EVALUATION OF CLOSEST SPEAKING SPACE IN DIFFERENT ANGLE'S CLASSIFICATION OF OCCLUSION

ABSTRACT:

Aim: To determine closest speaking space in different Angle's malocclusion classes.
Study design: Descriptive Cross Sectional
Place and Duration of Study: .Department of Prosthodontics, Liaquat University of medical and Health Sciences Hospital during period of July 2021 - Dec 2021
Methodology: Total 111 Patients from both genders with age range 18-45 with intact 1st and 2nd premolars were alginate impressions were taken. Polysiloxane Elastomeric impression material bites in 1.5cm thickness were placed bilaterally on occlusal surfaces of mandibular premolars and molar teeth in patients oral cavity. Patients were instructed to swallow and repeat the Sindhi Language word "SASSI"
The elastomeric material bite blocks were removed and thickeness was noted down for each patient at premolar region using digital vernier calliper. The measurements were recorded in millimetres.
Results: A total of 111 patients were examined, with an average age of 35 years and a range of 18 to 45 years (Table 1). Males made up 56 % of the population, while females consists of 44 % (Figure 1). According to occlusion, the majority of patients had class I 50 (45 %), class III 29 (26.1 %), and class II div I and II 16 (14.4 %) correspondingly (Table 2). According to the mean closest speaking space, it was highest in class II div II 7.05$\pm$2.38 mm and in class II div I 4.81$\pm$3.47 mm, with 2.02$\pm$0.75 mm in class I and 1.20$\pm$1.08 mm in class III (Table 3).
Conclusion: It was concluded that closest speaking space was significantly increased in angles class II patients whereas decreased in angles class III

Keywords: closest speaking space, occlusion, angles classification, OVD

1. INTRODUCTION:

Occlusal vertical dimension (OVD) is the maxillary contact with mandibular occlusal teeth surface at recurrent contractile distance of elevator muscles [1]. Several approaches have been used to determine OVD, the most frequent of which are clinical rest position and phonetics. [,2,3,4] Silverman proposed that the production of sibilant sound during phonetics necessitates a 1-2mm space between the maxillary and mandibular teeth, which he refers to as Closest speaking space (CSS).[,3,5] Its determination is critical in the fabrication of all restorations, with CSS being used to measure correct vertical dimensions of occlusion.[6] It varies between occlusion classes, depending on anatomic and morphologic factors.[7] According to a study conducted by Pounds, the value of CSS varies between 1.5 and 3mm in class I, less than 2mm in class III, and up to 10mm in class II occlusion, but Burnett and Clifford contradicted the above study by finding only fluctuation in class III with the lowest most values.[1,4,5]

Given the disparity in findings of different values of closest speaking space in different occlusal schemes in literature , and the fact that accurate determination of this is of utmost importance for proper restoration of aesthetics, function, and comfort of any prosthesis, this study was planned to be conducted among the local population, as ethnicity does make a difference in establishing norms. Furthermore, it will assist practitioners in establishing suitable vertical dimension during prosthesis fabrication by using the closest speaking space as a reference.

2. METHODOLOGY:

This descriptive study was conducted during period of July 2021 - Dec 2021at department of Prosthodontics, Liaquat University of medical and Health Sciences Hospital. Anonymity and confidentiality of participants' data was maintained throughout the research. Written informed consent was obtained from all the participants prior to collection of data. Sample size was calculated by Raosoft online calculator as margin of error=5%, confidence interval = 95%. The sample size calculated was 111. Patients from both genders with age range 18-45 with intact 1st and 2nd premolars were included using non -probability consecutive sampling technique were included in this study. Patients having any systemic disease, temporomandibular joint disorder , any habit that affects occlusion or tooth surface loss were set as exclusion criteria.

2.1 Data collection procedure:

All the patients were pre informed regarding nature and purpose of study and inform consents were taken from each patients in their mode of language. Patients were seated in dental chairs in an upright position with head unsupported and alginate impressions were taken in order to make casts and evaluate the Angle's classification of occlusion. Polysiloxane Elastomeric impression material bites in 1.5cm thickness were placed bilaterally on occlusal surfaces of mandibular premolars and molar teeth in patients oral cavity. Patients were instructed to swallow and repeat the Sindhi Language word "SASSI" 10 times, first load and then with normal conversational speed and volume and hold the mandible with our closing for 30 seconds to let material polymerise completely. The elastomeric material bites were then removed from oral cavity and thickness of both right and left side was noted down for each patient at premolar region using digital vernier calliper as suggested by Rizzatti et al method. In order to reduce the dimensional changes, the measurements were recorded within one hr and recorded values of closest speaking space were noted in millimetres. A structures proforma was used to collect the data. Data

was analyzed using SPSS version-23.0. The frequencies and percentages were calculated for the categorical variables like gender, closest speaking space and occlusion. The mean and standard deviation was calculated for the continuous variables like age. The chi-square test was applied. The p-value set as $P>0.05$.

