

Changes in Oral Health Related Quality of Life (OHRQoL) and Satisfaction with Conventional Complete Dentures Among Elderly People

Jelena Erić^a / Ljiljana Tihacek Šojić^b / Ljiljana Bjelović^c / Georgios Tsakos^d

Purpose: To assess the changes in oral health-related quality of life (OHRQoL) and satisfaction among older adults after receiving new complete dentures, and the association of age, gender, education, medical history, past prosthetic history (number of previous complete dentures and time since current complete dentures) and quality of existing complete dentures with patients' ratings of satisfaction with their complete dentures.

Materials and Methods: The study comprised 114 community-dwelling adults ≥ 65 year of age, all wearing complete dentures in both jaws. The sample was selected from four senior day centres. Data were collected using clinical oral examinations and a self-administered questionnaire. Dentures were clinically evaluated for retention, stability, occlusion, articulation and vertical dimension. The questionnaire recorded data on sociodemographic information, previous denture history, oral satisfaction scale (OSS), and OHRQoL through the Oral Impacts on Daily Performance (OIDP) scale.

Results: There was a significant improvement in OHRQoL after treatment (mean OIDP score: 2.7) compared to before treatment (mean OIDP score: 6.6). The largest changes were in relation to impacts on eating (33.3% to 15.9%) and smiling (17.5% to 4.5%). Six months after placement of the dentures, patient satisfaction improved compared to before treatment ($p < 0.001$). The results of this study demonstrated that satisfaction was correlated with age, gender, and past prosthetic history in the patients rehabilitated with complete dentures.

Conclusions: The provision of new dentures among older adults resulted in significantly better satisfaction and OHRQoL than wearing existing dentures. There was no significant correlation between the clinical assessment of the dentures and patients' satisfaction with them.

Key words: complete denture, oral health, patient's satisfaction, quality of life

Oral Health Prev Dent 2017; 15: 237–244.
doi: 10.3290/j.ohpd.a38524

Submitted for publication: 17.02.15; accepted for publication: 25.12.15

Tooth loss and wearing complete dentures can compromise patients' masticatory function, impair their quality of life and result in a range of emotional impacts in the edentulous.¹¹ Extensive tooth loss reduces chewing performance and limits food choice.²⁸ It would appear, therefore,

that edentulousness and wearing complete dentures could have an impact on overall quality of life.¹²

Most studies on oral health related quality of life (OHRQoL) in complete and removable denture wearers agree that compared to partially or fully dentate people, those receiving complete dentures reported worse OHRQoL.^{17,18} On the other hand, Forgie et al⁸ found that although the provision of complete dentures improved satisfaction, this did not generally impact on the quality of life.

The success of the treatment plan for edentulous patients depends mainly on their perceptions, as they are concerned more about their speech and their dentures' stability, comfort, ease of removal and cleaning.¹⁵ However, when assessing dental treatment outcomes, it is important to consider both the clinical and subjective points of view. To capture the functional and psychosocial aspects, the clinical indicators alone are not sufficient, as they do not consider the patients' perceived needs or preferences.³⁰ Pera et al²⁴ concluded that satisfaction was a highly complex phenomenon influenced by numerous factors, not strictly related to the

^a Assistant, Department of Prosthodontics, Faculty of Medicine, University of East Sarajevo, Foča, Bosnia and Herzegovina. Idea, experimental design, wrote the manuscript.

^b Full Professor, Department of Prosthodontics, Faculty of Dentistry, University of Belgrade, Belgrade, Republic of Serbia. Proofread the manuscript.

^c Assistant, Department of Endodontics and Restorative Dentistry, Faculty of Medicine, University of East Sarajevo, Foča, Bosnia and Herzegovina. Experimental design, wrote the manuscript.

^d Senior Clinical Lecturer, Department of Epidemiology and Public Health, University College London, London, UK. Proofread the manuscript, contributed substantially to discussion.

Correspondence: Jelena Erić, Faculty of Medicine, University of East Sarajevo, Studentska 5, 73300 Foča, Bosnia and Herzegovina. Tel: +387-5-821-1906; Email: jelena_kulic@yahoo.co.uk

stomatognathic system. Indeed, Boretti et al³ concluded that a patient's satisfaction with complete dentures would primarily depend on the subject's sociopsychological background.

