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"A Research Study on Various Morphological Shapes of Coronoid Process of Mandile"

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Abstract: *Objective of the Study: To know the various various morphological shapes of Coronoid Process of the Mandible. Materials and methods: The study was carried out using 100 dry mandibles comprised of both sexes in the department of Anatomy of S.V.Medical College,Tirupati,A.P. The different shapes of the coronoid process were found for both the right and left sides and the data obtained were subjected to statistical analysis. Results: The current study has illustrated various morphological shapes of the Coronoid Process of the Mandible and 82% of mandibles showed bilateral similarity and 18% showed difference from the opposite side. The most common shape of the coronoid process was observed to be Hook shaped costituting 47.5%, Traingular shape constitutes 28.5% and Round shape Coronoid process consists of 24%. Conclusion: Knowledge of the variant morphological shapes of the coronoid process is useful for the maxillofacial surgeon during reconstructive surgeries and used as a donor site for sinus augmentation. It is also useful for anatomist, anthropological studies and in forensic dentistry.*

Key Words: *Mandible, Coronoid process, Triangular, Rounded, Hook.*

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I. Introduction

The mandible is the largest, strongest and lowest bone in the face. It has a horizontally curved body that is convex forwards, and two broad rami that ascend posteriorly. 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 incisure, and its anterior border continues into that of the ramus.The coronoid process is derived from a Greek word "korone" meaning "crow's beak" [1]. The mandible or the submaxilla is a U shaped bone having curve shaped body with 2 rami. Each rami has condylar and coronoid process. 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 encroaching partially on its lateral surface. Rest of the lateral surface gives attachment to masseter [2]. Clinically, it is important as it is a membranous bone which can be removed intraorally without any functional deficiency and facial disfigurement for reconstruction of orbital floor deformities, alveolar defects, paranasal sinus augmentation, non-union fractures of mandible, osseous defect reconstruction, and other repairing procedures in craniomaxillofacial surgeries.[3] The coronoid process can also be used as an anthropological marker in the determination of race.[4] 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, shorter surgical and hospitalisation time, no cutaneous scarring as bone is harvested intraorally[5].

II. Materials And Methods

The present study has been carried out using 100 dry mandibles comprised of both sexes in the department of Anatomy of S.V.Medical College,Tirupati, A.P and the different shapes of the coronoid process were found, which are tabulated for both the right and left sides and the data obtained were subjected to statistical analysis.

III. Observations And Results

The current study has illustrated various morphological shapes of the Coronoid Process of the Mandible and 82% of mandibles showed bilateral similarity and 18% showed difference from the opposite side. The most common shape of the coronoid process was observed to be Hook shaped constituting 47.5% (95sides) of which 44 mandibles were bilateral and 7 mandibles were unilateral, Traingular shape constitutes

28.5%(57sides) of which 21 mandibles were bilateral and 14 mandibles were unilateral and Round shaped Coronoid process consists of 24% (48sides) of which 17 mandibles were bilateral and 14 mandibles were unilateral. Among the Unilateral variations, right sided mandiles showed 50% were hook shaped 25% were round shaped and 25% were triangular shaped coronoid process and among the left sided mandiles 45% were hook shaped 32% were triangular shaped and 23% were round shaped coronoid process. Among the individuals, Specimen number (Sp.no).3 showed rounded and hook shaped, Sp.no 6 – hook and triangular,Sp.no13- hook and rounded,SP.no18- rounded and triangular, Sp.no 34- triangulae and rounded , Sp.no 53- hook and triangular , Sp.no 54- rounded and triangular, Sp.no 58- hook and triangular, Sp.no 62- rounded and triangular, Sp.no 67- triangular and rounded, Sp.no 70- rounded and triangular, Sp.no 77- triangular and rounded, Sp.no 82- hook and rounded, Sp.no 87- rounded and triangular , Sp.no 90- triangular and rounded, Sp.no 97- rounded and triangular, Sp.no 98- hook and triangular, Sp.no100- rounded and triangular (right and left side respectively).

TABLE NO.1: SHOWING THE BILATERAL SIMILARITY AMONG CORONOID PROCESS OF MANDILE.

TYPES	PERCENTAGE	BILATERAL	UNILATERAL
HOOK (n-95 sides)	47.5%	44 mandibles(92.6%)	7 mandibles(7.36%)
TRIANGULAR (n-57 sides)	28.5%	21 mandibles(73.6%)	15 mandibles(26.3%)
ROUND (n-48 sides)	24%	17 mandibles(70.8%)	14mandibles(29.16%)

TABLE NO.2: SHOWING DISTRIBUTION OF CORONOID PROCESS OF MANDILE AMONG RIGHT & LEFT SIDES

TYPES	RIGHT	LEFT
HOOK	50%	45%
TRIANGULAR	25%	32%
ROUND	25%	23%
TOTAL	100%	100%

TABLE NO.3: SHOWING THE MASTER CHART OF VARIOUS SHAPES OF CORONOID PROCESS OF MANDIBLE.

