COMPARISON OF OCCLUSAL SCHEMES IN COMPLETE DENTURE PATIENTS

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ABSTRACT

The objective of this study was to compare the masticatory performance with bilateral balanced occlusion and lingualized occlusion in complete denture patients reporting to Armed Forces Institute of Dentistry Pakistan. A randomized control trial study was carried out on sixty edentulous patients. Subjects were divided into two equal groups, A and B by non-probability consecutive sampling method. Group A patients were provided complete dentures with bilaterally balanced occlusion and group B patients were provided complete dentures with lingualized occlusion. Masticatory performance was determined at the 01-month follow-up appointment using Sieving method. Data were analyzed using SPSS 19.0. Results of the study showed that patients with bilateral balance occlusion dentures had superior masticatory performance as compared to ones with lingualized occlusion. Conclusion made was that bilateral balance occlusal scheme patients were able to masticate properly with ease and comfort and were more comfortable with their prostheses.

Key words: complete denture, bilateral Balance Occlusion, lingualized Occlusion

INTRODUCTION

An occlusal scheme is defined as the form and arrangement of occlusal contacts in natural and artificial dentition. Different occlusal schemes have been employed in complete denture construction. They may influence denture stability and masticatory performance. Selection of an occlusal scheme for a patient should include correlation of masticatory ability of patient with occlusal scheme. Many types of occlusal schemes including monoplane occlusion, canine-guided occlusion, balanced occlusion and lingualized occlusion have been proposed with varying success degree.

Bilateral Balance occlusion is one of the earliest occlusal schemes for complete dentures and purports the balance of artificial teeth in laterotrusive and protrusive movements. This scheme may be functionally useful for well-developed ridges as well as to patients with residual ridge resorption suggesting that efficient mastication can be attained.

The specific design of positioning upper modified teeth on upper denture and non-anatomic and semi anatomic teeth on lower denture is lingualized occlusion which is characterized by contact of only palatal cusps of upper teeth with lower teeth. It is aimed to provide better aesthetics and stability. This scheme may allow the practitioner to improve the like hood of maximal intercuspation, avoid deflective occlusal contacts, determine cusp height for selective occlusal reshaping and achieve a natural and pleasing appearance.

The rationale of this study was to provide an insight into masticatory performance of two commonly advocated occlusal schemes in complete denture patients which is of utmost maintenance of optimum nutrition in complete denture patients, many of which belong to elderly section of the population that who are already predisposed to malnutrition and nutritional deficiency.

METHODOLOGY

A randomized trial study was carried out after obtaining the approval from ethical committee on sixty edentulous patients who were visiting Prosthodontics department of Armed forces institute of dentistry for provision of complete dentures. Complete denture patients with systemic diseases were excluded from this study. Sample size was calculated using WHO sample size calculator. An informed consent was obtained from the subjects. Their demographic information and history were obtained. Patients were divided into 2 groups of 30 each by random numbering table.
Comparison of occlusal schemes

marked as A and B. Group A patients were provided complete dentures with bilateral balanced occlusion concept. Lingualized concept was employed in complete dentures of group B.

Masticatory performance was determined at the 01-month follow-up appointment using Sieving method. Test was conducted using 15 g peanuts. Patients were asked to chew till it was ready to be swallowed and spit out the contents in a given container. Patients were given a tumbler of water and asked to rinse thoroughly and release the remaining contents in the same container. The chewed material was collected, pooled and passed through a 10-mesh screen sieve. The chewed material was left on a blotting paper for 30 minutes after it is passed through the sieve and weighed using an electrical balance with an accuracy of 0.01g for both the tests. All the measurements were entered in a proforma. For masticatory performance, mean ± standard deviation were calculated. Student’s t-test was used to compare the masticatory performance of the two occlusal schemes. P value of less than 0.05 was taken as significant. All the data was entered into SPSS version 19.

RESULTS

After data analysis of the sample patients, results of the study showed that: There were 18 males (60%) and 12 females (40%) in group A with bilaterally balanced occlusion and a male to female ratio of 1.5:1 while in lingualized occlusion, 20 patients were male (66.7%) and 10 females (33.3%) with male to female ratio of 2:1 (Table 1).

Table 2 showed the patients who were divided into two age groups. The majority of patients were in the age range between 45-55 years, 22 (73.4%) patients in bilaterally balanced occlusion and 16 (53.3%) patients in lingualized occlusion. The mean age in bilaterally balanced occlusion was 52.70±5.47 years and 54.83±5.97 years in lingualized occlusion.

