Title
Exploring adaptation and satisfaction in copied complete dentures regarding two different occlusal schemes.

Authors
Savvas N. Kamalakidis, DDS, PhD, FACP,1,2 Vassiliki Anastassiadou, DDS, MS, PhD,1 Argirios L. Pissiotis, DDS, MS, PhD1

Institutional affiliations
1 Department of Prosthodontics, Aristotle University Faculty of Health Sciences, School of Dentistry, Thessaloniki, Greece
2 Department of Prosthodontics, Tufts University School of Dental Medicine, Boston, MA

Correspondence:
Dr Savvas N. Kamalakidis
72 Mitropoleos Street, 54622, Thessaloniki, Greece
Email: drkamalakidis@gmail.com

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Abstract
Purpose: To compare patient adaptation to and satisfaction with new complete dentures fabricated with a duplication construction protocol (DCP) using two different occlusal schemes, bilateral balanced (BBO) and lingualized (LO). Materials and Methods: Twenty complete denture wearers who received replacement DCP dentures participated in this study. Ten
participants received complete dentures with a BBO scheme, and the other 10 received DCP dentures with an LO scheme. All of them evaluated their prostheses subjectively through the Oral Health Impact Profile-20 (OHIP-20) and the Complete Denture Satisfaction (CDS) questionnaires before treatment and at 3- and 6-month posttreatment intervals. The new prostheses were also normatively evaluated by recording the location and number of sore spots present at the scheduled early adjustment visits. Data were analyzed with nonparametric tests to identify differences in patient responses between groups and within each group at each evaluation interval point ($\alpha = .05$). **Results:** The within-group comparisons revealed statistically significant improvement for both denture groups ($P < .05$), while the between-group comparisons did not record statistically significant differences at the overall evaluation period ($P > .05$). Significant within-group differences were recorded in the pain, functional limitation, and psychologic disability domains of the OHIP-20 questionnaire and the comfort, esthetics, and stability domains of the CDS questionnaire. **Conclusion:** The patients’ adaptation to and satisfaction with newly constructed DCP dentures improved significantly for both BBO and LO denture groups throughout the evaluation period. The mean number of early adjustment visits was equal for both the BBO and LO denture groups. *Int J Prosthodont 2021. doi: 10.11607/ijp.7367*

**INTRODUCTION**

One of the major prerequisites for the fabrication of complete denture prostheses has been the provision of balanced occlusion. Two of the surfaces (polished and intaglio) described by Fish,¹ could be determined and shaped solely by the patients’ anatomy and muscle action. The occlusal surface, though should be arranged and modified based on the dentists’ knowledge and expertise,
assessing the patients’ individualized anatomic variables. Four occlusal concepts, namely balanced, non-balanced, linear or monoplane, and lingualized together with 3 types of denture teeth, such as anatomic, semi-anatomic, and non-anatomic, have been offered for denture stability during function. Yet, one has to question if the phrase coined by Prime “Enter bolus, exit balance” is genuinely valid, since the comminution of the food bolus that ultimately destabilizes the denture, might depend more on the patients’ neuromuscular coordination and less on the form and condition of the occlusal surfaces.

The concept of bilateral balanced occlusion (BBO) using anatomic denture teeth to stabilize the denture during function, has been dogmatically taught in the majority of undergraduate programs. However, the concept of lingualized or lingual contact occlusion (LO) has been recommended as a reliable alternative. Good esthetics, ease of adjustments, and reduced lateral forces directed toward the alveolar ridges have been introduced as some of the advantages of LO. However, a non-balanced occlusal scheme, such as the canine-guided occlusion (CGO) could be the treatment option for some cases of complete denture wearers following the individualized innate masticatory pattern modulated by the Centrally Generated Pattern (CGP).

In the last 20 years, several studies have compared BBO vs LO, and also BBO vs CGO. Additionally, one study compared CGO vs LO. The majority of those studies were randomized clinical trials with a cross-over design. The researchers used both subjective evaluation, such as psychometric instruments or masticatory performance indexes and objective (e.g. denture quality criteria, number of adjustment visits or sore spots registration) evaluation tools. The cross-over study design has enabled researchers to compare two
interventions on the same patient directly, but with the bias of them and their patients not being blinded to the change of the removable prostheses.

