

Variation of Sigmoid Notch in Digital Orthopantomography: A Radiographic Study

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ABSTRACT

Background: The sigmoid notch; also called the mandibular notch is a deep notch separating the coronoid process and the condyle. The sigmoid notch (wide, round and sloping) have been documented in literature as indispensable aids in anthropological and forensic studies.

Material and methods: A study was conducted using 200 digital orthopantomograms (OPGs). Patient's age selected between ranges of 10 and 60 years, those are reported in the OPD of our department. The sigmoid notch recorded in both side OPG, so total of 400 sigmoid notches is evaluated in this study.

Result: In 400 recoded sigmoid notches the round type of notch is 250, sloping is 28 and wide 128. The percentage value is 62.25% round, 7% sloping and 30.5% wide sigmoid notches.

Conclusion: In this study, with the help of digital panoramic radiograph, we studied various morphological variations of sigmoid notch and radiographs are the easiest and efficient way for antemortem preservation for future correspondence.

Keywords: Orthopantomograms, Sigmoid.

INTRODUCTION

The human mandible is considered as the largest and strongest bone in the face. It consists of two ascending rami one on either side that in turn bears the coronoid and condyle process. The sigmoid notch; also called the mandibular notch is a deep notch separating the coronoid process and the condyle.[1] The sigmoid notch (wide, round and sloping) [2] have been documented in literature as indispensable aids in anthropological and forensic studies. Maxillofacial radiography by means of orthopantomogram is used as a routine screening tool [3] in the diagnosis and treatment planning in various fields of dentistry.

Evidence-based reports suggest that few studies have documented the use of coronoid process and very few other studies have reported the use of condylar and sigmoid notch as a tool in personal identification most of these studies have been conducted using the dry mandibles obtained from the cadavers of the deceased individuals.[4] The need for this study was to accomplish more accessible means for personal identification by comparison of various morphological patterns of the sigmoid notch with the help of panoramic radiographs pertaining to our geographic area.

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Aim:

Following are the aim of our study

- I. To determine the morphology of sigmoid notch in Darbhanga population.
- II. To determine the personal identification through the sigmoid notch in this geographical region

MATERIALS AND METHOD

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 sigmoid notch were interpreted as given by Shakya *et al.*[2]. These shapes were recorded for both rights and left sides using each panoramic image, including both the sexes. Thus, a total of 400 sides were assessed, and comparison was made for a geographical area. The exclusion criteria of this study are those individual suffering from the various bony disorder, congenital bone disease and traumatic malformation in TMJ. The data obtained were tabularized, and statistical analysis was performed for the same.

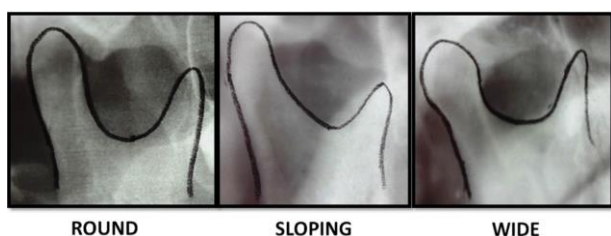


Fig 1: Show the different shape of the sigmoid notch in OPG

RESULT

Table 1: Show the percentage variation of the sigmoid notch in this geographical area.

		Percentage
OPG	200	
Round notch	250	62.5%
Sloping notch	28	7%
Wide notch	122	30.5%
Sigmoid notch	400	

Table 1 shows the percentage variation of the sigmoid notch in this geographical area. There is a high prevalence of round type sigmoid notch. The round sigmoid notch 250 in 400 recorded sigmoid notches. The percentage value of round sigmoid (62.5%) notch is also high in this region. Another type of sigmoid notch wide is also recorded slightly high in this geographic area. The wide sigmoid notch 122 in recorded 400 sigmoid notches. The percentage value of wide sigmoid notch (30.5%) less in compression of the round notch. Finally, sloping type of sigmoid notch is very less in compression of another type of sigmoid notch. The amount is only 28 in 400 recorded sigmoid notches and percentage value is 7%.

