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ORIGINAL ARTICLE

Correlation assessment between inter-commissural width and maxillary inter-canine teeth in south-west population of Sindh Pakistan.

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ABSTRACT… Objectives: To find out the correlation between inter commissural width and maxillary inter canine width. **Study Design:** Cross-sectional Research. **Setting:** Department of Prosthodontics Dental OPD LUHMS Jamshoro. **Period:** June to December 2021. **Material & Methods:** A total of 100 patients with maxillary impressions of patient were taken in metal perforated stock trays with irreversible Hydrocolloid impored immediately with dental stone type IV for making the study cast. Questionnaire mode of research instrument was used for the data acquisition during patient treatment. In parallel with maxillary anterior teeth selection and inter-commissural width determination by using Vernier calliper, the inter-canine distance was also assessed. **Results:** About 100 patients were assessed maxillary anterior teeth selection, and inter-commissural width. The mean age of the study participants was recorded as 21.52±2.83 years. Whereas 63% patients were male. The overall statistical calculations showed a significant positive correlation (r=0.73; p=0.0005) between and the inter-commissural width and maxillary inter-canine teeth. **Conclusion:** Based on the findings, the study concludes that there is a significant correlation between inter-commissural width and maxillary inter-canine teeth among the south-west population in Sindh.

Key words: Inter-commissural Width, Maxillary Inter-canine Width, Maxillary Impression.

INTRODUCTION

For an edentulous patient, anterior teeth selection is the most challenging and confusing step for a dentist to restore facial appearance to structural miniature. Restoration of facial appearance, normal teeth physiology, and aesthetically pleasing placement are the primary concerns of the patients while seeking prosthodontic treatment.[1] To ensure patient concerns, satisfaction and safe prosthodontic treatment, anterior maxillary teeth selection and size determination are the key interventions made by a dentist. Improper anterior maxillary teeth selection and size determination has long-lasting impact over the patient physical appearance, tooth physiology and comfort.[2] In many cases where, patients do not have the record of pre-extraction teeth and anterior teeth selection by using artificial reference teeth require complex set of guidelines to understand. The major guidelines include, measuring inter-cathal distance, inter-alar distance, bizygotic width, and inter-canine width measurement by using Vernier caliper.[3-4] In contrast, if a patient does have an intact natural tooth, in that case artificial teeth can be used as a reference tooth very easily.[4] Focusing on more specific parameters helping in anterior maxillary teeth selection include, size of the patient face, maxillary arch, papilla, residual ridges, lips, nasal width and inter-canthal.[5]

In parallel with subject methods Beery's method inter-alar width determination method is also used for anterior teeth selection.[6-7] Removable prosthesis method is considered least effective in anterior teeth selection in complete edentulous patients.[8-9] The selection of appropriate method for anterior teeth selection among completely edentulous patients still faces confusion and

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miss-interpretation. The purpose of current study is to find out the correlation between inter commissural width and maxillary inter canine width in south-west population in Sindh, Pakistan.

MATERIAL & METHODS

A descriptive cross-sectional study was conducted after getting approval from the Research and Ethics committee of LUMHS, Jamshoro CPSP/ REU/DSG-2016-166-1845 at the Department of prosthodontics dental OPD LUHMS Jamshoro for six months from June 16th 2021 to December 16th 2021. Patients aged ranging 18-30 years, belonging to either gender, with negative history of orthodontic treatment, have no missing teeth, without gingival problems and dental spaces visited the OPD for fixed partial dentures were included in the study. While patients with supra-erupted teeth, developmental dental anomalies, tooth surface loss due to abrasion, attrition, and fracture-related patients were excluded from further clinical assessment. Patients were selected using a non-probability sampling technique while the World Health Organization (WHO) recommended sample size calculation formula was used for sample size calculation at a 95% confidence interval.

After getting informed consent from patients, the socio-demographic information was recorded in a pre-designed written questionnaire.