S.NO	RIGHT	LEFT	S.NO	RIGHT	LEFT
1	TRIANGULAR	TRIANGULAR	51	HOOK	HOOK
2	ROUND	ROUND	52	HOOK	HOOK
3	ROUND	HOOK	53	HOOK	TRIANGULAR
4	TRIANGULAR	TRIANGULAR	54	ROUND	TRIANGULAR
5	HOOK	HOOK	55	TRIANGULAR	TRIANGULAR
6	HOOK	TRIANGULAR	56	HOOK	HOOK
7	HOOK	HOOK	57	HOOK	HOOK
8	ROUND	ROUND	58	HOOK	TRIANGULAR
9	ROUND	ROUND	59	ROUND	ROUND
10	TRIANGULAR	TRIANGULAR	60	TRIANGULAR	TRIANGULAR
11	TRIANGULAR	TRIANGULAR	61	TRIANGULAR	TRIANGULAR
12	ROUND	ROUND	62	ROUND	TRIANGULAR
13	HOOK	ROUND	63	HOOK	HOOK
14	HOOK	HOOK	64	HOOK	HOOK
15	TRIANGULAR	TRIANGULAR	65	HOOK	HOOK
16	ROUND	ROUND	66	TRIANGULAR	TRIANGULAR
17	HOOK	HOOK	67	TRIANGULAR	ROUND
18	ROUND	TRIANGULAR	68	ROUND	ROUND
19	TRIANGULAR	TRIANGULAR	69	HOOK	HOOK
20	HOOK	HOOK	70	ROUND	TRIANGULAR
21	TRIANGULAR	TRIANGULAR	71	TRIANGULAR	TRIANGULAR
22	HOOK	HOOK	72	HOOK	HOOK
23	ROUND	ROUND	73	TRIANGULAR	TRIANGULAR
24	HOOK	HOOK	74	ROUND	ROUND

25	HOOK	HOOK	75	HOOK	HOOK
26	HOOK	HOOK	76	HOOK	HOOK
27	HOOK	HOOK	77	TRIANGULAR	ROUND
28	HOOK	HOOK	78	HOOK	HOOK
29	TRIANGULAR	TRIANGULAR	79	HOOK	HOOK
30	HOOK	HOOK	80	ROUND	ROUND
31	ROUND	ROUND	81	TRIANGULAR	TRIANGULAR
32	HOOK	HOOK	82	HOOK	ROUND
33	HOOK	HOOK	83	TRIANGULAR	TRIANGULAR
34	TRIANGULAR	ROUND	84	HOOK	HOOK
35	HOOK	HOOK	85	HOOK	HOOK
36	HOOK	HOOK	86	ROUND	ROUND
37	ROUND	ROUND	87	ROUND	TRIANGULAR
38	HOOK	HOOK	88	TRIANGULAR	TRIANGULAR
39	HOOK	HOOK	89	HOOK	HOOK
40	TRIANGULAR	TRIANGULAR	90	TRIANGULAR	ROUND
41	HOOK	HOOK	91	ROUND	ROUND
42	TRIANGULAR	TRIANGULAR	92	ROUND	ROUND
43	HOOK	HOOK	93	HOOK	HOOK
44	HOOK	HOOK	94	HOOK	HOOK
45	HOOK	HOOK	95	TRIANGULAR	TRIANGULAR
46	HOOK	HOOK	96	ROUND	ROUND
47	ROUND	ROUND	97	ROUND	TRIANGULAR
48	HOOK	HOOK	98	HOOK	TRIANGULAR
49	TRIANGULAR	TRIANGULAR	99	HOOK	HOOK
50	HOOK	HOOK	100	ROUND	TRIANGULAR

FIGURE NO.1 SHOWING HOOK SHAPED CORONOID PROCESS WITH TIP POINTING BACKWARDS

FIGURE NO.2 SHOWING TRIANGULAR SHAPED CORONOID PROCESS WITH TIP POINTING UPWARDS

FIGURE NO.3 SHOWING ROUNDED SHAPE CORONOID PROCESS WITH BLUNT TIP

IV. Discussion

Accoording to Dr Smita Tapas [5] et.al, the triangular coronoid process (type1) with tip pointing upwards was seen in 60%. In 23 mandibles (46 sides) it was seen bilaterally while in 14 mandibles it was found unilaterally. The hook shaped coronoid process (type 2), had a tip which was pointing backwards was present in 22 (22%) sides. In 7 Mandibles (14Sides) it was present bilaterally, while in 8 mandibles it was present unilaterally. The (type 3) coronoid process had a rounded tip was present in 18%. In 10 mandibles (5 sides) the rounded coronoid process was present bilaterally and in 8 mandibles it was present unilaterally.