Several researchers have investigated the oral-health-related quality of life (OHRQoL)\textsuperscript{32,33} and the satisfaction\textsuperscript{34} related to replacement complete dentures by comparing dentures made with duplication (the copy technique) and a conventional construction protocol.\textsuperscript{35–38} The copy of the most favorable features of the patients’ existing prostheses and subsequent transfer to their new ones, has allowed for shorter adaptation periods and overall satisfaction.\textsuperscript{39} Moreover, the height of the mandibular residual ridge was correlated with the complete dentures’ occlusal design in several studies.\textsuperscript{10,14,18,27,28} Significantly lower retention values were recorded in patients with BBO vs LO prostheses and severely resorbed residual ridges.\textsuperscript{18} Additionally, masticatory performance and the resulting patients’ comfort scores were higher with the LO complete dentures.\textsuperscript{14}

Despite the numerous clinical studies available, no concrete conclusion has been reached regarding the best occlusal design for fabricating a successful replacement complete denture. The present study aimed to explore patients’ adaptation and satisfaction of complete replacement dentures made by the duplication (copy) technique and two different occlusal schemes (BBO vs LO). To assess the patients’ adaptation, the registration of the total number of sore spots during the early adjustment period was performed. To quantify and measure the patient’s satisfaction, the Oral Health Impact Profile 20 (OHIP-20) and the complete denture satisfaction (CDS) subjective outcome instruments were used. The null hypothesis was that no differences would be detected in the patients’ adaptation and satisfaction to newly constructed complete dentures fabricated with a duplication construction protocol, using either BBO or LO scheme throughout a 6-month evaluation period.
MATERIALS AND METHODS

The study was approved by the Institutional Review Board of the School of Dentistry, Faculty of Health Sciences, Aristotle University of Thessaloniki, Greece (Ethical Committee #301/14-6-2012). Twenty participants were admitted in the undergraduate clinic of the Department of Prosthodontics for denture replacement. The existing complete dentures were functional but exhibited either base material degradation or unsatisfactory repairs of the base or the denture teeth. The individuals were aged 65 years or above with more than 1 year of denture experience and with the absence of temporomandibular disorders, uncontrolled systemic physical conditions, or any psychiatric and autoimmune conditions. Their existing complete dentures exhibited less than 3 mm loss of vertical dimension, stable centric relation occlusion with bilateral posterior teeth contact occlusal schemes, none of which could be classified as LO, and proper teeth position. All participants were classified as ACP/PDI Class I or II for completely edentulous patients. They possessed similar baseline characteristics (Table 1), and they all signed the consent form before any intervention. All treatment procedures have been self-financed by the patients.

The study participants were randomly assigned into 2 equally sized groups by the primary researcher after the initial examination. The patients in the first group received DCP dentures with BBO and those in the second group received DCP dentures with LO. Twenty senior-year undergraduate students performed all clinical stages of the study under the supervision of the primary investigator, who was calibrated accordingly. The duplication construction protocol of the new complete dentures was similar to that proposed by Lindquist and Ettinger. A customized flask was used to duplicate the patients’ existing complete dentures with condensation silicone (Dentplus; Dental Line). The resulting impressions were filled with
molten denture wax (Kemdent Tenatex red; Associated Dental Products Ltd) up to the point of
the denture teeth area. Autopolymerizing acrylic resin (SR Ivolen; Ivoclar Vivadent AG) was
poured to fill the remaining space created by the base of the dentures. Intraoral try-in of those
trial bases and minor adjustments through the assessment of the interocclusal rest space and its
validation with the existing dentures were carried out. These minor adjustments were supervised
by the primary researcher and were comparable for both groups. A centric relation registration at
the appropriate vertical dimension was performed. After the mounting procedures on semi-
adjustable articulators, new denture teeth were positioned by individually removing the trial wax
teeth. Half of the dentures were given a BBO tooth set-up and the rest were given a LO set-up.
The esthetic and phonetic try-in was evaluated intraorally. Border molding procedures were
made with impression compound (Impression compound; Kerr Corp). The definitive impressions
were made with medium-body monophase elastomeric material (Honigum-Mono; DMG-CPF
GmbH). The trial dentures were laboratory-processed using heat-activated polymethyl
methacrylate resin (Lucitone 199; Dentsply Sirona Inc) at long cycle (73 °C for 9 hours to 100
°C for 30 minutes). BBO was obtained by using anatomical teeth (SR VIVODENT DCL; Ivoclar
Vivadent AG) and LO was established with specially designed teeth (SR ORTHOLINGUAL
DCL; Ivoclar Vivadent AG). The occlusal contacts were visually checked and verified with
articulating paper by the primary investigator. The definitive dentures were then delivered to the
patients with post-delivery instructions and a post-insertion appointments schedule.