The Maxillary impression of the patient was taken in metal perforated stock trays with irreversible Hydrocolloid impression material (Phase Plus, Zhermack Spa) and poured immediately with dental stone type IV (Elite Rock Zhermack) for making the study cast. Vernier calliper was used for the assessment of inter-canine distance. Initially, distal points of the right and left points of maxillary canines were identified and measured for inter-commissural width calculations. All the information was entered and statistically analyzed in SPSS version 17. Patient information was recorded as frequency and percentages as well as mean and standard deviation. Pearson correlation was calculated for the assessment of inter-commissural width and inter-canine width correlation. A p-value at <0.05 was considered significant.

RESULTS

About 100 clinically confirmed edentulous patients were included in this study. The majority (n=63, 63.0%) of patients were male compared to their female counterparts (n=37, 37.0%) The mean age of the patients was calculated as 21.52±2.83 years (range 19-30 years). Whereas, most of the patients belong to aged ≤ 25 years (Figure-1).

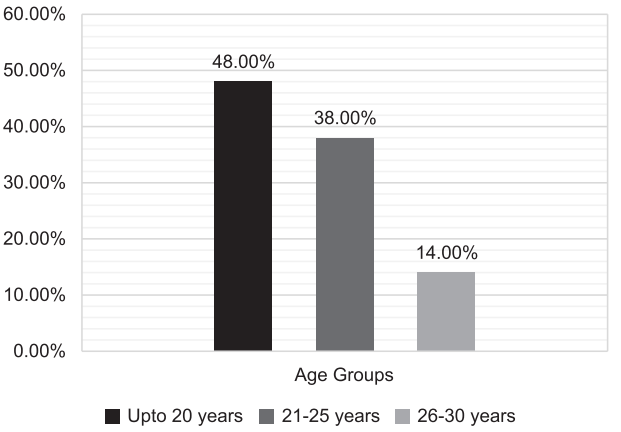

Figure-1. Age distribution of the patients (n=100)

The mean maxillary inter-canine width and inter-commissural width of study patients were 38.83±2.57 mm and 29.86±2.91 mm respectively. There was a statistically significant correlation ($p<0.05$) between maxillary inter-canine width and inter-commissural width was observed.

Figure-2 is demonstrating the scatter plot of the linear relationship between maxillary inter-canine width and inter-commissural width. A positive Pearson correlation (r=0.68; p=0.0008) between maxillary inter-canine and inter-commissural width was observed (Figure-2).

In demonstrating the differences between Scatter plots used for maxillary inter-canine width and inter-commissural width data representation, a positive Pearson correlation (r=0.73; p=0.0005) between maxillary inter-canine and inter-commissural width was observed. (Figure-3).

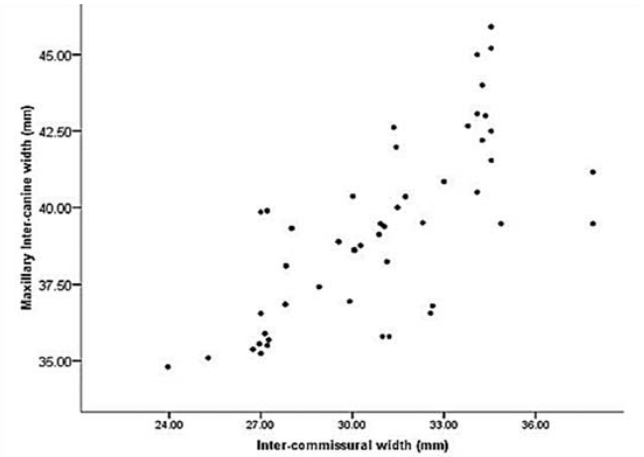

Figure-2. Scatter plot of linear relationship between maxillary inter-canine width and inter-commissural width