Although dentures may need to be replaced after a number of years, it is not obvious that their replacement would result in an improved quality of life, as there are many factors that influence patient satisfaction. This study aimed to assess the changes in OHRQoL and satisfaction among older adults after having new complete dentures, as well as the association of age, gender, education, medical history, past prosthetic history (number of previous complete dentures and time since current complete dentures) and quality of existing complete dentures with patients' ratings of satisfaction with their complete dentures.

MATERIALS AND METHODS

Participants

An intervention study was conducted among community-dwelling adults aged 65 years or over living in two municipalities: Foča and Sarajevo. The sample was selected from senior day centres, where retired independently-living senior adults meet, communicate and participate in recreational activities. There are six senior day centres in the eastern part of Bosnia and Herzegovina, and four of these were randomly selected using opaque envelopes for this study. The envelopes contained allocation to location of senior day centres. The inclusion criteria for selecting participants were: (1) use of complete dentures in both jaws; (2) presence of adequate healthy tissue to support the prosthesis; (3) adequate cognitive ability (Mini Mental State Examination score of 21 or more); (4) ability to respond to the questions posed. A total of 120 edentulous subjects wearing complete dentures were selected following an initial clinical exam and Mini Mental State Examination (MMSE). The study was approved by the Institutional Ethics Committee of the University of East Sarajevo (No. 01-2-5) and written informed consent was obtained from all participants.

Data Collection

Data were collected through clinical oral examinations and self-administered questionnaires. Clinical examinations of the dentures were performed for each patient by the same prosthodontist. Before the data collection for the study, the prosthodontist was trained by a benchmark examiner ('gold standard') and calibrated on 20 complete-denture wearers that were not part of the study group. Maxillary and mandibular dentures were evaluated for retention, stability, occlusion, articulation and vertical dimension of occlusion at baseline, 3 and 6 months after the initial training. The mean intraexaminer agreement obtained at baseline (kappa 0.86), 3 months (kappa 0.81) and 6 months (kappa 0.80) showed substantial or almost perfect agreement.²⁰

The questionnaire recorded data on sociodemographics, previous denture history (number of previous dentures and period of wearing existing dentures), the oral satisfaction scale (OSS) and the Oral Impacts on Daily Performances

(OIDP) measure. The OSS provided information on patient satisfaction with previous and new prostheses, while the self-administered mode of the OIDP was used to measure the OHRQoL of participants.

Prosthetic treatment lasted an average of 6 weeks (one visit per week), and all patients were treated by the same prosthodontist from the Department of Prosthodontics of the University of East Sarajevo. The participants' complete dentures were assessed clinically and the participants rated the level of their satisfaction with the complete dentures. If they fell below the required quality standards (poor occlusion and articulation and/or unsatisfactory retention and stability and/or unacceptable vertical dimension) and the participants were unsatisfied, they were replaced with new complete dentures. All complete dentures were made following the same protocol (primary and secondary impressions, recording of jaw relationships using occlusal rims, one or two trial insertions and fitting the new dentures). The concept of dental occlusion was bilateral balanced occlusion. This occlusal scheme has simultaneous bilateral posterior occlusal contacts when the patient is in the centric relation position. Also, the contacts of many mandibular and maxillary artificial teeth exist in all excursive movements. The dentures were fabricated from polymeric materials (polymethylmethacrylate). After the replacement of complete dentures, adjustments to the dentures were made until the prosthodontist judged further adjustment as unnecessary. The number of visits required for denture control differed between subjects (two, three or four visits). Because all complete dentures were covered by health insurance, patients were not burdened financially. All dentures were made by the same dental technician from the Dental Laboratory of University of East Sarajevo.

Clinical Assessment of Dentures

Clinical examination and assessment of need for denture replacement followed an earlier study²² and was determined by the prosthodontist's subjective judgement based on clinical experience, examination of the patient and the dentures. Clinical examinations of existing dentures determined retention, stability, occlusion, articulation and vertical dimension. Retention, stability and vertical dimension of dentures were classified as good, satisfactory and poor, while occlusion and articulation were classified as good or poor. If occlusion and articulation were good, stability and retention were good or satisfactory, vertical dimension acceptable, and the dentures were undamaged, they were classified as satisfactory (not needing replacement); otherwise, they were indicated as needing replacement. According to this evaluation method, 88 participants needed their dentures replaced.

