MESIODISTAL DIMENSION OF MAXILLARY ANTERIOR TEETH: THEIR CLINICAL IMPLICATIONS

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ABSTRACT

The size and form of the maxillary anterior teeth are important in achieving pleasing dental and facial esthetics[1,2]. However, little scientific data have been defined as criteria for evaluating these morphological features. Purpose of this study was to determine mesio-distal dimension of six maxillary anterior teeth at two different points i.e. from contact point to contact point and from mesio-labio-incisal point angle to disto-labio-incisal point angle so that excellence in treatment can be achieved. Gypsum casts of 100 full dentate Pakistani adult (14-36 years) representing, with well aligned maxillary anterior teeth and minimal attrition were included in this study. Following conclusions were drawn: 1) Mesio-distal dimensions of six anterior maxillary teeth at two different areas i.e. measured from contact point to contact point (mesiodistal width of maxillary central incisors (R & L) 8.70±0.53 & 8.71±0.53 respectively, maxillary lateral incisors (R & L) 7.00±0.62 & 7.04±0.66 respectively and maxillary canine (R & L) 7.84±0.51 & 7.82±0.51) and measured from mesio-labio-incisal point angle to disto-labio-incisal point angle (mesiodistal width of maxillary central incisors (R & L) 8.10±0.52 and 8.10±0.53 respectively, maxillary lateral incisors (R & L) 6.46±0.61 & 6.53±0.62 respectively and maxillary canine (R & L) 6.97±0.48 & 6.95±0.52) respectively was established as an aid for appropriate diagnosis and treatment out come in different domains of dentistry. 2) Statistically significant correlation existed for each pair between right side anterior maxillary teeth and left side anterior maxillary teeth.

Key words: *Mesio-distal width of Maxillary Anterior Teeth, Contact point-contact point dimension, mesio-labio-incisal point angle to disto-labio-incisal point angle*

INTRODUCTION

Proportionate mesio-distal and vertical dimension of the maxillary anterior teeth is important in achieving pleasing dental and facial esthetics.[1-3] However, little scientific data exists as far as evaluation of these morphological features is concerned. Diagnosis and treatment planning in different fields of dentistry is shifting form macro to micro esthetics and not only the dentists but even patients are now more aware of dental esthetics and its relationship with nose-lip-chin in resting stage as well as during social and non-social smile. Treatments are thus now not only aimed for aligning anterior teeth rather they are aimed for achieving balance and harmony of maxillary anterior teeth during dynamics. Orthodontist aims for achieving ideal maxillary anterior teeth positioning and inclination so that they could have a good impact on nasio-labial angle, lip prominence and facial harmony, which can't be obtained until and unless maxillary anterior teeth dimensions are near to norms and in balance with lower teeth (Bolton Analysis), otherwise either intra-oral problems like crowding, deepbite or abnormal incisor inclination occurs or extra-oral problems like nose-lip-chin harmony can not be idealized.[4,6] Restorative dentists aim for achieving this harmony by provid-

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ing different restorations ranging from enama-loplasty to composites, laminates, crowns, bridges and implants.[7,8] Prosthodontist aims for selecting mesiodistal dimension of teeth in balance and harmony with facial type.[9-10] Thus all dentists need to now about the ideal mesio-distal dimensions of all teeth and specially the maxillary anterior six teeth so that they can achieve the excellence in treatment.[11, 12]

It is not only important to know about mesio-distal dimension of these teeth from contact point to contact point rather it is equally important to have their mesio-distal dimension at the level of incisal edge. Until and unless entire mesio-distal dimension is known ideal treatment outcomes can not be achieved. Aim of this study was thus to determine mesio-distal dimension of six maxillary anterior teeth at two different points i.e. from contact point to contact point and from mesio-labio-incisal point angle to disto-labio-incisal point angle so that ideal management of these teeth could be possible.