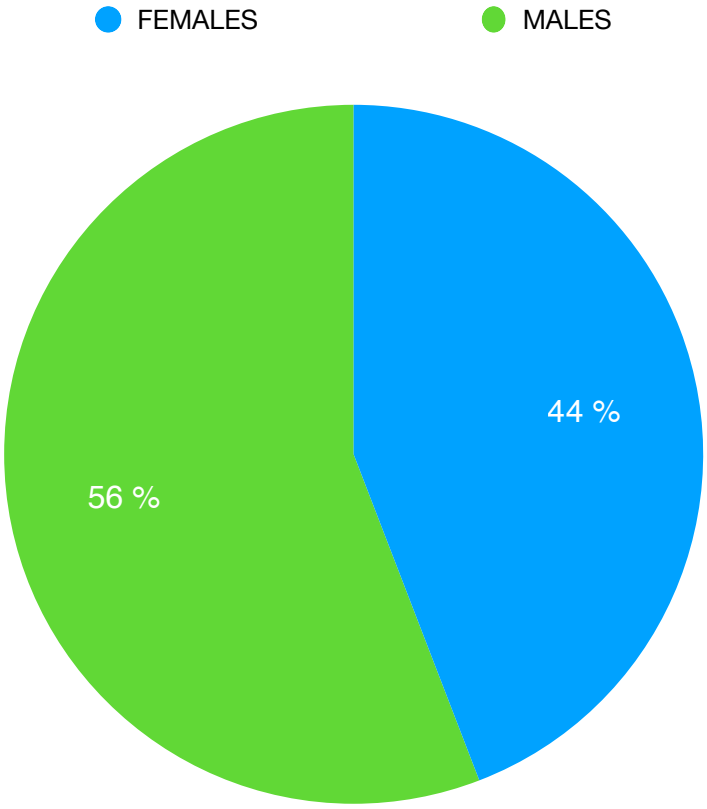
3.RESULTS:

A total of 111 patients were examined, with an average age of 35 years and a range of 18 to 45 years (Table 1). Males made up 56 % of the population, while females consists

of 44 % (Figure 1). According to occlusion, the majority of patients had class I 50 (45 %), class III 29 (26.1 %), and class II div I and II 16 (14.4 %) correspondingly (Table 2). According to the mean closest speaking space, it was highest in class II div II 7.05±2.38 mm and in class II div I 4.81±3.47 mm, with 2.02±0.75 mm in class I and 1.20±1.08 mm in class III (Table 3).

TABLE 1

DISTRIBUTION OF AGE



AGE	
MEAN	35 YRS
MINIMUM	18 YRS
MAXIMUM	45 YRS

FIGURE 1

DISTRIBUTION OF GENDER

TABLE :2

DISTRIBUTION ACCORDING TO OCCLUSION

OCCLUSION	FREQUENCY	PERCENTAGE
CLASS 1	50	45 %
CLASS 2 DIV 1	16	14,4 %
CLASS 2 DIV 2	16	14,4 %
CLASS 3	29	26,1 %

TABLE 3

DISTRIBUTION ACCORDING TO CLOSEST SPEAKING SPACE

OCCLUSION	MEAN
CLASS 1	2.02 ± 0.75
CLASS 2 DIVISION 1	4.81 ± 3.47
CLASS 2 DIVISION 2	7.05 ± 2.38
CLASS 3	1.20 ± 1.08

4.DISCUSSION:

According to the current study, the average age of the entire population was 35 years old

(table 1), with males being dominant group 56% while females 44% (fig 1). According to distribution of occlusion, majority of patients had Angles class I (50%), followed by class III (26%), and class II div I and div II (14.4%) respectively (table 2). Similar to our results, Mohammad AN and colleagues[10] reported highest frequency of Angles class I malocclusion 67.3% followed by class II div I 14.53% , class II div II 10.7% and class III 7.61% [8]. However studies done by Gul-e-Erum and Fida et al[8] reported highest percentage of patients having Angles class II malocclusion i-e 70.5%.According to the mean closest speaking space, our data shows highest mean score in in class II with div II 7.05±2.38 mm and div I with a score of 4.81±3.47 mm, followed by 2.02±0.75 mm in class I and 1.20±1.08 mm in class III (Table 3). A study done by Sakar O and colleagues[3] found only significant differences between Angle's class II div II and Angle's class III (0.034mm). Another study done by Hajimahmoudi M et al[9] on students also reported similar results with highest value of closest speaking space in Angle's Class II while lowest in Angle's class III. How ever Rivera-Morale et al reported significant differences in scores of students with occlusion Class II and Class III [11]. Further more, Sabouri A and Saniei also found highest mean score in angles class II (3.39±1.48 mm)but not a very significant difference in class I and class III (2.31±1.44mm & 2.33±1.54 mm[12].

5.LIMITATIONS:

Within the limitations of this study, we inferred that closest speaking space varies between different malocclusal schemes in dentate. As mandibular position changes during speech

regardless of the dental status and so does the closest speaking space, further research on skeletal malocclusions is needed to determine the actual CSS norm values, which will help in establishing OVD in edentate rehabilitation.

6. CONCLUSION:

In general, closest speaking space was shown to be significantly higher in Angles class II patients compared to Angles class III and class I patients. In addition, we found a substantial difference in mean scores between two divisions of class II. Since the closest

speaking space is so essential for establishing occlusal vertical dimension, aesthetics, phonetics, and function in edentates, more research on skeletal malocclusions in the local population is required, especially given the disparity in jaw size among ethnic groups, changes that occurs in ridge relationship after complete tooth loss and bone resorption. As a result, the proper occlusion and vertical dimension will be determined based on the bone classifications.

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