Denture Wearers' Satisfaction

Participants were asked to rate their level of general satisfaction with their dentures and also to grade their satisfaction with maxillary and mandibular dentures independently for functionality, aesthetics, stability and comfort through the OSS. The OSS is a visual analogue scale ranging from

1 to 5 (1 = totally dissatisfied, 5 = extremely satisfied) and ratings were done before and after prosthetic treatment.

OIDP Questionnaire

OHRQoL was assessed through the Bosnian version of the OIDP.⁶ The OIDP evaluates the degree to which the daily life of a person has been negatively affected by oral conditions. It focuses on 10 basic daily life activities and behaviours: eating; speaking; cleaning teeth or dentures; doing light physical activities; sleeping; relaxing; smiling; laughing and showing teeth without embarrassment; maintaining usual emotional state; going out and enjoying contact with other people. If a participant experienced an oral impact on any daily performance in the last six months, then its frequency and severity were assessed using 5-point ordinal scales. A performance score for each OIDP item was calculated by multiplying the respective frequency and severity scores. If no impact was experienced, then a zero score was assigned. The total OIDP score was the sum of the performance scores divided by the maximum possible score, then multiplied by 100 to be expressed as a percentage. Higher OIDP scores represent poorer quality of life.

At least 6 months after treatment, the same subjects completed the OIDP questionnaire again. The second questionnaire related specifically to the replacement dentures and the subjects did not see their earlier responses to the same questions about their previous dentures.

Statistical Analysis

Descriptive analyses referred to frequency distributions and percentages of demographic and clinical data as well as the OIDP. Comparisons between existing and new dentures for the OIDP and OSS were then made using the Wilcoxon Signed Ranks test. Differences in the OIDP score between baseline and follow-up were tested using paired t-test. OIDP change scores were calculated by subtracting the post-treatment summary scores from the pre-treatment scores. The effect size was calculated by dividing the mean of change score by the standard deviation of the pre-treatment score. The correlation between the sociodemographic information, medical history, past prosthetic history, clinical quality of denture and participants' satisfaction were calculated by Spearman's correlation coefficient.

RESULTS

Oral Health Characteristics of Study Population

Of the 120 people aged 65 years or older who were invited to participate in this study, 4 were excluded because they did not pass the cognitive test (MMSE \leq 21). Of the remaining 116 subjects, 2 did not consent to participate, so that the analysis refers to 114 participants (response rate: 95.0%). The mean age of the subjects was 71.4 (SD = 5.6) years and 53.5% were female. Only 1.8% of the subjects had finished high school, while 76.3% of the subjects had only finished primary school or had no formal education (Table 1). A considerable proportion of subjects had been

Table 1 Sociodemographic and clinical characteristics of the sample (n = 114)

Variables	n (%)
Sex	
Male	53 (46.5)
Female	61 (53.5)
Age	
65–74	75 (65.8)
75–84	31 (27.2)
85+	8 (7.0)
Education	
No education	44 (38.6)
Primary school	43 (37.7)
Secondary school	25 (21.9)
High school	2 (1.8)
Number of previous complete dentures	
0	58 (50.9)
1–3	56 (49.1)
Wearing duration of current complete dentures	
0–5 years	67 (58.8)
\geq 5 years \leq 10 years	40 (35.1)
\geq 10 years	7 (6.1)

edentulous for more than 3 years (43.18% in maxilla and 46.59% in mandible), and 41.2% of existing dentures had been made more than 5 years ago.

Denture-related Variables

The retention, stability, vertical dimension, occlusion and articulation of the 114 complete dentures are shown in Table 2. Overall, 80.7% of the dentures in the maxilla and 81.6% of dentures in the mandible had poor stability. Occlusion and articulation were good in 62.3% and 63.2% of the dentures, respectively.

