DOI: https://doi.org/10.53350/pjmhs22168856

ORIGINAL ARTICLE

Evaluation of Condylar Morphology Using Orthopantomogram among Patient Reporting at Sandeman Provincial Hospital Quetta

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ABSTRACT

Objective: To assess the condylar morphology using orthopantomogram among adult patient.
Study design: Cross sectional study
Place and duration of study: Department of Orthodontics, Dental Section, Sandeman Provincial Hospital, Quetta, from June 2020 to December 2020.
Material and methods: All patients presented to orthodontic department who fulfilled inclusion criteria were included in this study. One hundred and eighty candidates were included and underwent Orthopantomogram. Reports were assessed and condylar shape was noted. Data was analyzed by using SPSS. Vs. 20.
Results: The mean age of candidates was 25.5 ± 5 years. There were 90 (50%) males and 90 (50%) females. In left side, the condylar shape was oval in 101 (56.0%) while in right side, condylar shape was oval in 100 (55.6%) cases. In left side, the condylar shape was bird beak like in 32 (18.0%) while in right side, condylar shape was bird beak like in 33 (18.3%) cases. In left side, the condylar shape was diamond like in 26 (14.4%) while in right side, condylar shape was diamond like in 27 (15.0%) cases. In left side, the condylar shape was crooked finger like in 21 (11.7%) while in right side, condylar shape was crooked finger like in 20 (11.0%) cases.
Conclusion: Thus in our population, the most common condylar shape was observed to be oval type followed by bird beak type.
Keywords: Condylar morphology, Orthopantomogram, Orthodontics

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 condyle is a rounded projection that enunciates by means of glenoid fossa of temporal bone.[1]

The masticatory mechanism, (bones, muscles, ligaments, and teeth), is highly complex which is responsible for behaviours such as chewing, voice, and deglutition.An elaborate neurological control mechanism controls all these gestures, which is necessary for the system to operate normally and efficiently. [2]Disruptive muscle activity or structural damage to some of the components can result from a lack of such harmony.The role of the TMJ is peculiar in that both the condyle rotates and translates anteriorly along the articular eminence inside the fossa. [3]

Different morphological variations of the condyle (angled, round, convex and flat) has been documented in literature as indispensable aids in anthropological and forensic studies.[4, 5] These variations occur either due to the genetic background or due to functional changes that occur with the progression of growth. Many studies have been done by using the dry mandibles that are attained from the cadavers of dead bodies.[4]

Radiographs play an essential role in forensic dentistry to uncover the hidden facts that cannot be easily noticed by regular physical examination. Maxillofacial radiography by means of orthopantamogram is used as a routine screening tool in the diagnosis and treatment planning in various fields of dentistry and is found to be less expensive when compared to other advanced imaging modalities like CT, MRI and CBCT.[6] In a panoramic image, different shapes of the condyle can often be appreciated and thus this radiographic data when available as antemortem records and correlated with the post-mortem records can thereby aid in the identification of a person either living or dead.[7]

Orthopantomography is a routine imaging technique used by most dental surgeons to gain general knowledge about the teeth, jaw, and adjacent parts of the jaw.It also yields a beneficial cost-benefit relationship and subjects patients to radiation levels that are comparatively mild.[8]There are five basic forms of human mandibular condyles: flattened, convex, angled, rounded, and concave.Condyle morphological changes arise due to developmental variations,remodelling, multiple infections, trauma, endocrine conditions, and radiation therapy.The key screening modality for temporomandibular joint anomalies remains among the different imaging modalities used for panoramic radiographs for temporomandibular joint imaging. [9]

So this study was planned to assess the condylar morphology using orthopantomogram among adult patient.Such research in future will help us to provide data about the application of orthopantomogram for determination of condylar morphology in adult population,as no study has been done in Pakistan before.By this study we will be able to see the role of orthopantomogram in determining the most common condylar morphology in Pakistani population.
Objective: To assess the condylar morphology using orthopantomogram among adult patient.

MATERIALS & METHODS

This cross sectional study was done at Department of Orthodontics, Dental Section, Sandeman Provincial Hospital, Quetta for 6 months, from June 2020 to December 2020. Total sample size calculated 180 using WHO formula for sample size calculation,keeping the confidence interval at 95%, margin of error at 5%and percentage of crooked finger type condylar shape as 13.22%.[10]Patients were included through non probability consecutive sampling technique. The samples were from the population of Balochistan Inclusion criteria involving both male and female patients'age between 16-35 with non syndromic adult patient.The patient who gave the informed consent, they underwent Orthopantomogram.Patients with temporomandibular joint disorder or trauma, bony carcinoma,previous temporomandibular surgery, plastic surgery, developmental anomaly were excluded from the study.Then candidates underwent 2D dimensional view Orthopantomogram to evaluate the mandibular condylar shapes by a single radiologist. Reports were assessed and discussed with dentist. Type of condylar shape was assessed.Data was analyzed using SPSS version 20.Quantitative variables like age, was presented as mean and standard deviation while qualitative variables like gender and condylar type were presented as frequency and percentage