To rate the complete dentures, two validated subjective outcome measures were used.
The OHIP-20 and the CDS questionnaires. The participants used a 5-point Likert-type scale for
the OHIP-20 instrument with predetermined responses (1-“never”, 2-“rarely”, 3-“sometimes”, 4-
“often”, 5-“always”). The total sum of all responses was calculated, with higher scores
representing a deterioration in patients’ OHRQoL. A 100 mm visual analogue scale with the anchor words “completely unsatisfied” and “completely satisfied” marked at both ends was used to record the responses for the CDS instrument. Both questionnaires were administered to the patients by the primary researcher, pretreatment to rate their old prostheses, and at a 3-month and 6-month recall visits to grade their new complete dentures experience. The recall evaluation points were observed after the early adjustment period of 1 month had elapsed.

Additionally, to objectively evaluate the patients’ adaptation to their new prostheses, the exact location of every sore spot was recorded by the primary researcher. This was achieved with a customized data sheet illustrating the maxillary and mandibular anatomy,\(^{38}\) that was used in every scheduled adjustment visit during the early adaptation period, regardless of the presence of sore spots. The nonparametric Friedman test was used for within-group comparisons, and the Wilcoxon signed-ranks test was performed to assess differences that occurred within and between-subject responses for the pretreatment versus the 3- and 6-month post-treatment data. The Mann-Whitney and Kruskal-Wallis tests were used to evaluate differences in both questionnaires between treatment groups at each scheduled evaluation point time with significance level at \(a=.05\).

RESULTS

The study was completed with no participant dropout. The mean number of early adjustment visits was \(1.9 \pm 0.8\) for the BBO denture group and \(1.9 \pm 0.9\) for the LO denture group, with the difference not being statistically significant \((P>.05)\). The total number of sore spots recorded were close to equal for both denture groups (BBO:28 vs LO:30), and the ratio of sore spots between maxillary and mandibular dentures in both groups was 1:2. Both denture groups exhibited a statistically significant improvement regarding their general satisfaction and the total
sum of OHIP-20 ($P<.05$), with those mean scores not being statistically significant between groups at every scheduled evaluation point ($P>.05$). Regarding general satisfaction, the improvement within the BBO denture group between pretreatment and the 3- and the 6-month evaluation was not statistically significant ($P=.06$). On the contrary, the improvement within the LO denture group was statistically significant for the same evaluation points ($P<.05$). Based on the total sum of the OHIP-20 mean scores, the improvement within the BBO denture group between pretreatment and the 3- and the 6-month evaluation was statistically significant ($P<.05$), while within the LO denture group was not ($P>.05$). None of the denture groups recorded a statistically significant difference for within-group comparisons between the 3- and the 6-month evaluation in both outcome measures ($P>.05$) (Table 2).

A statistically significant improvement within the BBO group was recorded for the pain domain of the OHIP-20 questionnaire between pretreatment and the 3- and 6-month evaluation ($P<.05$). The improvement in the remaining 6 domains was not statistically significant between pretreatment and the 3- and 6-month evaluation points ($P>.05$). The mean scores within the LO denture group were improved in the functional limitation domain between pretreatment and the 6-month evaluation, and also in the psychological disability domain between pretreatment and the 3-month review ($P<.05$). The improvement in the remaining 4 domains was not statistically significant between pretreatment and the 3- and 6-month evaluation points ($P>.05$) (Table 3).

The responses to the CDS questionnaire revealed a statistically significant improvement within the BBO denture group, in relation to the comfort and lower stability variables between pretreatment and the 3-month evaluation ($P<.05$). The difference for the lower stability was significant also between pretreatment and the 3-month review ($P<.05$). All other variables did not record statistically significant improvement between pretreatment and the 3- and 6-month
evaluation points ($P > .05$). The LO denture group recorded statistically significant increase for the comfort, esthetics, and stability variables between pretreatment and the 3-month evaluation ($P < .05$). The improvement was statistically significant between pretreatment and the 6-month review for the esthetics and comfort variables ($P < .05$). The mean scores of the remaining variables did not record statistically significant improvement between pretreatment and the 3- and 6-month evaluation points ($P > .05$) (Table 4).