Table 3 shows the results of the patients' satisfaction with existing and new dentures. Most participants were dissatisfied with the functionality, stability and comfort of existing dentures. Six months after the placement of new dentures, patient satisfaction improved. Among the 88 patients treated, 85.2% and 48.8% were completely or moderately satisfied with functional aspects of the new upper and lower denture, respectively. Aesthetics of the prostheses also improved compared with the initial evaluation; 87.4% and 77.3% of subjects were completely or mostly satisfied with upper and lower dentures at follow-up. Further, 87.5%

**Table 2 Clinical assessment of dentures by the prosthodontist**

Denture variables	Prosthodontist's assessment n (%)		
	Good	Satisfactory	Poor
Retention (upper)	9 (7.9)	14 (12.3)	91 (79.8)
Stability (upper)	6 (5.3)	16 (14.0)	92 (80.7)
Retention (lower)	0 (0.0)	21 (18.4)	93 (81.6)
Stability (lower)	0 (0.0)	21 (18.4)	93 (81.6)
Occlusion	71 (62.3)		43 (37.7)
Articulation	72 (63.2)		42 (36.8)
Vertical dimension	67 (58.8)		47 (41.2)

Table 3 Denture wearers' satisfaction

	Satisfaction with existing dentures					Satisfaction with new dentures					p*
	Upper denture					Lower denture					
	ES	VS	MS	SS	NS	ES	VS	MS	SS	NS	
Functionality	7 (6.1)	20 (17.5)	21 (18.4)	7 (6.1)	59 (51.8)	38 (43.2)	26 (29.5)	11 (12.5)	5 (5.7)	8 (9.1)	p < 0.001
Aesthetics	10 (8.8)	34 (29.8)	12 (10.5)	10 (8.8)	48 (42.1)	37 (42.0)	26 (29.5)	14 (15.9)	6 (6.8)	5 (5.7)	p < 0.001
Stability	7 (6.1)	23 (20.2)	10 (8.8)	14 (12.3)	60 (52.6)	42 (47.7)	25 (28.4)	9 (10.2)	4 (4.5)	8 (9.1)	p < 0.001
Comfort	12 (10.5)	18 (15.8)	12 (10.5)	12 (10.5)	66 (52.6)	36 (40.9)	28 (31.8)	13 (14.8)	8 (9.1)	4 (4.5)	p < 0.001
GS	11 (9.6)	17 (14.9)	13 (11.4)	10 (8.8)	63 (55.3)	31 (35.2)	33 (37.5)	12 (13.6)	8 (9.1)	4 (4.5)	p < 0.001
Functionality	3 (2.6)	13 (11.4)	13 (11.4)	11 (9.6)	74 (64.9)	17 (19.3)	14 (15.9)	12 (13.6)	16 (18.2)	29 (33.0)	p < 0.001
Aesthetics	13 (11.4)	24 (22.1)	13 (11.4)	14 (12.3)	50 (43.9)	34 (38.6)	18 (20.5)	16 (18.2)	12 (13.6)	8 (9.1)	p < 0.001
Stability	5 (4.4)	10 (8.8)	12 (10.5)	11 (9.6)	76 (66.7)	8 (9.1)	23 (26.1)	16 (18.2)	12 (13.6)	29 (33.0)	p < 0.001
Comfort	5 (4.4)	10 (8.8)	13 (11.4)	13 (11.4)	73 (64.0)	7 (8.0)	17 (19.3)	20 (22.7)	15 (17.0)	29 (33.0)	p < 0.001
GS	4 (3.5)	8 (7.0)	17 (14.9)	16 (14.0)	69 (60.5)	11 (12.5)	22 (25.0)	21 (23.9)	16 (18.2)	29 (33.0)	p < 0.001

*Wilcoxon Signed Ranks Test for comparisons between the satisfaction with existing and new dentures. ES: extremely satisfied; VS: very satisfied; MS: moderately satisfied; SS: slightly satisfied; NS: not at all satisfied.

Table 4 Prevalence of Oral Impacts on Daily Performances (OIDP) for existing and new dentures

Daily performances	Existing dentures	New dentures	p*
Any impact	48 (42.1)	19 (21.6)	p < 0.01
Difficulty eating	38 (33.3)	14 (15.9)	p < 0.001
Difficulty speaking	18 (15.8)	8 (9.1)	p = 0.48
Difficulty cleaning dentures	6 (5.3)	3 (3.4)	p = 0.32
Difficulty doing light physical activities	7 (6.1)	7 (8.0)	p = 1.0
Difficulty relaxing	10 (8.8)	7 (8.0)	p = 0.44
Difficulty smiling	20 (17.5)	4 (4.5)	p < 0.001
Emotional instability	15 (13.2)	12 (13.6)	p = 0.47
Difficulty going out	14 (12.3)	6 (5.3)	p < 0.05
Difficulty enjoying contact with other people	11 (9.6)	6 (5.3)	p < 0.05
Participants' perception	N (%)	OIDP change score (mean, SD)	p**
Worsened a lot	2 (2.3)	-15.2 (3.96)	p > 0.05
Worsened a little	9 (10.2)	-0.35 (9.58)	p > 0.05
Stayed the same	21 (23.9)	5.55 (6.95)	p < 0.01
Improved a little	18 (20.5)	8.98 (8.97)	p < 0.01
Improved a lot	38 (43.2)	6.54 (9.33)	p < 0.01
All subjects		3.9 (4.1)	p < 0.001

