Research Article

JRAD Journal of Research and Advancement in Dentistry

J Res Adv Dent 2021;11:2:260-263.

Variations in Shapes of Mandibular Condyles on Digital Orthopantomograph Among Patients Visiting A Dental College

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ABSTRACT

Background: variations in shapes of mandibular condyles among the patients visiting the Dental hospital.

Materials and Methods: This cross-sectional retrospective study was conducted in department of orthodontics during in November 2020, among the patients >18 years of age who previously (March 2019 to Februrary 2020) visited the department for orthodontic treatments and were advised for Orthopantomographs (OPGs) as a routine, before treatment planning. Tracing of bilateral condyles was done on 300 selected digital OPGs using a tracing software and the shapes were noted.

Results: Among the selected 300 OPGs (600 condyles) on the basis of inclusion and exclusion criteria , 142 were of males and 158 were of females. The average age was 22.35 years. Among the 600 condyles, most of them i.e 207 (34.5%) were round/oval including followed by Diamond/angled i.e 182 (30.33%), followed by flattened i.e 84 (14%), followed by mixed i.e 67 (11.16 %), followed by bifid 32 (5.33%). The least common was crooked finger shaped i.e 28 (4.66%).

Conclusion: Our study concluded that round/oval shape condyle is most commonly seen our Indian as well as Jharkhand population followed by diamond/angled shape and least common is crooked finger shape and bifid condyle.

Keywords: Mandibular Condyle; Radiography; Panoramic.

INTRODUCTION

Mandible is one of the strongest bone in the face.[1] It is a curved shape bone which form a synovial hinge type of joint with the mandibular fossa.[2] The different parts of the mandible holds different growth pattern as well as different functions. The development of the different parts of mandible again depends on the musculature, activity/eruption of teeth, food habits and ethnic and racial variations as well.[3] The condyle is the part of the mandible which is responsible for the growth of mandible. The movement of the mandible helps in chewing, speaking as well as it co ordinates with swallowing.[4] Mandibular condyle shapes varies along with the shapes of mandibular fossa, coronoid process and sigmoid notch. The different types of shapes have been described by different researchers but we do not have a universal classification for condyles on basis of their shapes.[5] This might be because of insufficient data regarding shapes of condyles. There have been few studies

Received: Nov. 1, 2020: **Accepted**: Dec. 3, 2020
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pISSN 2278-0076
eISSN 2321-9270

around the globe and in India regarding the base line data of shapes of condyles but there has not been such study in our population of Jharkhand/ Bihar. So we planned this study to evaluate and classify the various shapes of mandibular condyles in our population visiting the dental hospital.

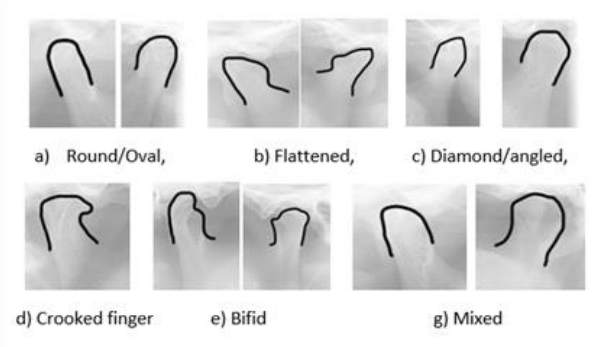

Fig 1: Showing 6 types of condylar shapes on Digital OPG.

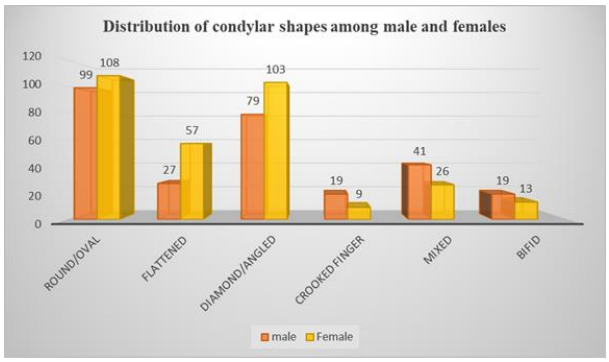

Fig 2: Showing distribution of 6 types of condylar shapes among males and females.

MATERIALS AND METHODS

This cross-sectional retrospective study was conducted in the department of Orthodontics in the month of November 2020. The digital Orthopantomographs (OPGs) of the patients above 18 years of age that was taken for the routine treatment of malocclusions during the period of March 2019 to February 2020 were included in the study. Digital OPGs of clear view without any distortion or defect, without any bony anomalies/pathologies like cyst or tumors, or generalized bone loss or changes in trabecular patterns, fractures/plates were included for the study. 300 randomly selected digital OPGs were included for the study by simple random sampling method. Each of the digital OPGs were visualized on a laptop screen of 15 inches without aby magnification (1:1 ratio). Each of the 600 condyles were traced using a tracing software and the shapes evaluated were recorded on Microsoft excel. Demographic data as mentioned on the digital OPGs were also recorded in the microsoft excel. The collected data was analyzed by SPSS software, which did a frequency analysis and the results were achieved.

