

# Comparative Masticatory Performance of Bilateral Balanced Occlusion and Lingualized Occlusion in Complete Denture Patients

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## ABSTRACT

**Background:** Both natural and artificial dentition has an occlusal scheme defined by the shape and positioning of the occlusal contacts. Complete denture fabrication has used a variety of occlusal designs that might have impact on stability of denture and masticatory function.

**Objective:** To determine comparative masticatory performance of bilateral balanced occlusion and lingualized occlusion in complete denture patients

**Methodology:** This study design was randomized trial carried out at the department of Prosthodontics, Altamash Institute of Dental Medicine for duration of six months. A total of 80 subjects were enrolled in the current study and were divided into two groups. Forty subjects were included in each group. In group LO subjects, complete dentures were provided with Lingualized occlusion whereas in group BBO participants, complete dentures were provided with bilateral balanced occlusion. All the required information's including demographic features were documented in a predesigned Performa. SPSS version 19 was used to enter and analyze all of the data.

**Results:** The mean weight of masticated peanuts in group LO was 5.30gm with standard deviation of 0.89 while in group BBO, the mean weight of masticated peanuts was 9.45gm with standard deviation of 2.10. The difference was significant statistically between two occlusions schemes ( $p=0.021$ ).

**Conclusion:** Our study concludes that masticatory efficiency was higher in complete dentures patients with lingualized occlusal than bilateral balanced occlusal scheme..

**Keywords:** Masticatory performance; Bilateral balanced occlusion; Lingualized occlusion

## INTRODUCTION

Health, according to the World Health Organization, is defined as a condition of full mental, physical and social health, rather than just the absence of sickness and disability. Oral health benefits from this modern strategy to health <sup>1</sup>. Teeth loss leads to a loss of face aesthetics as well as function. It is a challenging condition, and it's made considerably more difficult when the patient is entirely edentulous <sup>2</sup>. The majority of edentulous individuals are recovered with full dentures <sup>3, 4</sup>. Complete denture (CD) is a removable appliance that is used when all teeth with in a jaw have been lost and need to be prosthetically replaced by acrylic teeth and denture base <sup>5</sup>.

The integrity of the imprints and the chewing performance of the patients are both important factors in the efficacy of complete dentures <sup>6</sup>. An important element that influences patients chewing patterns and masticatory effectiveness is the occlusion plan of entire dentures <sup>7</sup>. During the wearing of dentures, the number and strength of contacts affect the intensity and direction of forces that are transferred through the base of the denture to the remaining ridges of the teeth. As a result, in the designing of complete dentures, occlusal plan is a crucial consideration <sup>2, 8</sup>.

There are two types of complete dentures that are suggested. One is called bilateral balanced occlusion and the other is called lingualized occlusion. In both ideas, anatomical and non-anatomical tooth moulds may be employed. In balanced occlusion, the occlusal surfaces of both the maxillary and mandibular teeth must be in maximal intercuspation at the start of movement, and they must remain in contact throughout the movement along specified working, balancing, and protrusive guiding routes. It is said to be the best occlusion for complete dentures <sup>9</sup>. Lingualized occlusion improves the patient's comfort, functionality, and attractiveness, all of which are important quality-of-life objectives for both the doctor and the patient. The goal of lingualized occlusion is to keep the prosthesis stable. It is predicated on the maxillary palatal cusps acting as the primary supportive cusp in

conjunction with the mandibular teeth's occlusal surfaces <sup>10</sup>. This study was carried out to assess the comparative masticatory performance of bilateral balanced occlusion and lingualized occlusion in complete denture patients

