

## Improvement in Quality of Life of Elderly Edentulous Patients with New Complete Dentures: A Systematic Review

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**Purpose:** To evaluate whether treatment with new complete dentures improves quality of life in elderly patients. **Materials and Methods:** A literature search was conducted in the MEDLINE/PubMed, Scopus, LILACS, SciELO, Web of Science, and Cochrane Library databases using specific keywords for relevant articles published up to March 2018. Three reviewers obtained the data and compared the results from reports that evaluated denture wearers 60 years of age or older whose old dentures were replaced with new ones. **Results and Conclusion:** Of 282 published studies, 7 met the inclusion criteria (5 evaluated quality of life before and after treatment using the Oral Health Impact Profile, 1 using the Oral Impacts by Daily Performance, and 1 using the Geriatric Oral Health Assessment Index). The articles showed a similar increase in quality of life after elderly patients were treated with new complete dentures; however, the limited methodologic quality in the reported and analyzed studies underscores the need for more robust controlled investigations to strengthen the current body of evidence, which is limited. *Int J Prosthodont* 2019;32:272–277. doi: 10.11607/ijp.6075

Although preservation of the natural dentition in elderly populations has been reported as increasing, a high incidence of tooth loss is still observed, and a significant number of these individuals may eventually lose their teeth.<sup>1</sup> While complete denture treatment has been successfully prescribed for edentulous patients, the dental literature reflects an increasing interest in the impact of health and clinical procedures on the quality of life (QoL) and general health of patients. The main outcome measures used for evaluation of complete denture treatment include retention and stability, esthetic perceptions, masticatory function, and management of occlusal forces. However, certain strategies of public and private health initiatives have been based on evidence concerning the benefits of alternative criteria for social welfare and disease treatment considerations. The quality and efficacy of these procedures are usually measured by their impact on an individual's QoL,<sup>2</sup> and some studies have sought to assess the influence of complete dentures on the QoL in elderly populations.

The measurement of results based on patient perceptions of treatment efficacy is improving, as scientists are evaluating the impact of different types of clinical interventions in edentulous patients using questionnaire-driven psychosocial data, such as the Oral Health Impact Profile (OHIP) and its variations, before and after treatment.<sup>1</sup> These types of questionnaires include items about the impact of oral health on function, daily habits, and social activities distributed among seven domains: functional limitation; pain; psychologic discomfort; physical, psychologic, and social impairment; and handicap.<sup>3</sup>

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Although some studies have shown limited predictability for denture treatment and poor adaptation over time,<sup>4,5</sup> there appears to be a strong correlation between oral health and quality of life. As a consequence, edentulism is considered a negative factor for the physical, mental, and social welfare of patients, while treatment with complete dentures is able to restore masticatory function and provide other benefits.<sup>6</sup> This systematic review addressed the following question: Does new complete denture treatment improve the QoL in elderly ( $\geq 60$  years) prosthesis-wearing patients?

## MATERIALS AND METHODS

This systematic review was carried out according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.<sup>7</sup> An electronic search in MEDLINE/PubMed, the Cochrane Library, Web of Science, LILACS, SciELO, and Scopus databases was conducted by three independent examiners until March 2018. The search included articles evaluating the QoL of elderly patients treated with complete dentures published in English, Portuguese, or Spanish. There was no limit for the year of publication. Only articles published in journals indexed in databases were selected. Table 1 shows the search strategies used for each database.

After the database searches, the titles and abstracts were listed using a standardized form. Based on the same eligibility criteria, the three researchers then selected the studies eligible for full-text analysis. The inclusion criteria were: patients  $\geq 60$  years old; measurement of an association between complete dentures and QoL; comparison before and after treatment with complete dentures; comparison between complete denture and implant treatment and/or comparison between complete denture and no

