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Gender As A Variable Influencing The Shape Morphology Of Mandibular Condyle In Young Adult Subjects Visiting Peshawar Dental Hospital

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ABSTRACT

Objective: *The main objective of the study was to determine the frequency of various shapes of mandibular condyles using OPG of young adults of male and female genders (age 18-35 years).*

Material and methods: *This were a cross-sectional study conducted in Outpatient Department of Peshawar Dental Hospital.*

A sample of 132 individuals with a mean age of 18-35 years was selected from a population visiting Peshawar Dental Hospital that fulfilled the inclusion criteria. OPGs were examined on an LED X Ray View box and tracing was done on a Schooler shammer tracing paper sheet for the morphology(shape) of the condyles to fit into one of the four types: rounded, angled, flattened & mixed.

Results: *The most common shape of left mandibular condyle in both genders was rounded 68 (male:31, female:37) followed by mixed 25 (male:13, female:12), flattened 20(male:10, female:10) and angled 19 (male:11, female:8). The most common shape of right mandibular condyle in both genders was rounded 64 (male:30, female:34) followed by mixed 31 (male:15, female:16), flattened 21 (male:11, female:10) and angled 16 (male:9, female:7). There was no significant association found between the shape of mandibular condyle and gender (P>0.05).*

Conclusion: *It can be concluded that there was no significant association found between the shape of mandibular condyle and gender* (P> 0.05).

Keywords: *Mandibular condyle, Temporal Mandibular Joint, Gender, Morphology.*

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I. INTRODUCTION

Anatomical and neurophysiological unsettling influence in condylar design led to change neuromuscular adjusts of temporomandibular joint. Such modification makes temporomandibular dysfunction (TMD) with development of age[1]. The proper and cleared out mandibular condyle verbalizes with their individual mandibular fossae to make the temporomandibular joint (TMJ) [2]. The joint between mandible and temporal bone (TMJ) is ginglymi-arthrodial having together with a ginglymus (hinging joint) and an arthrodial (sliding joint)[3], is one of the foremost essential and one-of-a-kind joints within the body and its capacities are vital for life[4]. The capability of TMJ are to supply plane, effective development of the lower jaw amid rumination, gulping as well as discourse. It moreover gives soundness of mandibular position and anticipates separation from outside or abnormal powers[2]. The TMJ is responsible for all movements of the jaw such as chewing, sucking and swallowing, articulating sounds, breathing, making facial expressions, protrusion, retrusion, lateralization of the jaw, opening the mouth and maintaining the correct pressure of the middle ear[5,6]

It is frequently presumed that a condylar head should have convex setup[7]. The morphology of mandibular condyle is distinguished by an adjusted bone protuberance with an upper biconvex and ovoid surface in hub plane[8].

Survey of writing uncovers that Yale, and his colleagues were the primary to find different shapes of condyle on cadaver. The classification of condyle was done according to its prevalence set in 3 categories;concave, curved, leveled[9].

Sonal V et al conducted a consider comprising of radiographic assessment of 400 condylar heads after visualizing 200 digitalized ortho-phantom-gram (OPG) taken for schedule examination. Agreeing to them condyle was classified into four sorts. 200 condyles were assessed, 60% had oval shape, taken after by winged creature nose (29%), precious stone (9%), and slightest was slanted finger (2%). The foremost common shape of condylar head was oval which was found in 46% of male and 62% of females[10].

Ribeiro et al categorized condyle in four sorts in horizontal see – circular, calculated, straightened and blended sort[8].

Singh and Chakrabarty moreover categorized it into four sorts. The test included 100-OPG of Indian patients from 14 to 45 a long time ancient, comprising of 52 males and 48 females. The recurrence of condylar shapes was dispersed as more noteworthy of the rounded shape (41%), taken after by calculated (28%), smoothed (19%) and blended (12%) sort individually[1].

Dither et al., (2015) conducted study in India and classified condylar head into four types in which the most frequently observed shape of the condyle among the males was angled (40.4%) followed by round (38.6%), convex (17.2%) and flat (3.5%) and amongst females was in the order of rounded (39.6%), angled (31.8%), convex (24.1%) and flat (4.3%)[11].

Various considers have been done on TMJ morphology utilizing dry and dissection human skulls, histology, attractive reverberation imaging, computed tomography, Cone-Beam Computed Tomography strategies (CBCTS) and Orthopantomograms[12].

