Intercommissural Width in 4 Racial Groups as a Guide for the Selection of Maxillary Anterior Teeth in Complete Dentures

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Purpose: To determine whether intercommissural width is a reliable guide for the selection of maxillary denture teeth width. ***Materials and Methods:*** Casts were made of 160 subjects from 4 different racial groups. Locations of intercommissural width landmarks (the corners of the mouth) were made on the subjects and transferred to the casts. The distances between the corners of the mouth and the distal of the canines were measured on the casts and compared. ***Results:*** A weak correlation was found between the distal of the canines and the distance between the corners of the mouth in the 4 racial groups. ***Conclusion:*** The use of the corners of the mouth for the selection of artificial teeth is generally inaccurate. *Int J Prosthodont 2005;18:513–515.*

The selection of artificial teeth for edentulous patients is difficult when preextraction records are not available. Errors at this stage can often result in patient rejection of otherwise well constructed, comfortable, and efficient dentures. Various guidelines have been suggested for determining the width of the maxillary anterior teeth. The curve distance between the corners of the mouth, which supposedly represents the curve distance between the distal surfaces of the maxillary canines,[1] is often used. Previous studies[2,3] have attempted to evaluate the relationship between the corners of the mouth and the distal of the canines but showed no significant relationship. However, most of the studies were conducted in Caucasian population samples, with little noted about other races. In 1992, Johnson[4] pointed out that the knowledge of racial norms for facial appearance might aid practitioners, since the treatment given would then be in harmony with the facial appearance for patients of different races. The purpose of this article is to evaluate the use of the distance between the corners of the mouth, the intercommissural width, as a guide for the selection of maxillary denture teeth of proper width in subjects from 4 racial groups.

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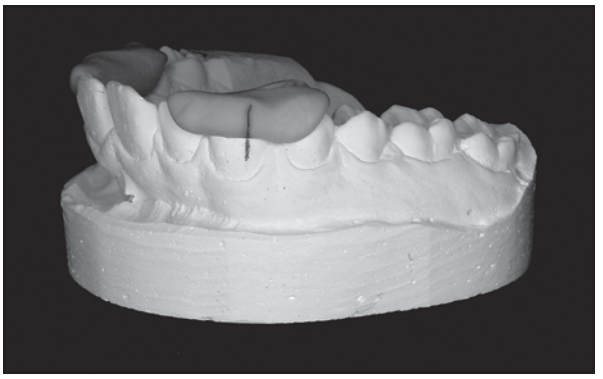

Fig 1 The mark corresponding to the corner of the mouth is transferred to the cast.

Fig 2 Dental tape is placed at the greatest curvature and sectioned by a blade.

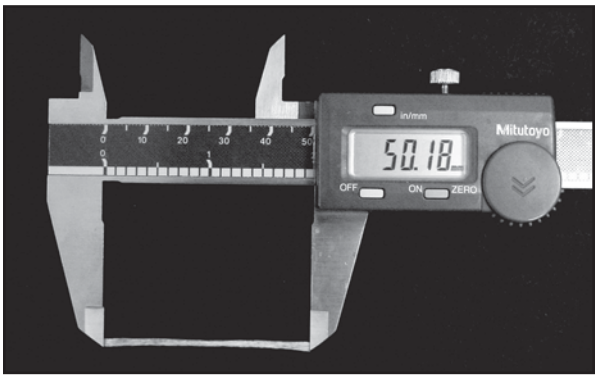

Fig 3 Dental tape is measured with the sliding caliper.

Materials and Methods

One hundred sixty subjects (40 whites, 40 blacks, 40 persons of mixed white and black ancestry (Mulatto), and 40 Asians of both sexes ranging from 18 to 33 years of age were selected. They all had natural permanent maxillary teeth in good alignment, with no history of orthodontic treatment, and they had no congenital or surgical facial defects. A maxillary stone cast was made of each patient from an irreversible hydrocolloid impression. Directly on the mouth, 2 removable screens were fabricated with silicone. Each screen covered the canine and extended to the lateral incisor and the first premolar. The location of the corners of the mouth was marked on the buccal surface of the screens with a pointer. The screens were removed from the mouth and positioned on the cast. The marks were transferred to the cast with graphite (Fig 1). The distance between the marks corresponding to the corners of the mouth (CM) was measured using a dental tape placed at the greatest curvature of the arch, sectioned at the locations of the marks, and measured with a sliding caliper (Figs 2 and 3). The distance between the distal of the canines (DC) was measured in a similar manner. Each measurement was repeated 3 times. The Pearson correlation coefficient was used to determine the relationship between the referred measurements.