**Table 1** Electronic Search Strategies

Database	Search strategy
PubMed	((((("complete denture" OR "denture, complete" OR "denture, complete, lower" OR "denture, complete, upper")) AND ("quality of life")) AND ("Randomized controlled trial" OR "controlled trial" OR "prospective studies")) AND (aged* OR elderly* OR "aged, 80 and over" OR "oldest old"))
Web of Science	Tópico: ("complete denture" OR "denture, complete" OR "denture, complete, lower" OR "denture, complete, upper") AND Tópico: ("quality of life") AND Tópico: ("Randomized controlled trial" OR "controlled trial" OR "prospective studies") AND Tópico: (aged* OR elderly* OR "aged, 80 and over" OR "oldest old")
Scopus	ALL ("complete denture" OR "denture, complete" OR "denture, complete, lower" OR "denture, complete, upper") AND TITLE-ABS-KEY ("quality of life") AND ALL ("Randomized controlled trial" OR "controlled trial" OR "prospective studies") AND ALL (aged* OR elderly* OR "aged,80 and over" OR "oldest old")
Cochrane Library	"complete denture" OR "denture, complete" OR "denture, complete, lower" OR "denture, complete, upper" and "quality of life" OR and "Randomized controlled trial" OR "controlled trial" OR "prospective studies" and aged* OR elderly* OR "aged, 80 and over" OR "oldest old" in Cochrane Reviews'
LILACS	("complete denture" OR "denture, complete" OR "denture, complete, lower" OR "denture, complete, upper") AND ("quality of life") AND ("Randomized controlled trial" OR "controlled trial" OR "prospective studies") AND (aged* OR elderly* OR "aged, 80 and over" OR "oldest old")
SciELO	("complete denture" OR "denture, complete" OR "denture, complete, lower" OR "denture, complete, upper") AND ("quality of life") AND ("Randomized controlled trial" OR "controlled trial" OR "prospective studies") AND (aged* OR elderly* OR "aged, 80 and over" OR "oldest old")

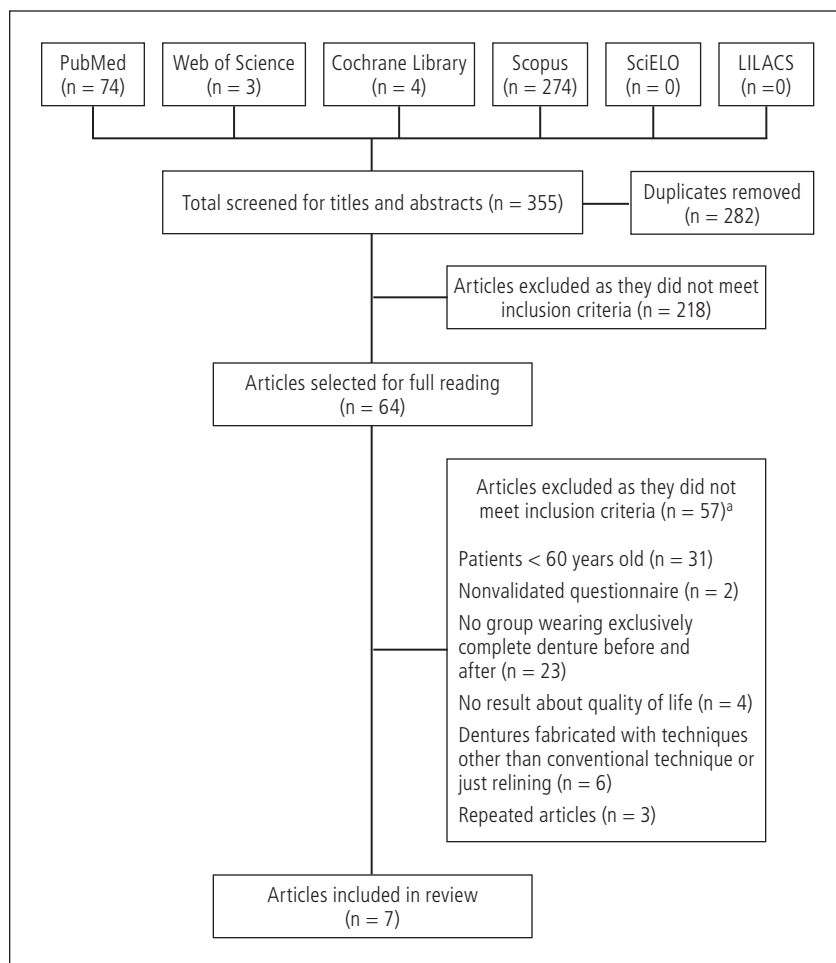
intervention; prospective and controlled clinical trials; and use of a validated questionnaire for QoL assessment. The exclusion criteria were: complete dentures fabricated with a simplified or digital technique and the use of a nonvalidated questionnaire.

The relevant studies were selected according to the inclusion and exclusion criteria. In case of disagreement between authors, a consensus was established or the reference was subjected to further evaluation. The articles found repeatedly in different databases were considered only once. After this first selection, all articles were read in full. Then, data about the authors, experimental design, samples, variables, follow-up, and denture impact on QoL were obtained from each article selected.

