# Mandibular Overdentures with Immediate Loading: Satisfaction and Quality of Life

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***Purpose:*** The aim of this study was to verify quality of life related to oral health and satisfaction with dentures. Conventional mandibular complete dentures were converted to overdentures retained by two implants with immediate loading (bar-clip system, n = 16). ***Materials and Methods:*** The Brazilian short version of the Oral Health Impact Profile (OHIP-14Br) was used to evaluate the impact of oral health on quality of life. Satisfaction with the prostheses was obtained by means of a questionnaire addressing satisfaction with the present prostheses and through use of a visual analog scale (VAS). ***Results:*** The results of the OHIP-14Br questionnaire were verified at 3 and 6 months after conversion from complete dentures to a mandibular overdenture. The satisfaction questionnaire for the mandibular prostheses obtained 43.75% satisfaction before conversion and 100% satisfaction at 1 week and 3 and 6 months after conversion. The satisfaction results of the prostheses, both maxillary and mandibular, were 68.75% before conversion, 93.75% at 1 week and 3 months after conversion, and 87.5% at 6 months. There was an immediate improvement in patients' satisfaction with the mandibular overdenture prostheses regarding stability and retention (Friedman test, $P = .000$) and quality of life (Friedman test, $P = .001$). ***Conclusion:*** The improvement seen justifies the immediate loading approach used in this study. *Int J Prosthodont 2011;24:534–539.*

Edentulism implies a limiting condition in mastication, which is one of the main functions of the stomatognathic system, and complicates other functions such as phonetics, swallowing, esthetics, social life, and psychologic comfort. In this way, edentulous subjects have unique characteristics that challenge the dental surgeon regarding the reestablishment of stomatognathic function.[1]

Before the advent of bone-integrated implants, the only option for rehabilitation of the completely edentulous patient was a mucosa-supported complete denture (MSCD). However, a variety of problems regarding retention and stability were observed in the mandibular denture relative to the maxillary one.[2,3] The most important factors that can contribute to poor retention of prostheses are the intensity of resorption of the alveolar bone and the reduction in salivary flow. Mandibular prostheses also require the use of muscular tonus exercises,[4] and patients' agility and salivary flow tend to reduce with aging.[3,5] This means that the individual's ability to adapt to MSCDs becomes increasingly complex. Oral rehabilitation with osseointegrated implants provides a way to resolve the stability and retention problems of complete dentures. It also increases functionality and leads to an improvement in patient satisfaction and quality of life.[6–8]

Scientific evidence exists supporting the idea of success in two-implant overdenture treatment with immediate loading,[9–11] but Cochran et al[12] suggested the necessity for more scientific studies to show evidence of increased patient satisfaction and quality of life linked to treatment with immediate loading of implants. According to Attard and Zarb,[13] it is commonly stated that treatment with immediate loading improves patient satisfaction and is more viable

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economically speaking. However, they maintain that scientific proof was not presented to support these allegations. Some studies were developed to investigate patient satisfaction,[11,14,15] but all of these studies made the evaluation before treatment and 1 year after. Only one article[14] evaluated life quality. The questionnaire was administered before treatment, following the fabrication of the conventional complete denture, after implant placement and conversion of the complete denture to a bar-retained overdenture, and again 1 year after surgery. Considering that immediately loaded implant treatment is a very up-to-date treatment option, knowledge on the impact of this type of rehabilitation on patient satisfaction and quality of life has become important to provide additional information to patients at the time of planning their rehabilitation, in addition to a simple indication of the level of success of this type of treatment.

This study objectively verified that quality of life and satisfaction with prostheses improves quickly in wearers of maxillomandibular MSCDs when only the mandibular prosthesis is converted to an implant-retained complete denture (IRCD) with immediate loading. The hypothesis of this study was that increasing the retention and stabilization of a mandibular prosthesis, using only two implants and the bar-clip system with immediate loading, immediately improves quality of life and satisfaction with the prosthesis.