Among different imaging modalities utilized, Orthopantomography (OPG) could be a schedule imaging methodology utilized by most dental specialists for getting common data approximately the teeth, mandible, adjoining locales of the jaw and screening methodology for TMJ anomalies[13]. It moreover provides a pocket friendly relationship while uncovering patients to moderately low radiation doses. The anatomical information of TMJ is the establishment of clinical hone, permitting the understanding of obsessive changes, symptomatic assessments through the assets of pictures, and choice of fitting restorative ways[8]. Review of writing shown that variety within the shape and estimate of the mandibular condyle exists completely different people, races and population[14]. In expansion, there's a scarcity of writing with respect to the morphological and morphometric examination of the mandibular condyle in people of neighborhood populace community, having distinctive way of life.

The aim of this study was to decide sex as a variable impacting the shape morphology of mandibular condyle of temporomandibular Joint (TMJ) in youthful grown-up subjects through OPG.

II. MATERIAL AND METHODS

It was a cross-sectional study. Present study was ethically approved by Institutional Research Ethics Board (IREB) of Prime Foundation. Data was collected in Outpatient Department (OPD) of Peshawar Dental Hospital in the supervision of Oral and Maxillofacial Surgeon to exclude inter-observer variability. Total of 132 subjects of both genders male and female were included, out of which 65 were males and 67 were females. The age range was from 18-35 years. Informed consent was taken from all subjects. Inclusion criteria was subjects of both genders having structurally sound temporomandibular joint and mandibular condyle who have been advised OPG by the dental practitioner for routine treatment planning. Exclusion criteria was subjects with a history of Hypoplasia or aplasia of the TMJ/condyle/discs, TMJ trauma, fracture, surgery and occlusal discrepancy and subjects having any prosthesis in the oral cavity.

Morphological shapes of mandibular condyle are classified as rounded, angled, flattened, and mixed. Rounded shape shall be defined when there is a predominance of circumferential arch. Angled shape shall be defined when there is a slope at an acute angle. Flattened shape shall be defined when there is a predominance of flattened profile, and mixed shall be defined as a combination of above.

The OPG print from individual patient was examined on an LED X Ray View box single screen which was available in OPD. It showed a full condylar view on both sides and tracing of condylar region was done on a Schooler shammer tracing paper sheet with an HB 21/2 pencil. Those traced images were evaluated by a consultant (Oral and Maxillofacial Surgeon) for the morphological shape of condyles to fit into one of the four types: rounded, angled, flattened & mixed. The relevant data was recorded in the data collection sheet.

III. RESULTS

In this study total simple size was 132 subjects were almost equally distributed in both genders in which males were n=65(49.2%) and females were n= 67 (50.8%). These details are graphically shown in fig 1.

The age range was 18–35 years with a mean age of 27.01 ± 5.779 years. The age group included in this study was from 18 to 35 years. The most common age group of the participants was 30-35 years with

59 (44.7%) subjects followed by those having age group of 18 to 23 years that had 49 (37.1%) subjects and 24 to 29 years with 24 subjects (18.2%). These findings are shown in table 1 ad fig 2.

The shapes of the condyles that have been identified are a) Angled b) Flattened c) Mixed and d) Rounded. The most common shape of left mandibular condyle in both genders was rounded 68(male:31, female:37) followed by mixed 25 (male:13, female:12), flattened 20 (male:10, female:10) and angled 19 (male:11, female:8). The most common shape of right mandibular condyle in both genders was rounded 64 (male:30, female:34) followed by mixed 31(male:15, female:16), flattened 21 (male:11, female:10) and angled 16 (male:9, female:7). There was no significant association found between the shape of mandibular condyle and gender (P>0.05). The cross tabulations of shapes of condyle with gender are expressed in table 2.