The quality of the studies included in this review was evaluated according to the Cochrane Risk of Bias Tool<sup>8,9</sup> with seven bias domains: sequence generation; allocation concealment; blinding of participants and personnel; blinding of outcome assessors; incomplete outcome data; selective outcome reporting; and other sources of bias. Finally, each study was classified into low risk of bias (low risk of bias for all key domains), unclear risk of bias (unclear risk of bias for one or more key domains), or high risk of bias (high risk of bias for one or more key domains).

## RESULTS

Of the 282 articles found after the final electronic search, 218 were excluded according to established parameters (some studies were excluded based on more than one criterion). A total of 64 articles were read in full. Figure 1 details the results of the search strategy. At the end, seven articles met the inclusion criteria of the present review.<sup>2,3,10-14</sup>



**Fig 1** Flow diagram of the search process. <sup>a</sup>Articles could be excluded based on more than one criterion.

A total of 345 elderly denture wearers were evaluated out of the 363 treated individuals. In three studies,<sup>3,10,11</sup> participants were recruited to answer questionnaires at the clinic, through advertisements in geriatric magazines, or through an announcement on a website in the cities where the studies were carried out. The participants of Dable et al<sup>12</sup> were selected from the daily outpatient department. Jabbour et al<sup>2</sup> recruited participants from a previous RCT.<sup>15</sup> Pearson<sup>14</sup> recruited participants living in residential or nursing homes, sheltered accommodations, private homes, or hospitals. One study did not explain clearly how the recruitment of the elderly occurred.<sup>13</sup>

The main parameters and the results of the seven articles are shown in Table 2, and quality evaluation of the clinical trials is shown in Table 3. Of the five clinical trials included, three showed a high risk of bias (especially related to random sequence generation, allocation concealment, and blinding of professionals), and two presented with an unclear risk. As the Cochrane Risk of Bias Tool is applied only to clinical trials, two prospective studies included in the review were not analyzed qualitatively.

The dropouts occurred due to illness, study withdrawal, death, and loss of contact. Three of the included studies compared new complete dentures to implant treatment (mandibular overdentures retained by two implants).<sup>2,3,11</sup> One clinical trial used nontreatment as a control.<sup>14</sup> The data from the nontreated control group were collected at the same time point

as the data from the group receiving treatment; after that, the treatment group received new dentures. The other studies evaluated the quality of life before and after rehabilitation with new complete dentures in the total sample or compared to another type of intervention (eg, dietary counseling).

Three studies evaluated only QoL.<sup>2,3,14</sup> Other variables were analyzed by the other studies. Dable et al<sup>12</sup> used a global self-rating scale for comparison of general health between the pretreatment and the 6-month posttreatment periods. Goiato et al<sup>13</sup> applied a perception questionnaire after denture insertion and 3 months later in order to evaluate uncomfortable sensations related to the new prostheses, including feeling of full mouth, pronunciation of sibilant tones, discomfort related to the prosthesis, and excessive salivation. Awad et al<sup>11</sup> evaluated QoL, general satisfaction with mandibular prostheses, and ability to chew six types of food (raw carrot, raw apple, cheese, sausage, bread, and lettuce), while Amagai et al<sup>10</sup> measured food intake using a brief self-administered diet history questionnaire.

The OHIP questionnaire (or its simplified versions, OHIP-EDENT and OHIP-20), the Geriatric Oral Health Assessment Index (GOHAI), and the Oral Impacts on Daily Performance (OIDP) were used to assess the impact of oral health on QoL. All studies presented significant improvement in QoL after treatment with complete dentures. Nevertheless, patients treated with mandibular overdentures and maxillary dentures showed better QoL (significantly lower OHIP scores) compared to those treated with both maxillary and mandibular dentures.

## DISCUSSION

This review sought to provide an analysis of the influence of complete denture treatment on improvement of QoL in elderly populations. All the