**DISCUSSION**

Based on the results of this clinical study, the null hypothesis was accepted. No statistically significant differences were recorded through the OHIP-20 and CDS questionnaires that evaluated the patients’ satisfaction of their newly constructed DCP dentures using either a BBO or LO scheme. Both study groups recorded a tendency for significant improvement in the mean score of the total sum of OHIP-20 index and the general satisfaction variable of the CDS questionnaire between all evaluation points. These findings were in agreement with most of the previous studies that evaluated complete dentures with BBO vs LO schemes.\(^{10,11,14,18}\) Only one study that used electromyography and patient satisfaction questionnaires concluded that LO was superior to BBO, with the patients not having any previous denture experience.\(^{15}\)

It should be noted, that for specific satisfaction related variables (lower comfort and stability), the participants in the present study tended to evaluate the LO scheme higher. That finding was in accordance with all previous studies that reported patients’ satisfaction.\(^{10,11,14,15,18}\) This observation was more evident in two studies that correlated the occlusal scheme with the height of the mandibular residual alveolar ridge.\(^{14,18}\) They reported an improvement in patients’ satisfaction and masticatory performance with strong positive correlation between LO and severely resorbed mandibular ridges. The present study did not examine the mandibular residual
height/occlusal scheme correlation, since the inclusion criteria encompassed patients with mild or moderate resorbed mandibular residual ridges (ACP/PDI Class I and II).

The ability to chew domain in the LO denture group registered the lowest tendency for improvement of the CDS domains between pretreatment and the 3-month evaluation point, although not statistically significant ($P = .389$). That observation might suggest that LO could potentially decrease the masticatory ability of the patients as comminution and mass formation of the food bolus becomes challenging. This finding was in contrast with previous studies that evaluated the masticatory ability between complete dentures with BBO and LO schemes, using masticatory performance or maximum occlusal force measurements.\textsuperscript{10,14} Another possible explanation could be that the patients in the LO denture group were satisfied with their existing prostheses, with higher mean CDS scores at the baseline recording for the ability to chew domain. This tendency was not recorded for the general satisfaction variable and the total sum of the OHIP-2O in the patients’ existing dentures for both groups.

To subjectively evaluate the patients’ adaptation to their new prostheses, the mean number of early adjustment visits and the total number of sore spots recorded in those visits was used. The mean number of postinsertion adjustment visits were 1.9 for both denture groups; substantially less than the number of visits (BBO:4.8, LO:5.6) recorded in the study by Kimoto et al.\textsuperscript{10} The difference could be potentially attributed to the duplication construction protocol used in the present study, since the patients’ neuromuscular mechanism was preconditioned to the shape and form of the new prostheses. As per the number of recorded sore spots (BBO:28, LO:30), no correlations with similar studies could be made since that measurement was not reported.
Limitations of the present study should be considered. The main weakness of the study was that the sample size was relatively small, consisting of the population addressing to University clinics seeking treatment and benefit from it. Although tendencies could be seen, the sample size was too limited to detect significant differences. Because of its size, it was unclear whether this lack of clear differences was due to the sample size or not. Furthermore, all the patients had mild or moderate resorbed mandibular residual ridges (ACP/PDI Class I and II), otherwise they were excluded based on the study’s protocol. Although the evidence has suggested that the occlusal scheme had little effect on patients’ adaptation and satisfaction of complete dentures, LO seemed to possess some advantages especially to patients’ satisfaction. Additionally, no masticatory performance or maximum occlusal force measurement were performed as in similar studies.\textsuperscript{10,14} The primary focus of the study was on the subjective evaluation of the patients’ chewing ability through the use of specific outcome measures. Objective measurements could have differed from the subjective criteria used by the patients\textsuperscript{30} and might have altered the final results.

The present clinical study has employed a duplication construction protocol in order to help the patients adapt more readily to their new prostheses. The utilization of digital scanning technology in future research could provide the patients with an exact duplicate of the denture base, apart the occlusal scheme, which might differentiate the final results. With the continuous evolution of digital denture design and construction, dentists might be able in the foreseeable future to automatically create the occlusal scheme of patients. This could be achieved through specially designed AI algorithms that analyze the patients’ posterior determinants of occlusion, 3D jaw measurements and 3D facial scans to provide the practitioner with the best suitable occlusal design.
CONCLUSIONS

Within the limitations of this clinical study, the following conclusions were drawn. In the study population, patients’ satisfaction related to their new prostheses improved significantly for both (BBO and LO) denture groups. The patients’ adaptation to their new prostheses was similar in terms of recorded sore spots, for both (BBO and LO) denture groups. Finally, the patients’ mean number of early adjustment visits was equal for both (BBO and LO) denture groups.