## Materials and Methods

Sixteen patients with maxillomandibular MSCDs (age range: 30 to 76 years, mean age: 59.2 years) participated in this study. The conventional complete dentures were evaluated using the following criteria: base extension of the prostheses, vertical occlusion, retention, and stability (Kapur Index).[16] All prostheses were acceptable before implant insertion. The only exclusion criterion was a negative reaction to surgery when receiving the two mandibular implants. In most cases, the only problem was poor retention of the mandibular prostheses, which was one of the reasons for conducting this study in addition to the small number of studies assessing the satisfaction and life quality of patients receiving an overdenture with immediate loading as a solution to this problem. Informed written consent was obtained from all subjects according to the Institutional Review Board of Uberlândia Federal University, Brazil.

The study was divided into four stages. In the initial phase (baseline), all subjects wearing an MSCD were evaluated in relation to their oral health–related quality of life (OHRQoL) and satisfaction with the prostheses. Following that, all subjects were submitted to a surgical procedure to place two Brånemark implants (Conexão Sistema de Próteses) in the mandibular parasymphyseal region in a single-stage protocol for immediate loading. Within a maximum period of 24 hours, a metallic bar with a circular transversal section was obtained and attached to the two implants. A plastic clip (Conexão Sistema de Próteses) was connected to the mandibular prosthesis, converting it into an IRCD. The same evaluation was carried out after 1 week and 3 and 6 months following conversion of the prostheses.

### *Analysis of OHRQoL*

The quality of life analysis was carried out by applying the OHIP-14Br questionnaire, a short version of the Oral Health Impact Profile adapted for a Brazilian population by Oliveira and Nadanovsky.[17] This version consists of 14 questions divided into 7 subscales: *(1)* functional limitation, *(2)* physical pain, *(3)* psychologic discomfort, *(4)* physical disability, *(5)* psychologic disability, *(6)* social disability, and *(7)* handicap. The responses were recorded on a Likert scale with values ranging from 0 to 4. The lower the level on the scale, the higher the quality of life. The analysis of each question was carried out separately, and the overall score was the sum of the responses to all questions.

### *Analysis of Satisfaction with the Prostheses*

Two questionnaires were used to evaluate patient satisfaction. The questionnaire regarding patient satisfaction with the present prostheses was composed of six questions related to satisfaction with the appearance, retention, and comfort of the prostheses[18]: *(1)* Are you comfortable smiling in proximity to other people? *(2)* Are you satisfied with your appearance? *(3)* Are you able to laugh outright with other people without the (a) maxillary or (b) mandibular prosthesis moving? *(4)* Do you talk freely to other people without the (a) maxillary or (b) mandibular prosthesis moving? *(5)* Do you eat in proximity to other people? and *(6)* Do you have pain or some discomfort in your mouth? Patient perception in relation to each question was recorded by the researcher as a yes or no.

To complement the questionnaire with regard to satisfaction with the present prostheses, four questions were asked that related to patient perception in regard to maxillary and mandibular prostheses, stability/retention, and appearance, which were verified using a visual analog scale (VAS).[19–21] A VAS has a scale of 0 to 10, with the extremes corresponding to "completely unsatisfied" and "totally satisfied," respectively.

**Table 1** Results at Baseline, 1 Week, and 3 and 6 Months for Individual Questions of the OHIP-14Br Questionnaire*

| | Baseline | 1 wk | 3 mo | 6 mo | *P* |
|---|---|---|---|---|---|
| 1. Difficulty in pronouncing any words | A | B | AB | B | .002† |
| 2. Feeling of reduced sense of taste | - | - | - | - | .162 |
| 3. Felt pain in the mouth | A | A | AB | B | .009† |
| 4. Found it uncomfortable to eat any foods | A | AB | AB | B | .032† |
| 5. Been self-conscious | - | - | - | - | > .999 |
| 6. Felt tense or nervous | AB | A | B | B | .016† |
| 7. Diet has been unsatisfactory | - | - | - | - | .058 |
| 8. Had to interrupt meals | - | - | - | - | .687 |
| 9. Had difficulty relaxing | - | - | - | - | .075 |
| 10. Felt uncomfortable or embarrassed | - | - | - | - | .059 |
| 11. Been irritable with other people | - | - | - | - | .337 |
| 12. Had difficulty in doing usual tasks | - | - | - | - | .392 |
| 13. Found life less satisfying | - | - | - | - | .098 |
| 14. Been completely unable to function | - | - | - | - | > .999 |

*Statistical difference (Wilcoxon test, $P < .05$) represented through different letters, where B represents more positive responses than A.
†Significantly different according to the Friedman test ($P < .05$).