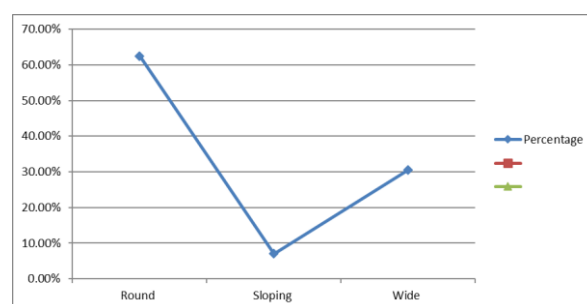


Diagram 1 shows the high value of round notch than wide notch and very less in sloping type.

Table 2: Shows the statically analysis variation of the type of sigmoid notch in this study.

Segmiod notch	Type of Segmiod notch	Mean	SD	P-Value
400	3	133.34	7.87	Less than 0.0001

Table 3 shows the static analysis variation of the type of sigmoid notch in this study. The mean is 133.33, and stander deviation is 7.78, and finally, the P-Value of this study is less than 0.0001. SO the study is statically significant.

Table 3

Static analysis is done on GraphPad software online, and the test is the one-sample t-test. The static stander error in this test is 0.394. The 95% confidence interval of this difference: From 132.2264 to 133.7736. The two-tailed P-value is less than 0.0001. By conventional criteria, this

difference is considered to be extremely statistically significant

Table 3: Static analysis done on GraphPad software: onlineOne sample t-test results

Intermediate values used in calculations:	Confidence interval	P value and statistical significance:
➤ $t = 337.9924$ ➤ $df = 399$ ➤ standard error of difference = 0.394	➤ The hypothetical mean is 0.0000 ➤ The actual mean is 133.0000 ➤ The difference between these two values is 133.0000 ➤ The 95% confidence interval of this difference: From 132.2264 to 133.7736	➤ The two-tailed P value is less than 0.0001 ➤ By conventional criteria, this difference is considered to be extremely statistically significant.

DISCUSSION

The sigmoid notch, which is the deficiency between the condylar and the coronoid process had been described as having sloping, wide and rounded contour.[5] The study showed the prevalence of sloping and rounded shape which is slightly similar to the finding reported by Narayanan (2004)[5]

Panoramic radiograph images include both maxillary and mandibular dental arches along with other surrounding structures such as the maxillary antrum, nasal fossa, TMJ, styloid processes and hyoid bone. It is a routine imaging modality utilized by dental surgeons for obtaining general information about the teeth, mandible, and adjacent regions of the jaw. It also yields a favourable cost-benefit relationship and exposes patients to relatively low doses of radiation.[6,7]

In this study did not show any significant change in the shape of the sigmoid notch on either side. However, in this study observed the combination of various shapes on either side, which reaches statistical significance. The round form of the sigmoid notch was most common among both the sexes. In this study, the round type of sigmoid notch is more, i.e. 250 out of 400, including both genders. Similarly, there is more prevalence wide type of

sigmoid notch in both genders i.e. 122 out of 400 (table 1). Our study there is very less side type of sigmoid notch in both genders i.e.28 out of 400. In this study age-related change is also recorded in sigmoid notch. In children and elderly people have morphological variation is also recorded. Various studies are none on dry mandible so very few studies on OPG .Similar study is done and the same variation in the type of sigmoid notch is recorded in Dathar S et al. (2016)[8]and Tejavathi N et al. (2017)[9]

Our study is very used ful for the personal identification, diagnosis and treatment of temporomandibular joint disorder and also surgery of TMJ.

CONCLUSION

In this study, with the help of digital panoramic radiograph, we studied various morphological variations of sigmoid notch and radiographs are the easiest and efficient way for antemortem preservation for future correspondence. This study is helpful for personal identification of people in this geographic area and during surgery of temporomandibular joint. There is a need for more study OPG related in this geographical region.

CONFLICTS OF INTEREST

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

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