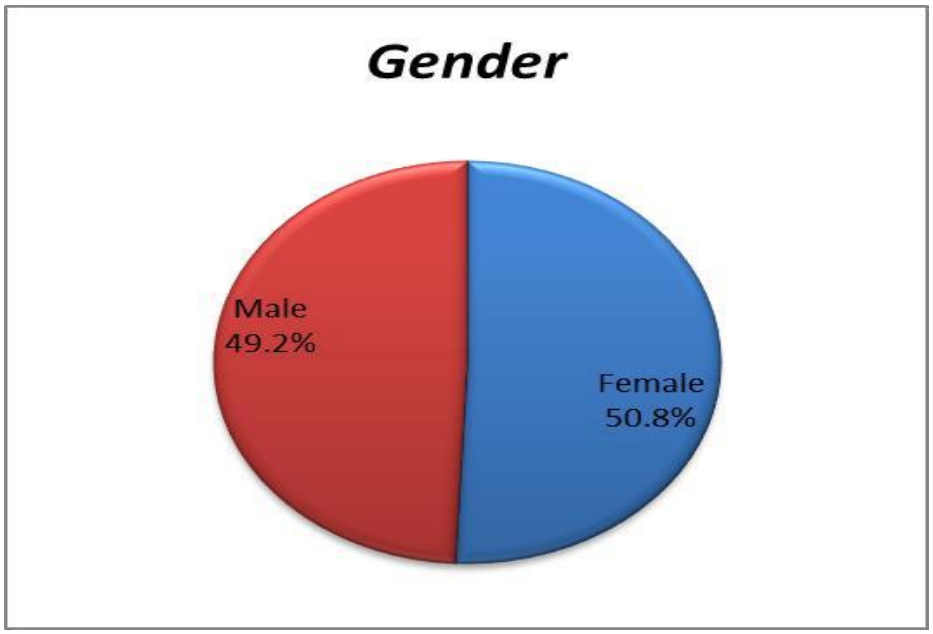

Figure. 1. Gender distribution of subjects included in the study.

Table 1: Distribution of age groups (N=132)

Age Group	Frequency (N)	Percentage %
18-23 Years	49	37.1
24-29 Years	24	18.2
30-35 Years	59	44.7
Total	132	100.0
Mean =27.01		SD = +5.779

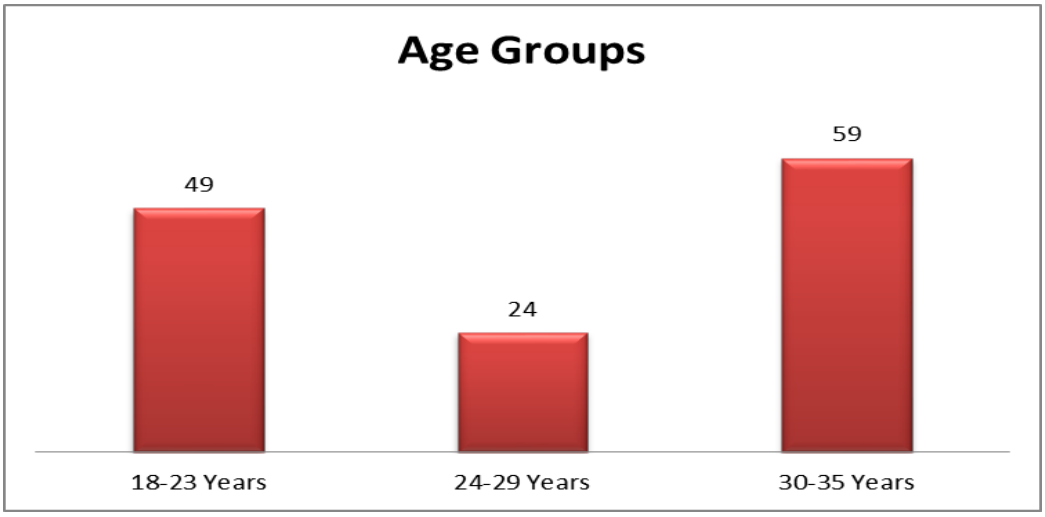

Figure2: Age groups

Table 2: Distribution of different shapes of the condyle with gender (N=132)

Condyle status	Shape	Gender		Total N (%)	P-Value
		Female N (%)	Male N (%)		
Left condyle	Angled	08(6.1%)	11(8.3%)	19(14.4%)	0.798
	Flattened	10(7.6%)	10(7.6%)	20(15.2%)	
	Mixed	12(9.1%)	13(9.8%)	25(18.9%)	
	Rounded	37(28.0%)	31(23.5%)	68(51.5%)	
	Total	**67**(50.8%)	**65**(49.2%)	**132**(100.0%)	
Right condyle	Angled	07(5.3%)	09(6.8%)	16(12.1%)	0.908
	Flattened	10(7.6%)	11(8.3%)	21(15.9%)	
	Mixed	16(12.1%)	15(11.4%)	31(23.5%)	
	Rounded	34(25.8%)	30(22.7%)	64(48.5%)	
	Total	**67**(50.8%)	**65**(49.2%)	**132**(100.0%)	

IV. DISCUSSION

This study determined whether gender was an important variable for the mandibular condylar shape and bilateral symmetry (left and right) in adult individuals of age group 18-35 years visiting Outpatient Department of Peshawar Dental College, Warsak Road Peshawar in a 6 months' time interval. The OPGs were examined for shape of mandibular condyle on an LED X Ray View box and traced on Schooler shammer tracing paper sheet with an HB2$^{1/2}$pencil.