Acknowledgments

None.

Conflict of interest

The authors have declared that no conflict of interest exist.

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33. Allen F, Locker D. A modified short version of the oral health impact profile for assessing


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## TABLES

Table 1. Sample profile.

<table>
<thead>
<tr>
<th>Denture groups</th>
<th>n</th>
<th>Age (years) Mean ±SD</th>
<th>Gender Male/Female</th>
<th>Edentulism (years) Mean ±SD</th>
<th>Denture age (years) Mean ±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBO</td>
<td>10</td>
<td>74.2 ±7.4</td>
<td>6/4</td>
<td>16.4 ±15.4 (R:1 to 40)</td>
<td>12.4 ±10.0 (R:1 to 30)</td>
</tr>
<tr>
<td>LO</td>
<td>10</td>
<td>73.0 ±5.5</td>
<td>2/8</td>
<td>20.3 ±11.5 (R:2 to 33)</td>
<td>11.7 ±12.5 (R:1 to 33)</td>
</tr>
</tbody>
</table>

BBO, bilateral balanced occlusion; LO, lingualized occlusion; R, range.
Table 2. General satisfaction and total sum of OHIP-20 scores with *P* values for both groups at every scheduled evaluation point.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Denture group (n=10)</th>
<th>Pretreatment Mean ±SD</th>
<th>3-month recall Mean ±SD</th>
<th>6-month recall Mean ±SD</th>
<th><em>P</em> value*</th>
<th>Pretreatment – 3 months</th>
<th>Pretreatment – 6 months **</th>
</tr>
</thead>
<tbody>
<tr>
<td>General satisfaction</td>
<td>BBO</td>
<td>63.1 ±37.7</td>
<td>83.2 ±20.4</td>
<td>84.0 ±20.4</td>
<td>0.015</td>
<td>0.060</td>
<td>0.060</td>
</tr>
<tr>
<td></td>
<td>LO</td>
<td>48.0 ±30.0</td>
<td>74.5 ±20.1</td>
<td>76.4 ±20.7</td>
<td>0.008</td>
<td><strong>0.008</strong></td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.005</td>
<td>0.243</td>
</tr>
<tr>
<td></td>
<td><em>P</em> value***</td>
<td>0.347</td>
<td>0.233</td>
<td>0.334</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OHIP-20 Total sum</td>
<td>BBO</td>
<td>42.3 ±23.3</td>
<td>31.8 ±12.2</td>
<td>30.7 ±13.2</td>
<td>0.007</td>
<td><strong>0.021</strong></td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>LO</td>
<td>46.8 ±15.4</td>
<td>39.3 ±15.4</td>
<td>39.6 ±16.5</td>
<td>0.012</td>
<td>0.058</td>
<td>0.073</td>
</tr>
<tr>
<td></td>
<td><em>P</em> value***</td>
<td>0.444</td>
<td>0.241</td>
<td>0.140</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BBO, bilateral balanced occlusion; LO, lingualized occlusion.

