

Coronoid Process: Morphological Variation in Digital Orthopantomographs

Satish Kumar^{1*} Saurabh Satyarth² Md Shadab Kalim³ Ankita Srivastava⁴ Sumanta Kumar Kolay⁵
Anumeha Narwal⁶

¹Senior Resident, Department of Dentistry, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India.

²Resident Doctor, Department of Dentistry, Government Medical College and Hospital, Bettiah, Bihar, India.

³Private Consultant, Samastipur, Bihar, India.

⁴Private Consultant, Bangalore, Karnataka, India.

⁵Professor and Head, Department of Dentistry, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India.

⁶Prosthodontist and Implantologist, Medi-Dent Polyclinic, Gurgaon, India.

ABSTRACT

Aim: To assess different morphological disparities of the coronoid process using panoramic radiographs for personal identification among the population in Darbhanga.

Materials and Methods: The study was conducted using 200 digital orthopantomographs were examined for the different shapes of coronoid process in gender. Patient's age selected between ranges of 10 and 60 years, who reported to the OPD of our department.

Results: This study has illustrated various morphological shapes of the three selected entities and the most common shape of the coronoid process was observed to be triangular. the most common shape of coronoid process was triangular (57%) followed by round shape (32%) and flat shape [Figure 4] (8.5%) with least common as beak shaped process (1%).

Conclusion: Various morphological shapes of coronoid process is useful in anthropological studies and forensic dentistry. This study shows that the morphological variation using panoramic radiography can uncertainly be used as a screening method for personal identification due to its easy availability and suitability.

Keywords: Coronoid Process, Morphological Variation, Orthopantomographs.

INTRODUCTION

The mandible is the largest and strongest bone in the face. It has a horizontally curved body that is convex forward and two broad rami that ascend posteriorly. The rami bear the coronoid and condyle processes.[1] The coronoid process projects upward and slightly forward as a triangular plate of bone. Its posterior border bounds the mandibular incisure, and its anterior border continues into that of ramus.1 In the human body, there are two different structures named coronoid process. The first coronoid process is in the mandible and the other coronoid process is seen in ulna, a long bone

which is found in forearm. Coronoid process in both the areas has an appearance of triangular shape. The mandibular coronoid process projects upward and slightly forwards. The margins and medial surface of coronoid process give attachment to temporalis muscle.[2]

Various in vivo and in vitro studies have done previously to evaluate the morphological variations of coronoid process in different population of the world. [2,3] In this regard, the present study was undertaken to depict variations in morphology of

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*Correspondence Dr. Satish Kumar.

Department of Dentistry, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India.

Email: Not Disclosed

coronoid process in North part of Bihar population.[2,3]

Aim and objective

- To determine the variation of coronoid process in gender
- To determine the variation of coronoid process in particular location

MATERIALS AND METHODS

A study was conducted using 200 digital orthopantomograms (OPGs). Patient's age selected between ranges of 10 and 60 years, who reported to the OPD of our department. The various shapes of the coronoid process were interpreted as given by Shakya *et al.* [4]. These shapes were recorded for both right and left sides using each panoramic image including both the sexes. Thus, a total of 400 sides were assessed, and comparison was made for geographical area. The exclusion criteria of this study are those individual suffering from various bony disorder, congenial bone disease and traumatic malformation in TMJ. The data obtained were tabularized, and statistical analysis was performed for the same.

RESULTS

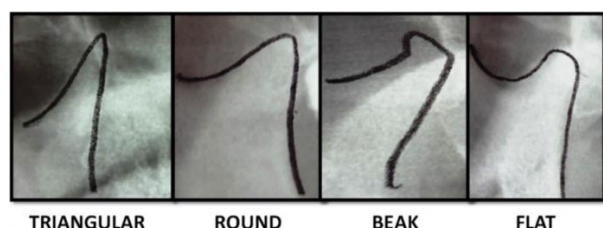


Fig 1:Triangiar 57%	Fig 2:Round 32%	Fig 3:Beak 01%	Fig 4:Flat 8.5%
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Fig A: Above figure show the shape of coronid process in OPG.

Over all variation of morphology of coronoid process in OPG is show in Table 1. In this table the variation of morphology of coronoid process in both region of condyle. In our study we observed 200 OPG in both sides so total number of coronoid process is 400.Out of 400 coronoid process the triangular shape coronoid process is 228 in comparison of round morphology 128.In other

morphology like flat is only 34 in both side in comparison beak morphology. [4]

Table 1: Type of coronoid process in OPG.