METHODOLOGY

100 full dentate Pakistani adult (14-36 years) representing, with well aligned maxillary anterior teeth and minimal attrition, to Faculty of Dentistry, The University of Lahore, participated in this study. Gypsum casts of the maxillary arches of the subjects were made and mesio-distal dimensions of the maxillary anterior teeth form two different areas i.e. from contact point to contact point, and from mesio-labio-incisal point angle to disto-labio-incisal point angle was noted using digital vernier caliper.

STATISTICAL METHOD

SPSS 16.0 was used for statistical evaluation.

1   Mean, Standard Deviation, Variance, Minimum & Maximum value and Range were calculated for each variable for each subject.

2   Right side meio-distal tooth dimensions were compared with left side mesio-distal tooth dimensions.

RESULTS

Study was conducted on 100 patients from age 14 to 36 years with mean age 24.03 years ± 7.75. Mean, Standard Deviation and variance for Mesio-distal widths of each of the six anterior teeth measured from contact point to contact point and measured from mesio-labio-

TABLE 1: MESIO-DISTAL WIDTH OF SIX ANTERIOR TEETH AT CONTACT POINT-CONTACT POINT

	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Tooth 6	2.60	6.60	9.20	7.84	0.51	.26
Tooth 7	3.40	5.20	8.60	7.00	0.62	.39
Tooth 8	3.10	7.20	10.30	8.70	0.53	.28
Tooth 9	2.90	7.40	10.30	8.71	0.53	.28
Tooth 10	3.20	5.10	8.30	7.04	0.66	.44
Tooth 11	2.10	6.60	8.70	7.82	0.51	.26

TABLE 2: MESIO-DISTAL WIDTH OF SIX ANTERIOR TEETH AT MESIO-LABIO-INCISAL POINT ANGLE TO DISTO-LABIO-INCISAL POINT ANGLE

	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Tooth 6	3.20	4.70	7.90	6.97	0.48	.24
Tooth 7	2.80	4.90	7.70	6.46	0.61	.38
Tooth 8	2.80	6.70	9.50	8.10	0.52	.27
Tooth 9	2.80	6.70	9.50	8.10	0.53	.28
Tooth 10	3.20	4.80	8.00	6.53	0.62	.39
Tooth 11	2.70	5.40	8.10	6.95	0.52	.27

TABLE 3: PAIRED SAMPLES CORRELATIONS MESIO-DISTAL WIDTH OF SIX ANTERIOR TEETH AT CONTACT POINT-CONTACT POINT

		Correlation
Pair 1	Tooth 6-Tooth11	.791
Pair 2	Tooth 7-Tooth10	.786
Pair 3	Tooth 8-Tooth 9	.896

TABLE 4: PAIRED SAMPLES CORRELATIONS MESIO-DISTAL WIDTH OF SIX ANTERIOR TEETH AT MESIO-LABIO-INCISAL POINT ANGLE TO DISTO-LABIO-INCISAL POINT ANGLE

		Correlation
Pair 1	Tooth 6-Tooth11	.789
Pair 2	Tooth 7-Tooth10	.802
Pair 3	Tooth 8-Tooth 9	.806

incisal point angle to disto-labio-incisal point angle was calculated and shown in Tables 1 & 2.

More over statistically significant correlation existed for each pair between right side anterior maxillary teeth and left side anterior maxillary teeth as measured from contact point to contact point and measured from mesio-labio-incisal point angle to disto-labio-incisal angle as shown in Table 3 & 4.