The weight of masticated peanuts collected at swallowing threshold, 30 patients (100%) between 3.5-7.0g in bilaterally balanced occlusion while in lingualized occlusion, 1 patient (3.3%) between 3.5-7.0g, 19 patients (63.4%) between 7.1-10.0g and 10 patients (33.3%) between 10.1-13.0g. Statistically the difference between the two occlusions is significant (P value<.05). This is shown in Table 3.

DISCUSSION

Tooth loss is a determining factor in the general health of any population.10 Socio-economic, physiological and psychological factors influence the tooth loss in the elderly.11,12 Loss of teeth in the geriatric population significantly impairs masticatory ability.13 The masticatory efficiency with natural dentition is much superior to that of a complete denture wearer.14

A study by Farias Neto et al1 was conducted in 2010 at Piracicaba Dental School, State University of Campinas and Piracicaba, Brazil. In this study 24 patients with mean age of 59.7 years were selected. At the end of the study, no patient asked for occlusal concept change. No statistically significant difference (p=0.095) was found for masticatory efficiency between the two occlusal concepts studied, and no significant relationship (p=0.298) was found between masticatory efficiency and chewing rating either. In addition, there was no significant difference (p=0.155) for patients overall satisfaction. Based on the results, it may be concluded that bilateral balanced occlusion does not improve masticatory efficiency in complete denture

<table>
<thead>
<tr>
<th>Gender</th>
<th>Bilaterally balanced occlusion (n = 30)</th>
<th>Lingualized occlusion (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Male</td>
<td>18</td>
<td>60.0</td>
</tr>
<tr>
<td>Female</td>
<td>12</td>
<td>40.0</td>
</tr>
<tr>
<td>Male/Female ratio</td>
<td>1.5:1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Bilaterally balanced occlusion (n = 30)</th>
<th>Lingualized occlusion (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>45 – 55</td>
<td>22</td>
<td>73.4</td>
</tr>
<tr>
<td>56 - 65</td>
<td>8</td>
<td>26.6</td>
</tr>
<tr>
<td>Mean±SD</td>
<td>52.70±5.47</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight of masticated peanuts (g)</th>
<th>Bilaterally balanced occlusion (n = 30)</th>
<th>Lingualized occlusion (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>3.5 – 7.0</td>
<td>30</td>
<td>100.0</td>
</tr>
<tr>
<td>7.1 – 10.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10.1 – 13.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mean±SD</td>
<td>5.38±0.75</td>
<td></td>
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<tr>
<td>P value</td>
<td>0.000</td>
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</tr>
</tbody>
</table>

Table 1 – Frequency and Percentage According to Gender

Table 2 – Frequency and Percentage According to Age

Table 3 – Frequency and Percentage According to Weight of Masticated Peanuts in Both Groups
weaters.

In another study done by Abdul Razzaq Ahmed et al at Department of Prosthodontics, Lahore Medical & Dental College, Lahore in 2013, Sixty edentulous patients between the ages of 45–65 years having no previous denture experience for provision of new complete dentures were part of study. Patients were divided into 2 groups of 30 each by random numbering table marked as A & B. Median (IQR) of mean weight of masticated Peanuts at swallowing threshold was 1.24(0.52) g in lingualized occlusion group and 1.47(0.46)g in balanced occlusion group. Median difference was statistically significant between the groups (Mann-Whitney U test= 307, p=0.034). The median weight of masticated peanuts was significantly low in lingualized occlusion groups than balanced occlusion groups at swallowing threshold. The statistically significant result of this study proved the hypothesis that masticatory efficiency is better with complete dentures fabricated by lingualized occlusal scheme as compared to those fabricated by bilateral balanced occlusion.

In another study done by Harold Clough et Al in 1983 at University of Nebraska Medical Center, College of Dentistry Thirty edentulous patients, 16 men and 14 women, were selected at random. Their ages ranged from 44 to 91 years. Two sets of dentures, one with lingualized occlusion and the other with monoplane occlusion, were made for each of 30 edentulous patients. The patients preferred the lingualized occlusal scheme because of improved masticatory ability, comfort, and esthetics.

The sample in this study collection was done only from Armed Forces Institute of Dentistry (AFID), Rawalpindi which represents a limited group of Pakistani population. Further research at a larger scale needs to be carried out on Pakistani population on this topic for improvement of masticatory ability and overall quality of life of complete denture patients.

CONCLUSION

Within the limitations of this study, the conclusion is that the masticatory efficiency was higher in patients who were provided with complete dentures fabricated with the bilateral balanced occlusal scheme as compared to those patients who received complete dentures made with lingualized occlusal scheme.

REFERENCES

CONTRIBUTION BY AUTHORS
1. Muzamar Maqsood Butt: Principal author and data collection.
2. Mubashir Sharif: Author