with how the temporalis muscle attaches to the mandible, and may reflect either functional or genetic differences. In anthropological and forensic studies, these variations in coronoid process morphology are useful because of the role they play as evolutionary markers. Reconstructive procedures involving the maxillofacial region place special importance on the coronoid process.[2] Changes in the coronoid process's shape, which are associated with the temporalis muscle's attachment, may have their origins in both genetics and function. There are multiple distinct patterns of dominant form discovery by experts. Coronoid processes tend to take on a triangular shape, as found by Tanveer A et al.[3] and Nirmale et al.[4] followed by hooked and rounded variants. Multiple studies, including those by Vipul et al.[5] , Sahithiet al.[6] , Shakya et al.[7] , Sudha et al.[2] , and Pradhan et al.[8] , have found that triangular coronoid processes are the most common. Forms of the

coronoid process are more common, which is great for anthropological and forensic studies.[7] Despite the fact that several studies have been undertaken on the topic, it is interesting to note that various academics have developed unique form patterns based on the dominant coronoid process shapes.

MATERIAL AND METHODS

After receiving clearance from the protocol review committee and the institutional ethics committee, this prospective, randomised investigation was carried out in the Department of Anatomy. The coronoid processes of 50(100 sides) dry adult human mandibles were investigated, including 28(56 sides) men and 22(44 sides) females. Male and female bones were distinguished by observing typical morphological characteristics. The observed coronoid processes are triangular, rounded, and hooked. For sexual dimorphism and difference on each side, the varied forms of coronoid processes were compared.

STATISTICAL ANALYSIS

Statistical analysis was also performed on a personal computer using IBM SPSS 25.0 software and the Chi-square test.

RESULTS

In the current research, the triangular form of the coronoid process was found in 50 mandibles, 67% of which were bilateral and 33% of which were unilateral. As a result, observation leads to the conclusion that the triangle form of is more typically bilateral. In the instance of unilateral surgery, 10 coronoid processes on the right side were triangular (corresponding side have 3 rounded shaped & 3 hook shaped coronoid process). It was the left side with four mandibles. It was round in 20 of the mandibles, with bilateral mandibles in 40% of the cases and unilateral mandibles in 60% of the cases. It is seen on three right and nine left sides of the mandible in unilateral occurrences.

The remaining 30 mandibles were discovered to be hooked shaped, with 76.67% being bilateral and 23.33% being unilateral. When the above data is analysed using the Chi Square Test on IBM SPSS software, the X2 value is 7.89, the "P" value is.011 and the results are significant. The test distinguishes between bilateral and unilateral bone shapes. A higher percentage (72%) of bilateral is triangular shape and approximately 76.67% is Hooked shape. In rounded shapes, the percentage of unilateral is greater than the percentage of bilateral. The overall findings are significant. 28 (56 sides) of the 50 (100 side) mandibles were male. Male mandibles were found to be triangular shaped in 9 (32.14%), rounded in 7 (25%), and hook shaped in 42.86%. While examining 22(44 sides) female mandibles, 13(59.10%) had triangular shapes, 3(13.64%) had rounded shapes, and 6(27.27%) had hook shapes.

Table-1: Incidence of various shape of coronoid process in total side with percentage.

Type	Shape	Total	%	Bi lateral		Unilateral			
				Sides	%	Right	Left	Total	%
1	Triangular	50	50	36	72	10	4	14	28
2	Rounded	20	20	8	40	3	9	12	60
3	Hook	30	30	23	76.67	3	4	7	23.33
Total		100	100	67	67	16	17	33	33

DISCUSSION

For maxillofacial surgery, understanding the coronoid process's morphology is essential. It's a great place to harvest a graft for use in correcting orbital floor abnormalities. Repair of alveolar defects, orbital floor, maxillary augmentation, and repair of non-union fracture of mandible are all possible using a graft taken from the Coronoid process.[9]

Overall, the coronoid processes in this research had a triangular form, followed by hook-shaped and rounder ones. Different studies have shown varying preponderances of forms in the coronoid process of the human mandible, as was mentioned before. Different research have reached different conclusions on the frequency of the various forms of coronoid processes, with some showing that triangular processes are the most prevalent, followed by rounded processes and hooked processes.

It was determined that 28 (56 sides) of the total 50 (100 sides) mandibles belonged to males. 9 (32.14%) of the male sample had triangular mandibles, 7 (25.2%) had rounded mandibles, and 42.86 (42%) had hook-like mandibles. However, when looking at 22 (44-sided) female mandibles, we observed that 59.10% of them were triangular in form, 13.64% were rounded, and 27.27% were hooked.

Tanveer A et al.[3] and Nirmale et al.[4] discovered similar patterns, with triangular forms followed by hooked forms and rounded forms. Vipul et al.[5] found that whereas triangles are the most prevalent shape, round and hook forms are the next most common shapes after that. As reported by Isaac B et al.[10] the presentation of the coronoid process was symmetrical in 79.6% of mandibles and asymmetrical in only 20.4% of mandibles. Males were more likely to have a triangular or rounded face (46.5%) than females were (triangular or hooked (23.5%).

Sahithi et al.[6] , Shakya et al.[7] , Sudha et al.[2] , and Pradhan et al.[8] found that males in South India were more likely to have a triangular coronoid process than females, but that both sexes might have any form. Sheela D. Kadam et al.[11] found that the triangular

form of the coronoid process was the most prevalent of both sexes. In 87.26% of mandibles, the coronoid process is symmetrical on both sides, while in 12.74 %, it is not.

Table-2: Shapes of coronoid process in mandibles.

Study	Shapes observed		
	Triangular	**Hook Shaped**	**Rounded**
Issac B et al [10]	49%	27.4%	23.6%
Vipul et al [5]	54.17%	21.25%	24.58%
Nirmale et al [4]	65%	28%	7%
Tanveer A et al [3]	67%	30%	3%
Present Study	50%	30%	20%

CONCLUSION

It was discovered via this investigation that the coronoid form most often seen in male mandibles is a hook, followed by a triangular and rounded coronoid. The most prevalent form for a woman's mandible is a triangular one, followed by a hook and a rounded one.

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