RESULTS

Among the selected 300 OPGs on the basis of inclusion and exclusion criteria, 142 were of males and 158 were of females. The average age of males was 23.45 and female was 21.26 , with a overall average age of 22.35. The minimum age was of 18 years and maximum was of 34 years. Total of 600 condyles were evaluated (including both left and right condyles of an OPG). We found 6 different shapes of condyles a) round/oval, b) diamond/angled, c) flattened, d) mixed, e) bifid, f) crooked finger. (Figure 1)

Among the 600 condyles, most of them i.e 207 (34.5%) were round/oval including 99 (16.5%) males and 108 (18%) females. The second most common shape seen was Diamond/angled i.e 182 (30.33%) including 79 (13.16%) males and 103 (17.16 %) females. The third most common shape seen was flattened i.e 84 (14%), including 27 (4.5%) males and 57 (9.5%) females. The fourth most common was mixed i.e 67 (11.16 %) , including 41(6.83%) males and 26 (4.33%) females. The fifth most common was bifid i.e 32 (5.33%) , including 19 (3.16%) males and 13 (2.16%) females. The least common was crooked finger shaped i.e 28 (4.66%), including 19 (3.16%) males and 9 (1.5 %) females. (Table 1 an d Figure 2)

DISCUSSION

The shape of Mandibular condyle varies with age, as it tends to grow along with the growth of overall mandible, which is dependent on various genetic and environmental factors.[1] OPG have been considered as a reliable tool for visualization of bilateral mandibular condyles at one time. OPG are most commonly prescribed extra oral radiographs in dentistry. They are conveniently taken with replicable conditions. Thus the types of mandibular condyles seen over the digital OPG can be considered universally and might be accepted well

Table 1: Distribution of variations in mandibular condyle among males and females.

Gender	Round/ oval (%)	Diamond/ angled (%)	Flattened (%)	Mixed (%)	Bifid (%)	Crooked finger (%)	Total
Male	99 (16.5)	79 (13.16)	27 (4.5)	41 (6.83)	19 (3.16)	19 (3.16)	284 (47.33)
Female	108 (18)	103 (17.16)	57 (9.5)	26 (4.33)	13 (2.16)	9 (1.5)	316 (52.66)
Total	207 (34.5)	182 (30.33)	84 (14)	67 (11.16)	32(5.33)	28 (4.66)	600 (100)

around the globe. Our study was conducted in the department of Orthodontics, Awadh Dental college and Hospital, Jharkhand. Our study included previously taken orthopantomographs of Patients from age of 18 years and above. The average age of the patient included in this study was 22.35 which was similar to the study done by Singh M etal[6] , age range was higher in other studies.[7,8,9]

We found round/oval shape to be the highest prevalence (34.5%) in our population which was similarly high in studies done by Singh M etal[6] (41%) , Sonal V etal [7] (60%) , Singh B etal[8] (28.7%) , Kanjani V etal [9] (46.12), Maqbool S etal[10] (60.6%) , Jawahar A etal[11] (58.5%). The difference in percentage could be because our study included a very narrow range of age group i.e young patients of 18-34 years. The second most common shape seen in our study was diamond/angled (30.33 %) which was similary seen in other studies by Singh M etal[6] (28%), Kanjani V etal [9] (29.29), Maqbool S etal [10] (29.31%), whereas it was only 9% , 3.2% and 9% in study done by Sonal V etal [7] , Singh B etal[8] and Jawahar A etal[11] respectively. This could be attributed to the reason that these studies have included bird beak shaped as one of the classifications which was not included in our study as well as studies[6,9,10] similar to our study. The third most common shape noted was flattened (14%) which was similar in rank but was more in studies done by Singh M etal[6] (19%) and quite low in studies done by Singh B etal[8] (1.2%), Kanjani V etal [9] (2.62%), Maqbool S etal[10] (2.58%) which included a wide age range of population with a larger sample size as well. Whereas studies done by Sonal V etal [7] and Jawahar A etal[11] didn't mentioned about flattened shapes. The fourth most common shape found was mixed shape of condyle (11.16%) which was very close to the study done by Singh M etal[6] (12%) whereas other studies[7,8,9,10,11] didn't mention about mixed shape of condyle. The least common shape noted in our study was crooked finger shape (1.5%) almost half more prevelant than the bifid shape (3.16%), which was found to be similar in study by Singh M etal[6] (2%) but quite higher in other study by Jawahar A etal[11] (14%), wheras most of the other studies did not mentioned about crooked shaped condyle and none of the studies mentioned about bifid condyle. As we did our studies following the previous studies, we tried to find as many shapes as possible and mentioned in previous studies. But to our surprise bifid condyle which could also have been considered/seen by other researchers as well.

CONCLUSION

Our study concluded that round/oval shape condyle is most commonly seen our Indian as well as Jharkhand population followed by diamond/angled shape and least common is crooked finger shape and bifid condyle. We would also suggest for a countrywide study for determine the more accurate data on prevalence of various shapes of condyles among the Indian population.

CONFLICTS OF INTEREST

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

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