## MATERIALS AND METHODS

This study design was randomized trial carried out at the department of Prosthodontics, Altamash Institute of Dental Medicine. Study duration was six months after the approval of study from ethical and research committee of the institute. The inclusion criteria of the current research was all the patients of both the sex and age range of 45-65 years, visiting department of Prosthodontics, Altamash Institute of Dental Medicine complete dentures provision and willing to participate in our study whereas the exclusion criteria was all the patients not willing to participate in our study and patients with systemic diseases. A total of 80 subjects were enrolled in the current study. For calculation of sample size, WHO sample size calculator was used (9). An informed consent in written was signed from all the participants. All the enrolled subjects were categorized group LO and group BBO. Forty subjects were included in each group. In group LO subjects, complete dentures were provided with Lingualized occlusion whereas in group BBO participants, complete dentures were provided with bilateral balanced occlusion. All the required information's including demographic features were documented in a predesigned Performa. The Sieving technique was used to assess masticatory function during the 30-day follow-up consultation. 15 g of peanuts were used in the test. Patients were instructed to chew until the food was suitable to swallow and then spit the stuff into a designated bucket. Participants received a glass of water and instructed to rinse well before discarding the remainder in the same receptacle. The chewed material was obtained, pooled, and sieved through a 10-mesh screen to remove any remaining debris. After passing through the sieve, the chewed specimen was collected on blotting paper for 30 minutes before

being weighed using an electronic balance with a precision of 0.01g for both tests. The mean and standard deviation of masticatory performance were determined. The masticatory efficiency of the two occlusal designs was compared using the Student's t-test. A p value of less than 0.05 was taken as significant. SPSS version 19 was used to enter and analyze all of the data.

**RESULTS**

In the current study, 40 patients were enrolled in each group. In group LO, there were 22 (55%) males and 18 (45%) females whereas in group BBO group, males were 23 (57.5%) and females were 17 (42.5%). (Figure 1) The mean age in patients of group LO was 50.60 years with standard deviation of 4.12 whereas the mean age of subjects in group BBO was 52.14 years with standard deviation of 3.26. In group LO, 26 (65%) patients were in age group 45-55 years while 14 (35%) subjects were in age group 56-65 years. In group BBO, 24 (60%) patients were in age group 45-55 years while 16 (40%) subjects were in age group 56-65 years. (Figure 2) In group BBO, the collected weight of masticated peanuts were 2 (5%) in the range of 3.5-7gm, 26 (65%) in the range of 7.1-10gm and 12 (30%) were in the range of 10.1-13gm while in group LO, all subjects, 40 (100%) were observed in the range of 3.5-7gm. (Figure 3) The mean weight of masticated peanuts in group LO was 5.30gm with standard deviation of 0.89 while in group BBO, the mean weight of masticated peanuts was 9.45gm with standard deviation of 2.10. (Figure 4) The difference was significant statistically between two occlusions schemes (p=0.021).