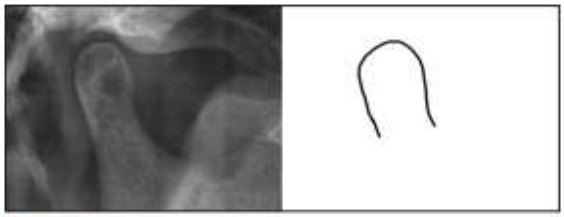

Figure 1: Oval shape

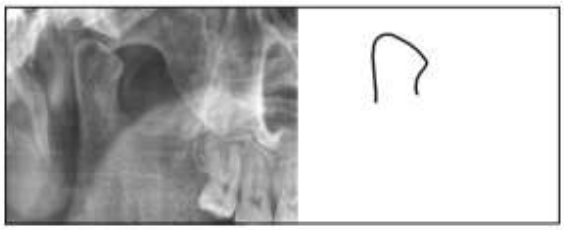

Figure 2: Bird beak shape

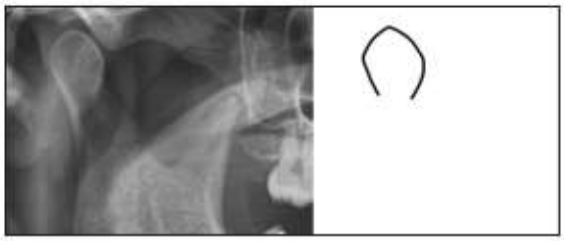

Figure 3: Diamond shape

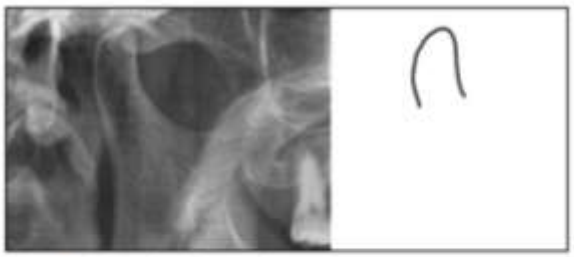

Figure 4: Crooked finger shape

RESULTS

The mean age of candidates was 25.5 ± 5 years. There were 90 (50%) males and 90 (50%) females. The males to female ratio was 1:1. Table 1

In left side, the condylar shape was oval [Figure 1] in 101 (56.0%) while in right side, condylar shape was oval in 100 (55.6%) cases. In left side, the condylar shape was bird beak like [Figure 2] in 32 (18.0%) while in right side, condylar shape was bird beak like in 33 (18.3%) cases. In left side, the condylar shape was diamond like [Figure 3] in 26 (14.4%) while in right side, condylar shape was diamond like in 27 (15.0%) cases. In left side, the condylar shape was crooked finger like [Figure 4] in 21 (11.7%) while in right side, condylar shape was crooked finger like in 20 (11.0%) cases. Table 2

Table 1: Characteristics of patients

N	180
Age (years)	25.5 ± 5
Gender	
Male	90 (50%)
Female	90 (50%)

Table 2: Type of condylar shape

Type	Left	Right
Oval	101 (56.0%)	100 (55.6%)
Bird beak	32 (18.0%)	33 (18.3%)
Diamond	26 (14.4%)	27 (15.0%)
Crooked finger	21 (11.7%)	20 (11.0%)

DISCUSSION

In normal individuals, the K2mandibular condyle is characterized by a rounded head, with an upper biconvex and oval surface. With time, there is a capacity of the human condyle to undergo remodelling, as various factors like age, sex, occlusal force, malocclusion, and skeletal class influence this remodelling.[11] This remodelling is seen to be more pronounced with age as the TMJ is subjected to more and more occlusal loading when the person chews and grinds.[5] The aetiopathogenesis for this remodelling, also known as osteoarthritis, is still not fully understood. It is believed to involve a sustained inflammatory process that initiates a series of biomechanical changes in the hard and soft tissues of the joint, triggering the immune system to release inflammatory mediators like cytokines and chemokines.[12, 13]

Temporomandibular osteoarthritis of the joint is diagnosed on the basis of radiography.In the evaluation of the bony structures of the temporomandibular joints, cone beam computed tomography has high diagnostic utility across all the imaging methods. [14]The growth and development phase of the dento-craniofacial complex, with the temporomandibular joint as one of its growth centres, occurs during the mixed dentition period.The state of the temporomandibular joint can be seen from the form of its condylar head;thus, the regular anatomy of the condylar head during the mixed dentition time must be known.[15]

Various classifications were produced for condylar morphology. Many studies have classified condyle into round, angle, convex and flat, most of these studies have used CBCT.[7, 16-18] Other studies used a nearly similar classification to the previous one, where condyle was classified into round, angle, pointed and flat.[19] In an Indian study, the most common shape seen among the subjects were oval followed by bird beak, diamond, and crooked finger: Oval (63%), bird beak (22%), diamond (12%), and crooked finger (3%) on orthopantomographic study.[20] In another study conducted in Dhaka, 200 mandibles of condylar head were evaluated. Out of them, about 60% had oval shape, then next common was bird beak (29%), diamond shape (9%) and crooked finger was the least among all (2%). [21]

Anisuzzaman et al., in his study in Bangladeshi population found that although the oval shape was the most common (68%), the second most common was the bird beak shape (20%).[22] In another study done by Vahanwala et al., 200 pairs of condylar heads were evaluated and they concluded that 60% had oval shape, followed by the bird beak (29%), diamond shape (9%) while crooked finger was least shape observed (2%).[8] Also Vahanwala et al., found that oval shape was the most common (60%), the second most common was the bird beak shape (29%), then diamond shape (9%) and least among them was crooked finger (2%).[8]

Morphological changes in the anatomic structures that occur either analogous to developmental divergences via inherited factors or because of functional deviations that ascend during the embryological or growth process.[1, 7]

CONCLUSION

Thus in our population, the most common condylar shape was observed to be oval type followed by bird beak type. Through this study we came to know that in our ethnic group, the most common type is oval sham in adult population by using Orthopantomogram. The findings have shown that, due to its ready availability in many clinical environments, the variations in the morphology of the coronoid process, condyle and the sigmoid notch using panoramic radiography can tentatively be used as a screening method in human identification.

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