*Wilcoxon Signed Ranks test for comparisons of oral impacts between patients with existing vs new dentures. **Paired t-test for comparisons of OIDP scores of patients with existing vs new dentures. Significant differences in bold face.

of participants rated their upper dentures as comfortable or generally comfortable while 50.0% assessed their lower dentures as generally comfortable.

Oral impacts were common before treatment; 42.1% of people reported at least one oral impact in the last 6 months. Eating was the most commonly affected daily performance (33.3%), followed by smiling (17.5%), while 13.2% reported difficulty maintaining their usual emotional state without being irritable (Table 4). Oral impacts were less prevalent after treatment; 21.6% of the participants reported at least one oral impact in the last 6 months.

Overall, there was a significant improvement in the OIDP score after treatment compared to before treatment (mean OIDP scores before and after treatment: 6.6 and 2.7; $p < 0.001$). The largest changes were in relation to impacts on eating (33.3% to 15.9%), smiling (17.5% to 4.5%), going out (12.3% to 5.3%), and enjoying contact with other people (9.6% to 5.3%). Looking at the OIDP change scores by categories of global ratings of oral health change, we observed a gradient for almost all categories with an increase in the mean change scores for consecutively better perceptions; 'worsened a lot' and 'worsened a little' had a negative mean OIDP change score, while the respective scores were

positive for 'stayed the same', 'improved a little' and 'improved a lot'. Differences in the pre- and post-treatment scores were significant for those who reported that their oral health stayed the same, those reporting that it improved a little and also for those that improved a lot ($p < 0.01$), but differences were not significant for the groups that reported deterioration (Table 4). The effect size of the OIDP change score for all subjects was 0.44.

Correlations Between Participants' Satisfaction with Dentures and Sociodemographic and Clinical Variables

The results showed that males were more satisfied with functionality and comfort of dentures and stability of the lower denture ($p < 0.001$). Older participants were more satisfied with the aesthetics of their dentures than were younger participants ($p < 0.05$). Patients with a longer period of wearing existing dentures were more satisfied with functionality and comfort ($p < 0.05$). The number of previous dentures was positively correlated with the functionality, stability and comfort. No significant correlation was found between the clinical assessment of dentures and patients' satisfaction for any of the factors evaluated (Table 5).



Table 5 Spearman’s correlation coefficients between the gender, age, education, medical history, past prosthetic history, clinical quality of complete denture and patients’ ratings of satisfaction

	Patients’ ratings of satisfaction							
	Upper denture				Lower denture			
	Functionality	Aesthetics	Stability	Comfort	Functionality	Aesthetics	Stability	Comfort
Gender	-0.267**	-0.150	-0.131	-0.281**	-0.208*	-0.056	-0.321**	-0.386**
Age	0.088	0.197*	0.143	0.169	0.048	0.093	0.067	0.095
Education	0.177	-0.109	-0.003	-0.110	0.008	-0.098	-0.011	-0.051
Medical history	0.125	0.080	-0.047	0.163	-0.019	0.043	-0.036	-0.032
NPD	0.296**	-0.021	0.280**	0.275**	0.114	-0.012	0.033	0.161
Time	0.253*	-0.158	0.177	0.246*	0.086	-0.175	0.077	0.060
Retention	-0.125	-0.144	-0.161	-0.153	-0.003	-0.09	-0.004	-0.028
Stability	-0.098	-0.113	0.137	-0.128	0.023	-0.058	0.021	-0.003
Occlusion	0.035	0.02	0.039	0.027	0.169	-0.133	0.161	0.083
Articulation	0.092	0.096	0.106	0.101	0.085	-0.110	0.72	0.006
VDO	-0.121	-0.083	-0.125	-0.154	-0.054	-0.058	-0.054	-0.117

* p < 0.05; **p < 0.001; VDO: vertical dimension of occlusion; NPD: number of previous dentures; Time: duration of wearing current complete dentures.