DISCUSSION

One of the prime goals of dentists is to improve anterior maxillary transition there by improving the facial esthetics and the masticatory efficiency, which becomes frustrating in the presence of crown-size discrepancies. It is thus essential for the clinician to know the size of individual tooth and groups of teeth, to make an adequate diagnosis and treatment plan.[13]

Isa ZM et al in their study on 60 full dentate Malaysian adults (18-36 years) representing 2 ethnic groups (Malay and Chinese), with well aligned maxillary anterior teeth and minimal attrition found that the mesiodistal diameters of the maxillary central incisors, lateral incisors, and canines were 8.54 ± 0.50, 7.09 ± 0.48, and 7.94 ± 0.40 mm[14], respectively while in our study mesiodistal width of maxillary central incisors (R & L) from contact point to contact point was 8.70 ± 0.53 & 8.71 ± 0.53 respectively, mesiodistal width of maxillary lateral incisors (R & L) from contact point

to contact point was 7.00 ± 0.62 & 7.04 ± 0.66 respectively and mesiodistal width of maxillary canine (R & L) from contact point to contact point was 7.84 ± 0.51 & 7.82 ± 0.51 respectively showing that maxillary central incisors are slightly of a bigger mesiodistal dimension in our sample while maxillary lateral incisor & canines are of a little smaller size that of Malaysian group.

Hasanreisoglu U et al in their study on 100 Turkish students found that as a whole the existence of the so-called "golden proportion" for the maxillary anterior teeth does not exist. Differences emerged when the mean ratios between various perceived widths were compared with the ideal golden ratios (P<.01).[15] Same was found for our sample.

Magne P, Gallucci GO, Belser UC in their study on 146 Swiss patients found that there was no influence of the incisal wear on the average value of W (width) within the same tooth group. The widest crowns were those of central incisors (9.10 to 9.24 mm) > canines (7.90 to 8.06 mm) > lateral incisors (7.07 to 7.38 mm). Same pattern was found in our study however in general, mesiodistal dimensions of teeth under study were less than in Swiss sample.[16]

Ali Fayyad M, Jamani KD, Agrabawi J in their study on 376 Sudani students concluded that both the golden proportion and the RED proportion are unsuitable methods to relate the successive widths of the maxillary anterior teeth. However, the golden percentage theory seems to be applicable to relate the successive widths of the maxillary anterior teeth if percentages are adjusted taking into consideration the ethnicity of the population. Same was found in our study[17] i.e. ethnicity has an impact on tooth width and so Gold Standards are not applicable on every population.[18-23]

Present study thus established the mesio-distal widths of each of the six maxillary anterior teeth for Pakistani sample. Mesio-distal widths of each of the six anterior teeth was measured from contact point to contact point and from mesio-labio-incisal point angle to disto-labio-incisal point angle in this study which is its uniqueness as no other study of this kind is seen in literature. In general mesio-distal widths measured from contact point to contact point are larger than mesio-distal width measured from mesio-labio-incisal point angle to disto-labio-incisal point angle as shown in Table 1 & 2.

In this study we compared the mesio-distal widths of right sided maxillary anterior teeth with the mesio-distal widths of left sided maxillary teeth at two different areas and statistically insignificant difference in dimensions was found between right & left sided teeth as shown in table 3 & 4.

Ideal treatment outcomes thus can't be achieved until & unless exact dimensions of teeth are not known and this study was an effort to establish the same for maxillary anterior teeth.

CONCLUSION

Mesio-distal dimensions of six anterior maxillary teeth at two different areas i.e. measured from contact point to contact point (mesiodistal width of maxillary central incisors (R & L) 8.70 ± 0.53 & 8.71 ± 0.53 respectively, maxillary lateral incisors (R & L) 7.00 ± 0.62 & 7.04 ± 0.66 respectively and maxillary canine (R & L) 7.84 ± 0.51 & 7.82 ± 0.51) and measured from mesio-labio-incisal point angle to disto-labio-incisal point angle (mesiodistal width of maxillary central incisors (R & L) 8.10 ± 0.52 & 8.10 ± 0.53 respectively, maxillary lateral incisors (R & L) 6.46 ± 0.61 & 6.53 ± 0.62 respectively and maxillary canine (R & L) 6.97 ± 0.48 & 6.95 ± 0.52 respectively) was established as an aid for appropriate diagnosis and treatment out come in different domains of dentistry. Statistically significant correlation existed for each pair between right side anterior maxillary teeth and left side anterior maxillary teeth.

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