

Maxillary Intermolar Width Of Pakistanis With Untreated Normal Occlusion

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ABSTRACT:

Objective: Intermolar width is a key measurement which assists in treatment planning of orthodontic patients requiring expansion as an alternate to premolar extraction. The present research was aimed at determining the mean value of intermolar arch width (IMW) of untreated normal arch Pakistani patients visiting tertiary care dental hospital

Material & Methods: This cross sectional study was carried out using IMW measurements on plaster model of 120 untreated normal occlusion patients, at Department of Orthodontics, Faisalabad Medical University and de'Montmorency College of dentistry, from 15-12-2016 to 15-10-2017. The non probability consecutive sampling technique was used in this study. Data analysis was done using SPSS software 21.0.0.

Results: The mean age of the subjects was 18.23±3.75 years. The mean value of IMW in selected subjects was 45.33±3.42 mm.

Conclusion: Study results concluded that in Pakistanis, ideally align maxillary arch and occlusion can be achieved with upper intermolar distances of 45.33±3.42 mm

Keywords: Intermolar; Dental arch width; Occlusion.

INTRODUCTION:

In determining the normal dental arch width of a population, intermolar width (IMW) is a key measurement which assists in diagnosis and treatment planning of orthodontic patients, especially in patients requiring expansion as an alternate to premolar extractions in a patient having narrow dental arches¹⁻³. Dental arch importance in orthodontic diagnosis, treatment planning and post treatment stability is well understood.

Numerous dental arch indices have been proposed, such as, Pont and Schwarz proposed numerical indices. Howe concluded that ideal IMW are 37.4 mm in boys and 36.2 mm in girls. However all indices gave poor estimation of maxillary arch width. For index validity, actual upper arch width should be as close as possible to predicted arch widths, in normal occlusion subjects.

There exist certain racial differences in terms of norms of

mean IMW width. IMW in Kuwait residents was 51.32 mm ± 2.61¹⁰, in Colombian subjects mean IMW was found to be 45.9±3.9, in Karachi population it was 45.6 mm±2.3, and in Nepalese it was 47.94±3.34. In general, IMW dimension remains very stable with some degrees of sexual dimorphism present. The findings of one study indicated that maxillary dental arch width measurements were significantly narrower in the Class III group as compared to normal occlusion group (P < .001)¹⁴.

This study was designed with aim to measure the mean IMW of subjects visiting Department of Orthodontics, Faisalabad Medical University and de'Montmorency College of dentistry, In orthodontics change of 1 mm is crucial while treatment planning decisions for extraction verses non-extraction orthodontic cases.

The Objective of current study was to measure the mean dental arch width i.e. IMW in our population.

MATERIAL AND METHODS:

This cross sectional study was conducted at Faisalabad Medical University and de'Montmorency College of Dentistry, from 15-12-2016 to 15-10-2017. 120 untreated normal occlusion patients was estimated as sample size, using 95% confidence level, d=1 with an expected IMW = 47.23 mm±2.65.¹⁰ Non probability consecutive sampling was employed. Following are the inclusion criteria:

- No history of Ortho-treatment
- Untreated normal occlusion patients
- 12 to 25 year age, both genders
- Patient having permanent dentition from 16 to 26

The exclusion criteria are:

- Partially erupted posterior teeth
- Grossly carious maxillary posterior teeth
- Rotations of upper posterior teeth
- Incisor irregularity

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Received: 12-12-17
Accepted: 26-06-18

After ethical review committee (ERC) approval, sample of 120 untreated normal occlusion patients were included according to inclusion and exclusion parameters. IMW was calculated on plaster models by single investigator, as the distance from upper one side first permanent molar to the same on other side at distobuccal cuspal tip on the occlusal surface, using digital caliper. Ideal occlusion patients were those who got following features¹⁰:

- Lack of crowding, spaces, cross bite, CO-CR shift, midline discrepancy in anterior or posterior part of either arch
- Normal overjet and
- Normal overbite

Data analysis was done with SPSS software version 21.0.0. Mean and standard deviation (S.D) was calculated for mean IMW, frequency and percentage for gender. Effect modifiers of age and gender were stratified. Following stratification chi square test was applied. p value =0.05 was taken as significant.

RESULTS:

The mean age of selected sample was 18.23±3.75 years. The minimum age of the patient was 12 years while the maximum age was 25.60(50%) patients were boys and 60(50%) patients were girls. Overall mean value of IMW was 45.33±3.42 mm. The minimum IMW in the patient was 40 mm while the maximum IME was 50 mm (Chi value 1.92 p - value 0.165).

≤20 years age subjects were 82, in which 45 mm IMW was calculated in 46 cases, similarly >20 years patients were 38, in which 45 mm IMW was found out to be in 7 cases only. There was insignificant differences of IMW for different age and gender groups (Table 1).

DISCUSSION:

Inter molar width is one of the key calculation for measuring and access the posterior maxillary arch normality^{15,16}. As per Moorrees et al.¹⁷ mandibular IMW usually increased in late mixed dentition and early permanent dentition but remained constant following permanent dentition.

In present research, the mean IMW of selected sample was 45.33 mm±3.42, which is different from the studies conducted elsewhere. In Norwegian sample, mean IMW was found out to be 46.11 mm¹⁸. Measured mean IMW in Kuwait

population was 51.32 mm ±2.61, in Colombian sample mean IMW was 45.9 ±3.9, in a study done in Karachi it was 45.6 mm ±2.3, and in Nepalese population it was 47.94 mm ±3.34. The upper IMW at the distobuccal cusps of the first molars of the Pakistanis were narrower than Chinese and Caucasians^{19,20,21}. Comparison of IMW values of current study with different local and international studies is difficult, due to the fact that most of the conducted studies on IMW measurement used different landmarks for measuring the intermolar width.

In present research, IMW values were greater in girls (46.30 ±3.06 mm) than in boys (44.37 ±3.53 mm), which is not in agreement with previous studies where IMW values were greater in males than in females^{11,22-28}. In present research, there was no statistically significant difference of IMW values for different ages, which is again not in agreement with previous studies^{17,29-30}. These differences may be due to the racial, genetic and dietary differences among various populations, as all of these factors play important role in development of arch length width and other dimensions.

Because of the lack of reference data for Pakistanis and the limited validity of existing methods to predict IMW widths, the purpose of this research was to calculate the mean IMW of upper arch in Pakistanis. However further large scale studies are suggested with improved sample size and multi-centric approach.

CONCLUSION:

Study results concluded that in Pakistanis, ideally align maxillary arch and occlusion can be achieved with upper intermolar distances of 45.33±3.42 mm.

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Inter molar width		Mean	SD	
	≤20 years	44.83	3.22	t-value -1.26 p-value 0.127
	>20 years	46.42	3.65	
	Male	44.37	3.53	t-value -1.70 p value 0.094
Female	46.30	3.06		

Table 1: Comparison of inter molar width with Age & Gender

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