DISCUSSION

This study shows that patient satisfaction and OHQoL significantly improved after providing new dentures to elderly people.

The high OIDP score at baseline indicated that people had poor OHQoL despite wearing dentures. This may be explained by the fact that subjects were dissatisfied with their old dentures and had retention and stability problems. Furthermore, subjects were generally very satisfied with their new dentures, which was reflected in a significant improvement in quality of life. The significantly improved OIDP ratings for eating, smiling, going out and enjoying contact with other people could be related to the fact that the old dentures caused discomfort, while the new ones provided greater chewing efficacy and fit on the supporting tissues. The rehabilitation with new dentures re-established the vertical dimension of occlusion and the anatomy of the teeth, restoring the cuspids and the triturating areas, thereby improving the efficacy of mastication. Mastication is an important factor in improving oral function of people with complete dentures.¹⁹ The significant improvement in OHRQoL regarding smiling, going out and enjoying contact with other people may be because patients with a new and well-adapted complete prosthesis were satisfied with the aesthetic appearance and the function of their dentures, which in turn can raise self-esteem and self-confidence levels.

Without empirical evidence on responsiveness to change, and particularly on the ability to detect small meaningful changes, researchers cannot be sure whether any difference in the OHRQoL reflects actual change or merely measurement error. The minimally important difference (MID) is the smallest score or change in a score that would be important from the patient’s or clinician’s perspective and helps to interpret whether the observed change in OHRQoL is meaningful.¹³ Our study provided evidence that the provision of new dentures can improve quality of life; the magnitude of the effect size showed that this change reflected a moderate improvement.⁵ In our study, participants who reported that their oral health deteriorated after treatment also had negative OIDP change scores, indicating deterioration in their OHRQoL, while those who reported that they improved considerably had the highest positive mean change score, showing the highest improvement in OHRQoL.

A serious consequence of a poorly adapted complete denture may be social isolation. Studies have shown that the absence of teeth and/or use of a poorly adapted prosthesis restrict the diet and make people feel socially uncomfortable, leading them to avoid eating with others.^{12,27} In contrast, the provision of new dentures generally results in improvement in the OHRQoL of older adults.^{1,15,17}

Our results revealed that a high proportion of subjects (55.3% for upper and 60.5% for lower dentures) were extremely dissatisfied with their old dentures; this is higher than in previous studies.^{2,6} Several factors, such as the

potential maladaptation of the base of the dentures, cuspid resin wear and tear and changes to the vertical dimension of the occlusion, may negatively affect prosthesis retention, eating and speaking, resulting in higher levels of dissatisfaction.^{12,18,27} After rehabilitation with new conventional dentures, patients were much more satisfied, which is in agreement with other studies.^{1,6,17} This could be attributed to the better quality of the new dentures compared to the old ones, resulting in improved comfort and aesthetics. However, we cannot rule out that these results may also be partly explained by a potential Hawthorne effect, i.e. the patients were more satisfied because they were looked after and treated by a professional.

The literature is conflicting in terms of the association between the clinical quality of complete dentures and the patients' appreciation of the denture fit.^{18,25,28,30} Previous studies have demonstrated that there is often no or poor correlation between a dentist's assessment of denture quality and a patient's satisfaction with it.^{2,6,14,31} The majority of complete denture wearers are satisfied with their dentures, irrespective of denture quality, and some 10–20% are dissatisfied even if the dentures are constructed according to prosthodontic guidelines.² A study on complete denture wearers showed a high correlation between patient and dentist ratings of poor dentures, but little or no correlation when dentists and patients rated the dentures as good.³¹ In our study, patients' satisfaction with their dentures was not significantly associated with the clinical assessment of the dentures by a prosthodontist. Patients' satisfaction was greater than that justified by the prosthodontist's assessment, potentially indicating that patients and professionals consider different dimensions when rating dentures. Dentists consider dentures to be successful when they meet certain technical standards, whereas patients evaluate their prostheses according to their personal satisfaction;²⁶ the latter is determined primarily by their functional ability as well as psychological factors rather than anatomical and technical prerequisites of the dentures.