### *Statistical Analysis*

Statistical analysis was carried out using SPSS statistical software (IBM). The Friedman and Wilcoxon tests were applied to the data obtained with the OHIP-14Br questionnaire, satisfaction with the current prostheses questionnaire, and the VAS. Statistical significance was set at a level of 5%.

## Results

### *OHRQoL*

When analyzing each question of the OHIP-14Br, statistically significant differences were noted for questions 1, 3, 4, and 6 (Table 1), and therefore, the topics of these questions probably had a higher impact in terms of quality of life for the subjects. The best result for these four questions was found to be at 6 months.

Table 2 shows that there was a statistically significant difference between baseline, 1 week, and 6 months, with results at 1 week not presenting an overly significant difference. The best results were obtained at 3 and 6 months.

### *Satisfaction with the Prostheses*

Table 3 demonstrates that questions related to the movement of the mandibular prostheses during conversation (question 4b) and outbursts of laughter (question 3b) improved significantly after 1 week, whereas those related to pain or discomfort (question 6), while presenting an observable improvement after 3 months, showed a statistically significant difference only after 6 months in relation to baseline and 1-week values.

Table 4 demonstrates that, regarding satisfaction with the maxillary prostheses (question 1) and appearance (question 4), there was no statistically significant difference between the four stages analyzed. However, with regard to satisfaction with the mandibular prostheses (question 2) and satisfaction with the stability and retention of the prostheses (question 3), a statistically significant difference between baseline and the other assessment timepoints was observed, with baseline values being the least favorable. There was no statistically significant difference between 1-week, 3-month, and 6-month values.

## Discussion

In the proposed protocol for this study, although the patients felt tense or nervous during the postoperatory period (question 6, OHIP-14Br), the fact that they had been using their prostheses for more than 1 year helped to avoid complications with the prostheses, making it easier to evaluate the outcomes of the new treatment. The procedure of converting the complete denture to an implant-retained overdenture included only the addition of a retentive clip to the mandibular prosthesis and an occlusal adjustment made after fixing the clip. This technique used for the conversion reduced the chair time in addition to being a simpler procedure.

**Table 2** Results at Baseline, 1 Week, and 3 and 6 Months for the Total Score of the OHIP-14Br Questionnaire*

| | Statistical categories | *P* |
|---|---|---|
| Baseline | A | .001† |
| 1 wk | AB | |
| 3 mo | B | |
| 6 mo | B | |

*Statistical difference (Wilcoxon test, $P < .05$) represented through different letters, where B represents more positive responses than A.
†Significantly different according to the Friedman test ($P < .05$).

**Table 3** Statistical Significance of Results from the Satisfaction Questionnaire at Baseline, 1 Week, and 3 and 6 Months

| | Question* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3a | 3b | 4a | 4b | 5 | 6 |
| Baseline | – | – | – | A | – | A | – | A |
| 1 wk | – | – | – | B | – | B | – | A |
| 3 mo | – | – | – | B | – | B | – | AB |
| 6 mo | – | – | – | B | – | B | – | B |
| *P* | .261 | .875 | .245 | .000† | .494 | .000† | .392 | .003† |

*Statistical difference (Wilcoxon test, $P < .05$) represented through different letters, where B represents more positive responses than A.
†Significantly different according to the Friedman test ($P < .05$).

**Table 4** Level of Significance for Responses at Different Timepoints with Regard to Satisfaction with Maxillary (Question 1) and Mandibular Prostheses (Question 2), Satisfaction with Stability and Retention of the Prostheses (Question 3), and Satisfaction with the Appearance of the Prostheses (Question 4)*

| | Question† | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| Baseline | – | A | A | – |
| 1 wk | – | B | B | – |
| 3 mo | – | B | B | – |
| 6 mo | – | B | B | – |
| *P* | .900 | .000‡ | .004‡ | .102 |

*Verified by means of the VAS.
†Statistical difference (Wilcoxon test, $P < .05$) represented through different letters, where B represents more positive responses than A.
‡Significantly different according to the Friedman test ($P < .05$).

### *OHRQoL*

Immediately after conversion from the mandibular MSCD to the IRCD, benefits related to quality of life were observed regarding phonetics and comfort while eating, which relate to two functions of the stomatognathic system. Another benefit was observed in terms of pain in the mouth after a longer period of time (6 months; question 3, Table 1).