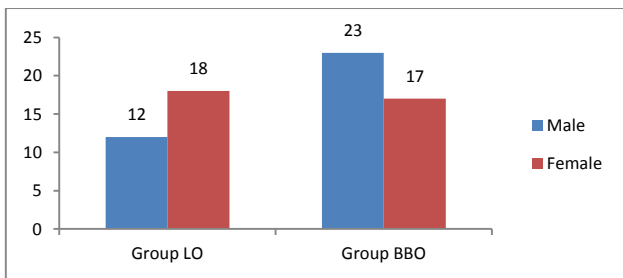


Figure 1: Gender wise distribution of both the groups

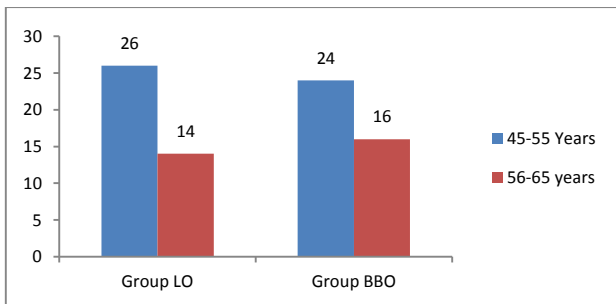


Figure 2: Age wise distribution of both the groups

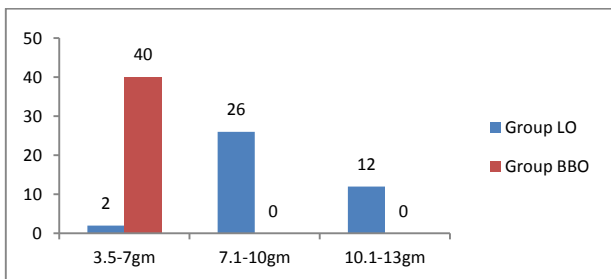


Figure 3: Collected weight of masticated peanuts in both the groups

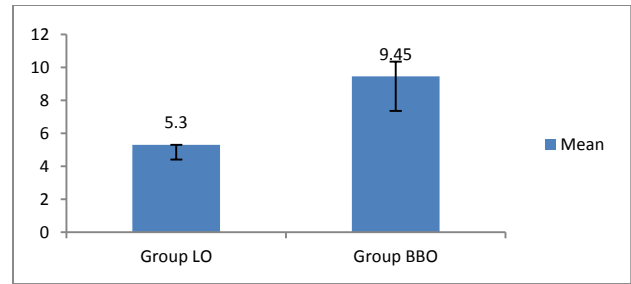


Figure 4: Mean collected weight of masticated peanuts in both the groups

The mean weight of masticated peanuts in group LO was 5.30 with standard deviation of 0.89 while in group BBO, the mean weight of masticated peanuts was 9.45 with standard deviation of 2.10.

**DISCUSSION**

The overall health of any population is directly affected by tooth loss<sup>11</sup>. Tooth loss in the aged people is influenced by socioeconomic, psychological and physiological variables<sup>12, 13</sup>. In the elderly, tooth loss has a major impact on masticatory efficiency<sup>14</sup>. Natural dentition has a substantially higher masticatory performance than complete denture wearers<sup>15</sup>.

The statistically significant findings of this research supported the assumption that masticatory efficiency is improved with complete dentures manufactured using a lingualized occlusal scheme in comparison to complete dentures produced using a bilateral balanced occlusal method. Patients who had dentures made using a lingualized occlusal design were satisfied with their dentures. Chewing was effortless and comfortable for them.

The patients of age group 45-65 years were enrolled in the current research to reduce the confounding influence of age. Patients younger than 45 years of age were excluded from the research due to their improved neuromuscular coordination, which might have impact on the study's assessment for the masticatory efficiency of patients<sup>16</sup>.

Numerous studies have been reported in the dentistry literature demonstrating that the grade of complete dentures as determined by professionals does not correspond to the subjective opinions of patients<sup>17</sup>. According to Awad and Feine<sup>18</sup> and Heydecke et al.<sup>19</sup>, practitioners' impressions of and satisfaction with freshly given prostheses cannot be used to predict patient contentment with their prostheses. As a result, the primary outcome of this research was patient chewing efficiency. The capacity of chew and mastication was greatly improved in this research when patients were given dentures with a lingualized occlusal design. A prior research compared the masticatory efficiency of edentulous individuals wearing complete dentures with bilateral balanced occlusion and lingualized occlusion. In comparison to bilateral balanced occlusion, lingualized occlusion demonstrated a greater capacity in crushing food, a greater masticatory performance, a quicker and smoother masticatory action and chewing patterns<sup>20</sup>. The findings of this research are consistent with the previous study, who reported improved chewing abilities with lingualized occlusion than bilateral balanced occlusion<sup>21</sup>. In contrast to our findings, a previous study carried out by Farias Neto et al. reported no significant difference between the two occlusal schemes<sup>22</sup>.

Another study carried out in 2013 by Abdul Razzaq Ahmed et al. observed significant difference between the occlusion schemes and reported that masticated weight of peanuts was significantly low in lingualized occlusion groups as compared to bilateral balanced occlusion<sup>23</sup>.

**CONCLUSION**

Our study concludes that masticatory efficiency was higher in complete dentures patients with lingualized occlusal than bilateral

balanced occlusal scheme. More research in our population is needed to determine the advantages of various occlusal schemes in the manufacture of partial dentures and other prosthetics.

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