Dr. Varalakshmi [6] et.al et.al observed triangular shaped coronoid process was seen in 45.19%. In 33 mandibles it was seen bilaterally and unilateral in 28 sides (16 on right side and 12 on left side). Hook shaped was seen 33.65% in 70 sides, in which it was bilateral in 18 and unilateral in 34 sides (13 on right side and 21 on left side). Round shaped coronoid process was present in21.15%., 44 sides Bilateral in 12 mandibles and unilateral in 20 mandibles.

S.M Akram Hossain [7] et.al in astudy illustrated that hook shaped coronoid process seen in 45% sides of mandibles, bilateral in 56 mandibles and in 14 mandibles it was unilateral. triangular shaped coronoid process was seen in 29.65%. In 38 mandibles it was seen bilaterally and unilateral in 7mandibles . Round shaped coronoid process was present in 25.35%., in 60 mandibles it was bilateral while in 11 mandibles it was unilateral.

Mouna Subbaramaiah [8] et al in a study, it was noted that hook shaped coronoid process predominated with 61.5% followed by triangular (14%) and rounded forms (12.5%) 70% of the mandibles showed similar shape on both sides, while in 30% there was a difference in the shape on right and left side of mandible. Amongst symmetrical mandibles majority of them belonged to hook type.

PriyankBhabhor [9] et.al, observed among the mandibles, the hook shaped coronoid process had a tip which was pointing backward which was present in 126(45%) sides. It was present bilateral in 56 mandibles (112 sides) while in 14 mandibles (9 right, 5 left) it was present unilaterally. The triangular coronoid process with a tip pointing straight upward was seen in 83 (29.65%) sides. It was present bilaterally in 38 mandibles (76 sides), while in 7 mandibles (5 right, 2 left), it was found unilaterally. In 60 mandibles, (120 sides), rounded coronoid process was present bilaterally, while 11 mandibles (2 right, 9 left), it was found unilaterally.

S.Pradhan[10] et.al, observed Out of total 184 sides (92 mandibles) studied, incidence of triangular coronoid process was found to be maximum i.e.86sides (46.73%). In 32 mandiblesit was found bilaterally and in14 mandibles it was present unilaterally. Coronoid process with rounded tip was found in 35.3%i.e 65 sides .In 27 mandible it was present bilaterally and in 11 mandibles it was unilaterally. Incidence of hook shape was least 17.93%i.e 33 sides, 24 (12 mandible) bilateral and 9 unilateral in presentation. Shrijana Shakya[11] et.al, study showed that triangular shape was more common, followed by rounded, beak and flat shape and rectangular coronoid process were rare.

B Lalitha[12] et.al observed triangular shape was predominant and hook shape was least common. In females, a round shape was the most prevalent. Bilateral symmetry was observed in 73.9%. Hook shape was observed in 25 (17.12%) sides, triangular shape in 80 (54.7%) sides, and rounded in 41 (28.08%) sides In this study, 73.9% mandibles were showing bilateral symmetry and only 26.02% of mandibles were showing difference in the shapes in both sides.

Abdulhaseeb Quadri[13] et.al observed Overall triangular type of coronoid process (67%) more prevalent than hook shape (30%) and rounded (3%). Isaac, B[14] Hook shaped coronoid processes were found in 86 (27.4%) sides, triangular in 154 (49%), and rounded in 74 (23.6%) sides. Hook shaped coronoid processes were found bilaterally in 35, triangular in 64 and rounded in 26 mandibles. Of the remaining 32 mandibles, the appearances were different on both the sides. Vikas.C.Desai[15] in a study The shape of coronoid process was triangular in 68%, Hook shaped in 24% and round shape in 8% of cases.

In the present study most common shape of the coronoid process was observed to be Hook shaped costituting 47.5%, Traingular shape constitutes 28.5% and Round shaped Coronoid process consists of 24%. The current study correlates with studies of S.M Akram Hossain [7] et.al, Mouna Subbaramaiah [8] et al, PriyankBhabhor [9] et.al.

V. Conclusion And Summary

The study was carried out using 100 dry mandibles comprised of both sexes in the department of Anatomy of S.V.Medical College,Tirupati,A.P. The different shapes of the coronoid process were found for both the right and left sides of which 82% of mandibles showed bilateral similarity and 18% showed difference from the opposite side. The most common shape of the coronoid process was observed to be Hook shaped (47.5%), Traingular shape (28.5%) and Round shape Coronoid process (24%). Knowledge of the variant morphological shapes of the coronoid process is useful for the maxillofacial surgeon during reconstructive surgeries which is used as a graft and used as a donor site for sinus augmentation. It is also useful for anatomist, anthropological studies and in forensic dentistry.

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