There was no significant association found between the shape of mandibular condyle and gender (P> 0.05) (Table 2).

TMJ is a unique joint among other human body joints because it has many features both anatomically and functionally[15]. Knowledge of TMJ (temporomandibular joint) morphology play a key role in perceiving its growth and development including the capacity for remodeling of bone (skeletal characteristic) and phylogenic aspects[16]. The main site for the facial growth is mandibular condyle, which is expressed in an upward and backward direction[17,18].

The study of Singh and Chakrabarty[1] involved the participants of age range 14-45 years (male: 52, female:48) while in the current study, we involved the individuals of age range 18-35 years (males:65, females: 67). Age and gender involvement were slightly similar to the current study. After studying 200 mandibular condyles in 100 OPGs of humans in an antero-posterior dimension. The condylar shape was classified as rounded, mixed, flattened and angled. The recurrence of condyle/s shapes were dispersed as more remarkable of the rounded shape (41.0%) followed by angled (28.0%), flattened (19.0%) and mixed (12.0%)[1]. These findings agreed with our study that shows rounded shape of condyle (Left=51.5% and Right 48.5%), mixed shape of condyle (Left=18.9% and Right 23.5%), Flattened shape of condyle (Left=15.2% and Right 15.9%), angled (Left=14.4% and Right 12.1%) shape of condyle.

Sonal V et. al[10] conducted a consider comprising of 200 digitalized Orth pan-Tomogram (OPG) in which radiographic assessment of 400 heads of mandibular condylar were taken for schedule examination, after studying. Agreeing to them condyle was classified into four sorts. Out of the 200 sets of condylar heads assessed, 60.0% were oval, taken after by winged creature nose (29.0%), precious stone (9.0%), and slightest being slanted finger (2.0%). The foremost common shape of condylar head was oval which was found in 46% of male and 61% of females[10].

Anisuzzaman et al conducted a study on 500 condylar heads after observing 250 OPGs and classified the condylar shape in same manner and concluded almost similar results i.e., oval (68%) followed by winged creature nose (20.0%), precious stone (8.0%), and slightest being slanted finger (4.0%)[17].

A.H Shaikh et al radiographically evaluated 500 mandibular condylar heads in 250 OPGs and found that 50% were oval, 40 %-winged creature nose, 4.8% slanted finger and precious stone 4.8%[19]. The oval shape could be easily compared with findings of rounded shape in present study which showed that it was in accordance with our study in which we found rounded shape (68% left, 64% right) the most common occurrence in majority of population studied.

In the present study rounded shaped condyles are most common in both genders followed by mixed, flattened and angled shaped condyles (Table:2). However these results were not in accordance to a study conducted in India, in which the most frequently observed shape of the condyle among the males was angled (40.4%) followed by round (38.6%), convex (17.2%) and flat (3.5%) and amongst females was in the order of rounded (39.6%), angled (31.8%), convex (24.1%) and flat (4.3%)[11]. Another study conducted in Turkey was also not in agreement with the findings of present study and has concluded that the most common shape of mandibular condyle was analyzed as convex in 40.5%, angled in 34.3%, flat in 15.5%, round in 9.6% of the cases[20].

V. LIMITATION

This is a one point (OPD) and limited sample study further large sample size studies are recommended. This hospital-based study which may not really represent the Peshawar's population; further community-based studies in rural and urban areas of any locality will explore this area in detail.

VI. CONCLUSION

- Rounded shaped mandibular condyles were prevalent in both male and female patients followed by mixed, flattened and angled shaped condyles.
- The association between age group of participants with gender was not statistically significant.

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CONFLICT OF INTEREST

Conflict of interest is declared with research topic and not among authors.