**Table 2** Main Results of the Articles Included in the Systematic Review

Studies (n = 7)	Experimental design	Sample	Questionnaire	Mean age (y)	Follow-up	Main results
Awad et al (2003) <sup>11</sup>	RCT	60 patients divided into implant group with mandibular overdenture (IG, n = 30) and complete denture group (GC, n = 30)	OHIP-49 OHIP-EDENT	Total sample: 69.3 y (SD 3.1)	Before and 2 mo after treatment	Reduced scores for all variables of OHIP and OHIP-EDENT occurred in both groups. In the IG, there was a significant reduction in OHIP-49 total value, functional limitation, psychologic discomfort, and physical impairment. OHIP-EDENT was also significantly lower after 2 mo for the same domains except physical impairment. IG showed significantly lower OHIP-49 and OHIP-EDENT scores.
Heydecke et al (2003) <sup>3</sup>	RCT	60 patients divided into implant group (IG, n = 30) and complete denture group (CG, n = 30)	OHIP-20	IC = 68.9 y, CG = 69.4 y	6 mo	The CG showed significant reduction in OHIP-20 scores concerning physical pain and psychologic discomfort. IG had significantly better oral health status than the CG group. IG showed significant reduction in OHIP-20 scores concerning functional limitation, physical pain, physical disability, and psychologic disability.
Jabbour et al (2012) <sup>2</sup>	Longitudinal prospective cohort study emerging from an earlier RCT	172 patients divided into two-implant mandibular overdenture (IG, n = 95) and complete denture (CG, n = 77) groups	OHIP-20	Mean age at T <sub>2</sub> : 73 y (SD 4.4)	T <sub>0</sub> : Baseline T <sub>1</sub> : 1 y T <sub>2</sub> : 2 y	There was a reduction in OHIP score ( $P < .001$ ) and its dimensions ( $P < .01$ ) from T <sub>0</sub> to T <sub>1</sub> and from T <sub>0</sub> to T <sub>2</sub> in the CG group. There was no statistically significant difference in OHIP social impairment score between the groups at T <sub>1</sub> . Both groups exhibited statistically significant improvement in OHRQoL ( $P < .001$ ) for over 2 y of follow-up.
Dable et al (2013) <sup>12</sup>	RCT	63 patients rehabilitated with complete dentures	GOHAI	69.41 y	6 mo	GOHAI scores increased from $28.90 \pm 7.28$ to $42.19 \pm 7.60$ ( $P < .001$ ).
Goiato et al (2012) <sup>13</sup>	Cohort study	60 patients rehabilitated with complete dentures	OHIP-EDENT	71.0 y (SD 7.6)	3 mo	Significant impacts were found for masticatory-related complaint items, psychologic discomfort and disability items, and oral pain and discomfort items. Differences between T <sub>1</sub> and T <sub>2</sub> were also observed for two social disability items ( $P < .05$ ). Most of the OHIP-EDENT items showed a highly significant impact of the new prostheses on oral health ( $P < .003$ ).
Amagai et al (2017) <sup>10</sup>	RCT	70 patients divided into intervention group (complete dentures + simple dietary advice, n = 35) and control group (complete denture + denture care advice, n = 35)	OHIP-EDENT-J	Total sample: 77.0 y (SD 7.6) Intervention group: 75.3 years (SD 8.2) Control group: 78.6 y (SD 6.6)	3 mo	Significant improvements in total scores in the intervention group and the control group were observed. The median results and interquartile ranges of the summary score of intervention group decreased from 18 (15) to 16 (17) ( $P = .003$ ). In the control group, the summary score decreased from 18 (17) to 13 (14) ( $P = .002$ ). In both groups, two domains showed significant improvements: functional limitation and physical pain.
Pearson et al (2007) <sup>14</sup>	RCT	133 elderly patients divided into study group (new complete dentures, n = 65) and control group (received 3 home visits, n = 68)	OIDP	Study group: 80.7 y Control group: 79.5 y	3 mo	The two groups were similar at baseline with respect to QoL. Approximately three quarters of participants had an impact at baseline (76.9% and 79.4% of the study and control groups, respectively). At follow-up, the prevalence of the study group was 36.9%; in the control group, it was 66.2%.

RCT = randomized controlled trial; OHIP = Oral Health Impact Profile; OHIP-EDENT = OHIP for assessing oral health of edentulous patients; OHIP-EDENT-J = Japanese version of the OHIP-EDENT; SD = standard deviation; OHRQoL = oral health-related quality of life; GOHAI = Geriatric Oral Health Assessment Index; OIDP = Oral Impacts by Daily Performance; QoL = quality of life.

**Table 3** Risk of Bias of Included Clinical Trials

Studies	Sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessors	Incomplete outcome data	Selective outcome reporting	Other sources of bias	Overall classification of the study
Awad et al (2003) <sup>11</sup>	Low	Unclear	High	Low	Low	Low	Low	High
Heydecke et al (2003) <sup>3</sup>	Low	Low	Unclear	Unclear	Low	Low	Unclear	Unclear
Dable et al (2013) <sup>12</sup>	High	High	Unclear	Unclear	Unclear	Low	High	High
Amagai et al (2017) <sup>10</sup>	Low	Low	Low	Low	Low	Low	Unclear	Unclear
Pearson et al (2007) <sup>14</sup>	Low	Unclear	High	Low	Low	Low	Unclear	High

included reports asserted significant improvement in QoL after treatment with complete dentures. The studies were standardized using validated questionnaires in order to provide similarity, validity, and reproducibility of the results. Participant age was also standardized to avoid the influence of age on the results and to focus findings for the main group of denture wearers. However, meta-analysis of the studies was not conducted because the articles used different questionnaires or different versions of the same questionnaire and because the presentation of the data was performed heterogeneously.