The conversion from the mandibular MSCD to the IRCD, combined with postsurgical healing, can negatively provide statistically significant differences. The worst results were found in the 1-week evaluation, compared to the 3- and 6-month results, when referring to a person feeling nervous as a result of problems related to the prostheses (question 6, Table 1). It could be observed throughout the study that patients were anxious since they were not able to remove their

mandibular prostheses by themselves when they wanted. This problem relates to the IRCD and not the immediate loading. The event of feeling tense or nervous at baseline and 1 week can also be related to pain in the mouth. In addition, at 1 week, patients still had sutures underneath the prostheses, which would be different if loading were delayed.

According to other authors, the quality of life of maxillomandibular MSCD wearers who were rehabilitated with IRCDs improved irrespective of the type of attachment used to secure the prosthesis.[6,20,22–26] Heydecke et al[27] also observed an improvement in IRCD users when referring to quality of life connected to general health. In this study, a significant improvement in terms of quality of life can be observed 3 months after conversion from the mandibular MSCD to the IRCD. The results at 1 week were statistically similar to those at baseline and 3 months (Table 2). In contrast to the current study, Attard et al[14] discovered a significant difference relating to quality of life after implant placement with immediate loading and conversion of the complete denture to a bar-retained overdenture; the improvement in quality of life was maintained after 1 year of function.

### *Satisfaction with the Prostheses*

In this study, the chief complaint at baseline was initially related to the mandibular prosthesis. Lack of retention and stability of the mandibular MSCD negatively impacted social interactions, such as laughing freely (61.25%) and talking freely (43.75%), apart from discomfort or pain in the mouth (43.75%). At baseline, only one patient with an MSCD reported not eating close to other people; no subjects reported this problem at 3 months.

At baseline, only one patient complained of mobility of both prostheses (mandibular and maxillary). However, soon after conversion from the mandibular MSCD to the IRCD, her complaint related only to the maxillary prosthesis. The residual edge in this subject was highly resorbed, with an extremely unfavorable anatomical shape for prosthesis retention. In every meeting, she would report her sadness at having had all her teeth extracted when 11 years old. The prostheses were probably not significant in causing the psychologic problems compared to the loss of her teeth.[4] As a general rule, the meticulous finishing of the MSCD regarding retention, stability, esthetics, phonetics, comfort, and health of the supporting tissue is sufficient in assuring patient satisfaction. Nonetheless, if the inherent psychologic condition of tooth loss acts in a more decisive way than that of the quality of the prostheses, the risk of the patient remaining dissatisfied persists.[18]

Subjects that have received treatment with IRCDs see an improvement in oral and social function.[18,23–25,28,29] A similar result regarding the satisfaction with the prosthesis, mainly the mandibular one, is presented in studies when treatment with immediate loading was evaluated before and 1 year after surgery.[11,14,15]

After conversion from the mandibular MSCD to an IRCD, 100% of patients were immediately satisfied with the retention of the prostheses. It is noteworthy that 25% of patients who had not previously complained about their maxillary prosthesis did so after converting the mandibular MSCD to an IRCD. Comparison of the mandibular prosthesis, with improved retention and stability, altered the perception of the maxillary prosthesis stability.

### *Limitations*

Possible limitations of this study include the small number of patients and the absence of a control group. Nevertheless, scientific evidence shows that the conversion of a conventional complete denture to an implant-retained overdenture has a positive impact on OHRQoL[22,23,27] and the satisfaction provided by the prosthesis.[23–25,28–30] Therefore, the objective of this study was not to compare immediate and conventional loading treatments, but to investigate if patient satisfaction would change immediately upon conversion, while still undergoing postsurgical care. Having the same prostheses and patients in a long-term study eliminated some drawbacks, which would include having two separate groups of patients. Nevertheless, these results should be interpreted with caution because of the reduced number of patients.

## Conclusion

In accordance with the methodology used and the statistical analysis of the results, complete denture wearers who underwent conversion from an MSCD to an IRCD with immediate loading reported immediate improvement in satisfaction, stability, and retention with the mandibular prosthesis. Satisfaction was related to the movement of the mandibular prosthesis when talking and laughing (social interaction). Quality of life was related to phonetics and comfort when eating.

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