The selection error resulting from the application of this method was determined, defined as the difference between the width of the artificial teeth estimated by the method and the real width of the natural teeth, ie: CM minus DC. In addition, a prediction was made of the percentage of subjects of the white, mixed white and black ancestry, black, and Asian populations (using a 95% confidence interval) in which this error would be within 0 and 2 mm, within 2 and 4 mm, and greater than 4 mm.

One-way analysis of variance was used to determine whether CM and DC and the selection errors were significantly different among races. The Tukey test compared means where statistically significant differences were found ($P < .05$).

Results

The mean values obtained for CM and DC and the result of the Tukey test are shown in Table 1. Pearson correlation analysis showed a weak correlation between DC and CM in the 4 racial groups. The following coefficients (r) were obtained: whites = 0.447, mixed white and black ancestry = 0.518, blacks = 0.516, and Asians = 0.291. Table 2 contains information regarding selection errors resulting from use of the intercommissural width for the selection of the artificial teeth.

Table 1 Values for the Distances Between the Corners of the Mouth (CM) and Between the Distal of the Canines (DC)

Measurements/ statistic (mm)	White	Mulatto	Black	Asian
CM*				
Minimum	36.76	40.62	40.83	32.90
Maximum	55.83	58.15	65.07	51.54
Mean	47.02[a]	48.12[ab]	50.33[b]	43.10[c]
SD	4.46	4.60	5.70	4.35
DC*				
Minimum	44.45	45.32	46.32	42.98
Maximum	58.16	60.39	61.47	59.87
Mean	52.12[a]	53.35[a]	55.61[b]	53.04[a]
SD	3.23	3.91	3.19	2.87

Equal letters ([a, b, c]) indicate that the Tukey test showed no significant difference ($P < .05$).
*$P = .0000$.

Table 2 Information Regarding the Selection Errors Resulting from the Use of the Intercomissural Width for the Selection of the Tooth Width

Information	White	Mulatto	Black	Asian
Error statistics (mm)*				
Largest error for wider teeth	0.96	4.26	5.53	0.28
Largest error for narrower teeth	–13.98	–12.51	–14.77	–18.74
Mean	–5.10[a]	–5.23[a]	–5.28[a]	–9.95[b]
SD	4.18	4.22	4.89	4.46
Prevision of errors (%)				
Within 0 and 2 mm	18.5	17.9	18.3	3.4
Within 2 and 4 mm	19.7	19.2	18.5	5.7
Greater than 4 mm	61.8	62.9	63.2	91

Equal letters ([a, b]) indicate that the Tukey test showed no significant difference ($P < .05$).
*$P = .0000$.

Discussion and Conclusion

The correlation found between the measurements of the distal of the canines and the corners of the mouth was not high enough to be used as a predictive factor in the 4 racial groups studied. The use of the corners of the mouth for the selection of the artificial teeth width would lead, in general, to the selection of narrower teeth. In a high percentage of subjects, the intercomissural width would lead to selection errors greater than 4 mm. Within the limitations of this study, such as classifying the racial groups without subdivisions, the results suggest that the method is inaccurate for the 4 racial groups, rendering the worst result for the Asian group.

References

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Literature Abstract

Reproducibility of tooth color gradation using a computer color-matching technique applied to ceramic restorations

The purpose of this in vitro study was to evaluate the accuracy of reproducing color gradation for ceramic restorations using a spectrophotometer and a prototype computer program. Ten shade tabs from the Vitapan 3D Master shade guides were selected and measured at 4 regions from cervical to incisal. For each shade tab measured, 3 tooth shape ceramic specimens were fabricated. The color of the 10 shade tabs and their corresponding 3 tooth shape ceramic specimens were then measured in 10 incremental areas from gingival to incisal. The color differences between the shade tabs and their corresponding ceramic specimens were calculated. The color differences were then analyzed using Repeated Measured ANOVA. Three prosthodontists visually assessed the clinical acceptability of the corresponding ceramic specimens to the matched shade tabs. The mean color differences were clinically acceptable (below 3.6 ïï) for incremental areas from 3 to 10, but not clinically acceptable for areas 1 and 2 (gingival area). The visual assessment resulted in all fabricated samples having a clinically acceptable color match to their corresponding shade tab.

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