REFERENCES

[1]. Singh M, Chakrabarty A. Anatomical variations in condylar shape and symmetry: Study of 100 Patients. Int J Sci Res. 2015;4(12):933-5.
[2]. Ashwinirani SR, Patil ST, Nair B, Rajmane Y, Kamala KA. Morphological variations of condylar process and sigmoid notch using Orthopantomograms in Western part of Maharashtra population. methods. 2018; 2:3.
[3]. Bhargava D, Gurjar P. Anatomy and Basic Biomechanics of the Temporomandibular Joint. in Temporomandibular Joint Disorders 2021 (pp. 9-21). Springer, Singapore.
[4]. Roberts WE, Goodacre CJ. The temporomandibular joint: a critical review of life-support functions, development, articular surfaces, biomechanics, and degeneration. Journal of Prosthodontics. 2020 Dec;29(9):772-9.
[5]. Cuccia AM, Caradonna C, Caradonna D. Manual therapy of the mandibular accessory ligaments for the management of temporomandibular joint disorders. Journal of Osteopathic Medicine. 2011 Feb 1;111(2):102-12.
[6]. Bordoni B, Varacallo M. Anatomy, head and neck, temporomandibular joint.2019
[7]. Mohamed HN, Ashmawy MS, Ekladious ME, Farid MM. Analysis of the relationship between condylar changes and anterior disc displacement with reduction: a preliminary study. Oral Radiology. 2022 May 13:1-0.
[8]. Ribeiro EC, Sanches ML, Alonso LG, Smith RL, Ribeiro E, Sanches M, SMITH R. Shape and symmetry of human condyle and mandibular fossa. Int J Odontostomatol. 2015 Apr;9(1):65-72.
[9]. Yale SH, Rosenberg HM, Ceballos M, Hauptfuehrer JD. Laminographic cephalometry in the analysis of mandibular condyle morphology: a preliminary report. Oral Surgery, Oral Medicine, Oral Pathology. 1961 Jul 1;14(7):793-805.
[10]. Sonal V, Sandeep P, Kapil G, Christine R. Evaluation of condylar morphology using panoramic radiography. Journal of Advanced Clinical and Research Insights. 2016;3(1):5-8.
[11]. Sahithi D, Reddy S, Teja DD, Koneru J, Praveen KN, Sruthi R. Reveal the concealed–Morphological variations of the coronoid process, condyle and sigmoid notch in personal identification. Egyptian Journal of Forensic Sciences. 2016 Jun 1;6(2):108-13.
[12]. Nah KS. Condylar bony changes in patients with temporomandibular disorders: a CBCT study. Imaging science in dentistry. 2012 Dec 1;42(4):249-53.
[13]. Singh V, Yadav Y, AR HP, Agarwal C. Assessing Evaluating and Correlating the Clinical Findings of Temporomandibular Joint Pathology with Orthopantomogram and Magnetic Resonance Imaging–A Cross-Sectional Study.2021
[14]. Ishwarkumar S, Pillay P, DeGama BZ, Satyapal KS. An optometric evaluation of the mandibular condyle in a black KwaZulu-Natal population. International Journal of Morphology. 2016 Sep;34(3):848-53.
[15]. Mathew AL, Sholapurkar AA, Pai KM. Condylar changes and its association with age, TMD, and dentition status: a cross-sectional study. International Journal of Dentistry. 2011 Oct 31;2011.
[16]. Christiansen EL, Thompson JR, Zimmerman G, Roberts D, Hasso AN, Hinshaw Jr DB, Kopp S. Computed tomography of condylar and articular disk positions within the temporomandibular joint. Oral surgery, oral medicine, oral pathology. 1987 Dec 1;64(6):757-67.
[17]. Anisuzzaman MM, Khan SR, Khan MT, Abdullah MK, Afrin A. Evaluation of mandibular condylar morphology by orthopantomogram in Bangladeshi population. Update Dental College Journal. 2019 Apr 27;9(1):29-31.
[18]. Enlow DH, Moyers RE, Merow WW. Handbook of facial growth. WB Saunders Company; 1982.
[19]. Shaikh AH, Ahmed S, Ahmed AR, Das G, Taqi M, Nisar S, Khan O. Assessment of radiographic morphology of mandibular condyles: a radiographic study. Folia Morphologica. 2022;81(2):481-6.
[20]. Yalcin ED, Ararat E. Cone-beam computed tomography study of mandibular condylar morphology. Journal of Craniofacial Surgery. 2019 Nov 1;30(8):2621-4.

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