For the studies that used OHIP and its variations,<sup>2,3,10,11,13</sup> there was a significant improvement in the functional limitation, physical pain, and physical disability domains. These results could be explained by the fact that old dentures were uncomfortable for patients, and the new dentures provided greater chewing efficiency and a better fit to the supporting tissues.<sup>13</sup> Furthermore, satisfaction and QoL in treated patients were related to the ability to chew and talk, comfort, retention, and esthetics.<sup>13,16</sup> So, it could be supposed that the new complete dentures re-established the occlusal vertical dimension and the anatomy of the teeth (ie, restoring the cuspids and triturating areas), hence improving the efficiency of mastication.<sup>13</sup>

It is important to note the results of the comparisons between complete dentures and implant-supported prostheses that were conducted in three of the seven articles selected. Recently, several studies reported the superiority in function, patient satisfaction, and QoL for implant-supported prostheses compared to complete dentures, including articles in this review.<sup>2,3,11</sup> However, in relation to QoL, there is a notion that individual factors are important. QoL is a dynamic construct that can change within an individual if their internal standards of measurement or values change.<sup>14</sup> In addition, patient satisfaction is related to their level of acceptance of the dental treatment, which is directly dependent on their emotional and mental statuses.<sup>12</sup>

For example, in one study it was found that despite better results (lower OHIP scores) in the implant group in all OHIP-20 domains, there was improvement in the physical pain and psychologic discomfort scales in the complete denture group. Furthermore, the difference between implant overdentures and complete denture treatment is not as great as was found in an earlier trial in a group of younger people.<sup>17</sup> The impact of oral disease diminishes with age,<sup>3</sup> suggesting a better adaptation and satisfaction with treatment with complete prostheses.

So, although the great effect of the implant treatment alternative supports its clinical relevance,<sup>2,3,11</sup> complete dentures provide a positive impact on the oral health and QoL of edentulous patients, especially for patients potentially experiencing limitations (eg, financial or systemic) preceding implant treatment.<sup>12,13</sup>

The literature search revealed only a few randomized, controlled clinical trials. Of seven articles, five met this experimental design, greatly reducing the reliability of the evidence found. Furthermore, the studies presented poor methodologic quality with high or unclear risks of bias, which can limit data analysis. The differences in experimental design and inclusion and exclusion criteria represented a significant challenge for the synthesis and comparison of results. The variance in follow-up range was also an evident limitation. In general, all studies conducted a short follow-up. Thus, it is uncertain whether the positive impact of complete dentures persists over time. In addition, none of the studies using a control group with no treatment evaluated the control group at two different time points.

The use of psychometric questionnaires such as the OHIP or the GOHAI may be limited when measuring feelings and behaviors associated with dental impairment and disability.<sup>18</sup> Questionnaire limitations include confusing attributes, misinterpretations, translations, significance and utility of scores, and unstable scores. Such limitations may explain why respondents with similar dental impairments rate their oral health as good and satisfied or poor and dissatisfied.<sup>19</sup>



However, despite those limitations, generic instruments provide standardized health measures and indices that are useful in economic, political, and social evaluations of health. In addition, the questionnaires provide information for planning of oral health care services for the studied population, simplifying the results for health policy makers.<sup>20,21</sup> Although qualitative methods provide more complex analyses, there are few studies using such methods in oral rehabilitation. So, the validated psychometric questionnaires for elderly people were selected.

Complete denture treatment improves the QoL in elderly patients, similar to treatment with implants. This is relevant because implant treatment is not always a possible alternative due to systemic impairment or psychological issues. In some cases, it is not a desirable option.<sup>22</sup> Perceptions about health and disability are influenced by the social, cultural, and political contexts in which they are assessed, so complex investigations are needed to perceive the emotional complexity of tooth loss and adaptation to dentures. Thus, complete dentures can be a restorative option with satisfactory results for these types of patients.

## CONCLUSIONS

The present systematic review evaluated a total of seven studies and showed that complete denture treatment improves elderly patients' QoL after denture replacement.

This conclusion highlights the importance of providing dental treatment for such edentulous individuals. It must be acknowledged that only a few randomized controlled clinical trials are reported to assess the influence of this treatment approach on the QoL of elderly patients. Further studies with stronger evidence and better methodologic quality are required to validate the hypothesis that complete denture treatment provides positive diverse treatment outcomes in elderly populations.

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