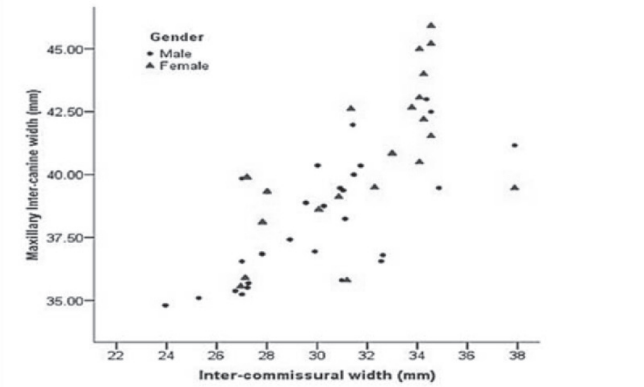

Figure-3. Scatter plot of the linear relationship between maxillary inter-canine width and inter-commissural width among male and female

DISCUSSION

Replacement of missing teeth was a major concern to restore esthetics and function. In the case of a completely edentulous patient, a complete denture is essential to prevent atrophy of muscles and to help in mastication.[10] Fabrication of a complete denture depends on various parameters which determine its success. One such parameter is anterior teeth selection which plays a major role in determining esthetics. Several studies have been done to estimate and correlate the use of various extra-oral and intraoral landmarks to determine the anterior teeth in edentulous patients.[11,12,13] Our study demonstrated a strong positive correlation between the two parameters which emphasizes the fact that in the absence of pre-extraction records, anterior teeth selection can be done using the inter-commissural width of the patient at rest. This is in accordance with the study conducted by Ayub et. al. in estimating the dimensions of anterior teeth in the Kashmiri population. Although there was a weak but significant correlation between the inter-commissural width and anterior teeth dimensions which is contradictory to this study results, there is a strong positive correlation between the parameters.[14]

However, the study conducted by Kini and Angadi showed similar results with this study and established a significant positive correlation between the parameters.[15] Deogade et al. in their study stated that variations in the values may occur due to different measuring techniques used and the various population groups involved in the study. This study also showed a strong positive correlation between the parameters which is in accordance with the present study.[16] A study by Liu showed that inter-canine was ± 4 mm from the commissures, but another study showed that there was no significant correlation between inter-canine distance and inter-commissural width in anterior teeth selection.[17] Another study showed that the patients prefer the lesser width of artificial teeth in prosthesis when compared to the width of their natural teeth.[18] However, there are little data in literature stating the accurate guidelines for anterior teeth selection. This shows that more than one parameter should be assessed for accurate prediction of the width of anterior teeth in determining teeth selection[19]

Certain authors believe the use of facial measurements provides better accuracy in teeth selection. These measurements are made with the help of easily located constant reference points usually facial landmarks and are compared with the width of anterior teeth. Feuki proposed a similar method using “Anthropometric Cephalic Index” in which anterior teeth was selected by dividing transverse circumference of the head by 13 or by dividing the bizygomatic width by 3.3. According to Sears study, tooth length was compared to the length of the face.[20] Hence, it is concluded by various researchers that anthropometric analysis done within similar

population groups and their interrelationship with the natural teeth measurements using pre-extraction records help in better determination of anterior teeth selection for edentulous patients.[16]

Due to limited time and resources, only a single center was selected for conducting the study. Our study outcomes are smaller population-based as existing variations of this new method may varies from patient to patient. Moreover, limited and scares national or local data was available. Further research is required to project the outcomes based on a larger population group focusing multiple ethnic groups and localities.

CONCLUSION

Based on the findings, the study concludes that there is a significant correlation between inter-commissural width and maxillary inter-canine teeth among the south-west population in Sindh.

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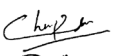
1	Champa Kumari	Principal investigator, Patient selection.	
2	Anny Memon	Patient acquisition, Clinical drafting.	
3	Muhammad Muslim Khahro	Quality assessment, Manuscript writing.	
4	Muzaffar Qayum Khan Ghauri	Data compilation literature search.	
5	Asia Wali	Data analysis & results.	
6	Vishal Dherwani	Patient monitoring, Methodology, Study design.