SNo	TYPE OF CRONOID PROCESS	NUMBER OF CRONOID PROCESS IN LEFT REGION	NUMBER OF CRONOID PROCESS IN RIGHT REGION
1	TRIANGULAR	114	114
2	Round	064	064
3	Beak	002	002
4	Flat	017	017
Total	400	197	197

Table 2: Percentage of coronoid process in OPG.

SNo	TYPE OF CRONOID PROCESS	PERCENTAGE OF CRONOID PROCESS	
1	TRIANGULAR	228	57%
2	Round	128	32%
3	Beak	004	1%
4	Flat	034	8.5%
Total	400	394	

Table 2 shows the percentage variation of the coronoid process in the OPG. The triangular shape of coronoid is more in percentage 57% in comparison of round 32% Similarly the flat morphology is more 8.5%in comparison of beak 1%.

DISCUSSION

In the present study, the most common shape of coronoid process was triangular [Figure 1] (57%) followed by round shape [Figure 2] (32%) and flat shape [Figure 4] (8.5%) with least common as beak shaped process (1%). The results of the present study were similar to studies done by Tapas and Isaac studies in different parts of the world [Table 4]^{2,10}

In the present study different shapes of the coronoid process was assessed with help of orthopantomographic images. The common shapes of the coronoid process were observed to be the triangular followed by round in our geographic area pertaining to the Southern part of India which goes in harmony with the studies conducted by Shakya *et al.*³, Sudha *et al.*⁴ an Pradhan *et al.*⁵ among the South

Indian populations. Our observations were in contradictory to the studies conducted by Tapas et al.¹⁰ among the North Indian population and Kadam et al.⁸ among the West Indian population wherein they had reported the hook/beak shape to be common followed by the triangular shape. Prajapati et al.⁶, had conducted a study using dry mandibles and the results showed that triangular coronoid processes were common followed by the round and the hook shapes and the incidence of the hook shape was almost equal in both the sexes, which goes in accordance with the current study. Observations made by Isaac et al. we're not similar to those of the present study, which showed triangular shape to be more common followed by hook and round shapes and the incidence of round shape was almost equal among both the sexes.^{7,10}

CONCLUSION

In the modern era the process of personal identification by means of radiographs had gained utmost importance owing to its feasibility. Various morphological shapes of coronoid process is useful in anthropological studies and forensic dentistry. This study shows that the morphological variation using panoramic radiography can uncertainly be used as a screening method for personal identification due to its easy availability and suitability.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

REFERENCES

1. Standring S, Collins P, Healy JC, Wigley C, Beale TJ. Mandible: Infratemporal and pterygopalatine fossae and temporomandibular joint. Gray's Anatomy: The Anatomical Basis of Clinical Practice. 4th ed. New York: Elsevier, Churchill Livingstone; 2008. p. 530-2.

2. Isaac B, Holla SJ. Variation in the shape of the coronoid process in the adult human mandible. J Anat Soc India 2001;50:137-9.

3. Shakya S, Ongole R, Nagraj SK. Morphology of coronoid process and sigmoid notch in orthopantomograms of South Indian population. World J Dent 2013;4:1-3.

4. Sudha R, Chandrasekaran S, Aruna N. Study of morphological variations in the shape of coronoid process of mandible in South Indian population. Int J Cur Res Rev 2013;05(10):84-92

5. Pradhan S, Bara DP, Patra S, Nayak S, Mohapatra C. Anatomical study of various shapes of mandibular coronoid process in relation to gender and age. IOSR J Dent Med Sci 2014;13(8):9-14

6. Prajapati VP, Malukar O, Nagar SK. Variations in the morphological appearance of the coronoid process of human mandible. Int J Med Res 2011;1(2):64-6.

7. Cameriere R, Ferrante L, Molleson T, Brown B. Frontal sinus accuracy in identification as measured by false positives in kin groups. J Forensic Sci 2008;53(6):1-3.

8. Kadam SD, Roy P, Ambali MP, Doshi MA. Variation in the shape of coronoid process in dry mandible of Maharashtra population. Int J Anat Res 2015;3(1):895-8.

9. Isaac B, Holla SJ. Variations in the shape of the coronoid process in the adult human mandible. J Anat Soc India 2001;50(2):137-9.

10. Tapas S. Morphological variations of coronoid process in dry adult human mandibles. Ind J Basic Appl Med Res 2014;3 (2):401-5.