*P*≤0.05 shown in bold *Friedman test. ** Wilcoxon Rank-Sum test. *** Mann-Whitney U-test.
Table 3. Pretreatment, 3-month, and 6-month recall of OHIP-20 domain scores for both groups with P values for within-group differences.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pretreatment Mean ±SD</th>
<th>3-month recall Mean ±SD</th>
<th>P value</th>
<th>6-month recall Mean ±SD</th>
<th>P value</th>
<th>Pretreatment Mean ±SD</th>
<th>3-month recall Mean ±SD</th>
<th>P value</th>
<th>6-month recall Mean ±SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Limitation</td>
<td>2.57 ±1.35</td>
<td>2.13 ±1.07</td>
<td>0.257</td>
<td>2.03 ±1.27</td>
<td>0.247</td>
<td>3.50 ±0.88</td>
<td>2.77 ±1.10</td>
<td>0.076</td>
<td>2.53 ±1.02</td>
<td>0.016</td>
</tr>
<tr>
<td>Pain</td>
<td>2.23 ±1.26</td>
<td>1.58 ±0.67</td>
<td>0.015</td>
<td>1.50 ±0.82</td>
<td>0.015</td>
<td>2.48 ±1.02</td>
<td>2.15 ±0.97</td>
<td>0.348</td>
<td>2.08 ±0.89</td>
<td>0.284</td>
</tr>
<tr>
<td>Psychological discomfort</td>
<td>2.35 ±1.62</td>
<td>1.65 ±0.94</td>
<td>0.253</td>
<td>1.65 ±1.11</td>
<td>0.246</td>
<td>2.05 ±0.86</td>
<td>1.93 ±1.32</td>
<td>0.723</td>
<td>2.25 ±1.18</td>
<td>0.373</td>
</tr>
<tr>
<td>Physical disability</td>
<td>2.38 ±1.60</td>
<td>1.73 ±0.82</td>
<td>0.061</td>
<td>1.63 ±0.73</td>
<td>0.118</td>
<td>2.30 ±0.79</td>
<td>2.10 ±0.92</td>
<td>0.643</td>
<td>2.20 ±1.01</td>
<td>0.719</td>
</tr>
<tr>
<td>Psychological disability</td>
<td>1.90 ±1.43</td>
<td>1.55 ±0.96</td>
<td>0.375</td>
<td>1.55 ±0.64</td>
<td>0.630</td>
<td>2.55 ±1.34</td>
<td>1.80 ±0.98</td>
<td>0.007</td>
<td>2.15 ±1.40</td>
<td>0.211</td>
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<tr>
<td>Social disability</td>
<td>1.37 ±0.81</td>
<td>1.20 ±0.45</td>
<td>0.747</td>
<td>1.17 ±0.36</td>
<td>0.624</td>
<td>1.37 ±0.55</td>
<td>1.20 ±0.42</td>
<td>0.364</td>
<td>1.17 ±0.53</td>
<td>0.373</td>
</tr>
<tr>
<td>Handicap</td>
<td>1.80 ±1.18</td>
<td>1.10 ±0.32</td>
<td>0.126</td>
<td>1.09 ±0.32</td>
<td>0.126</td>
<td>1.95 ±1.19</td>
<td>1.45 ±0.83</td>
<td>0.129</td>
<td>1.30 ±0.95</td>
<td>0.191</td>
</tr>
<tr>
<td>Sum</td>
<td>42.3 ±12.3</td>
<td>31.8 ±12.3</td>
<td>0.021</td>
<td>30.7 ±13.2</td>
<td>0.038</td>
<td>46.8 ±12.4</td>
<td>39.3 ±15.4</td>
<td>0.058</td>
<td>39.6 ±16.5</td>
<td>0.073</td>
</tr>
</tbody>
</table>

BBO, bilateral balanced occlusion; LO, lingualized occlusion.

*P*≤0.05 shown in bold * Mann-Whitney U-test.
Table 4. Pretreatment, 3-month, and 6-month recall of CDS scores for both groups with $P$ values for within-group differences.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Denture group BBO (n=10)</th>
<th>Denture group LO (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretreatment Mean ±SD</td>
<td>3-month recall Mean ±SD</td>
</tr>
<tr>
<td>General satisfaction</td>
<td>63.1 ±37.7</td>
<td>83.2 ±20.4</td>
</tr>
<tr>
<td>Ease of cleaning</td>
<td>75.6 ±31.3</td>
<td>90.0 ±16.4</td>
</tr>
<tr>
<td>Ability to speak</td>
<td>65.3 ±38.5</td>
<td>80.4 ±31.1</td>
</tr>
<tr>
<td>Ability to chew</td>
<td>59.4 ±44.0</td>
<td>77.2 ±26.1</td>
</tr>
<tr>
<td>Comfort upper</td>
<td>67.7 ±36.3</td>
<td>91.0 ±12.4</td>
</tr>
<tr>
<td>Comfort lower</td>
<td>61.2 ±37.8</td>
<td>92.6 ±9.8</td>
</tr>
<tr>
<td>Esthetics upper</td>
<td>74.8 ±28.8</td>
<td>90.5 ±12.4</td>
</tr>
<tr>
<td>Esthetics lower</td>
<td>76.8 ±24.5</td>
<td>90.5 ±12.4</td>
</tr>
<tr>
<td>Stability upper</td>
<td>67.3 ±39.0</td>
<td>90.2 ±18.4</td>
</tr>
<tr>
<td>Stability lower</td>
<td>50.7 ±36.9</td>
<td>86.9 ±18.2</td>
</tr>
</tbody>
</table>

BBO, bilateral balanced occlusion; LO, lingualized occlusion.

$P \leq 0.05$ shown in bold * Mann-Whitney U-test.