Our results showed that older people were more satisfied with the aesthetics of their dentures. This might be because age may also be a determinant of patient expectations, since elderly denture wearers are more satisfied with their dentures compared to their relatively younger counterparts.¹⁶ Female patients rated significantly lower satisfaction with the functionality, comfort and stability of their dentures than did males. Other studies have found differences between gender and patient satisfaction with complete dentures,^{4,23} which may be related to women's negative self-perception of oral health.²¹ In regard to previous denture experience, our results showed that patients with previous denture experience and a longer period of wearing existing dentures would tolerate the new complete dentures better than the patients that did not have dentures in the past. In agreement with previous studies,^{10,29} patients with previous denture experience were more satisfied with functionality, stability and comfort.

This study is not without limitations. We used a sample from four day centres in two Serbian-speaking cities and

therefore it is not representative of older adults in Bosnia and Herzegovina. In addition, the follow-up period of 6 months after denture provision was relatively short. Future studies should address this by evaluating dentures over a longer follow-up period.

CONCLUSION

This study indicated that the provision of new dentures among older adults with unsatisfactory existing complete dentures resulted in significantly better oral health-related quality of life, particularly in terms of improved eating, speaking, smiling, going out and enjoying contact with other people. Denture wearers perceived marked improvements in their functionality, aesthetics, stability, comfort and reported better overall satisfaction after poorly fitting dentures were replaced with new, better-fitting ones. Patient satisfaction with their existing dentures was higher among older age, males, in patients with previous denture experience and longer period of wearing existing dentures. In contrast, there was no significant correlation between the clinical assessment of the dentures and patients' satisfaction with them.

REFERENCES

1. Allen P, McMillan A. A longitudinal study of quality of life outcomes in older adults requesting implant prostheses and complete removable dentures. *Clinical Oral Implants Research* 2003;14:173–179.
2. Berg E. Acceptance of full dentures. *Int Dent J* 1993;43:299–306.
3. Boretti G, Bickel M, Geering AH. A review of masticatory ability and efficiency. *J Prosthet Dent* 1995;74:400–403.
4. Carlsson GE, Johansson A, Johansson AK, Ordell S, Ekback G, Unell L. Attitudes toward dental appearance in 50- and 60-Year-old subjects living in Sweden. *J Esthet Restor Dent* 2008;20:46–55.
5. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*, ed 2. Hillsdale, New York: Lawrence Erlbaum Associates, 1988:406.
6. De Lucena SC, Gomes SGF, Da Silva WJ, Del Bel Cury AA. Patients' satisfaction and functional assessment of existing complete dentures: correlation with objective masticatory function. *J Oral Rehabil* 2011;38:440–446.
7. Erić J, Stančić I, Tihaček-Šojić Lj, Popovac Jelenković A, Tsakos G. Validity and reliability of the Oral Impacts on Daily Performance (OIDP) scale in the elderly population of Bosnia and Herzegovina. *Gerodontology* 2012;29:e902-e908.
8. Folstein MF, Folstein SE, McHugh PR. Mini-mental state. A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 1975;12:189–198.
9. Forgie AH, Scott BJ, Davis DM. A study to compare the oral health impact profile and satisfaction before and after having replacement complete dentures in England and Scotland. *Gerodontology* 2005;22:137–142.
10. Frank RP, Milgrom P, Leroux BG, Hawkins NR. Treatment outcomes with mandibular removable partial dentures: a population based study of patient satisfaction. *J Prosthet Dent* 1998;80:36-45.
11. Gerritsen AE, Allen PF, Witter DJ, Bronkhorst EM, Creugers NH. Tooth loss and oral health-related quality of life: a systematic review and meta-analysis. *Health Qual Life Outcomes* 2010;8:126.
12. Goiato MC, Banwart LC, Moreno A, Dos Santos DM, Martini AP, Pereira LV. Quality of life and stimulus perception in patients' rehabilitated with complete denture. *J Oral Rehabil* 2012;39:438–445.
13. Guyatt GH, Osoba D, Wu AW, Wyrwich KW, Norman GR. Methods to explain the clinical significance of health status measures. *Mayo Clinic Proceedings* 2002; 77:371–383.

14. Heydecke G, Klemetti E, Awad MA, Lund JP, Feine JS. Relationship between prosthodontic evaluation and patient ratings of mandibular conventional and implant prostheses. *Int J Prosthodont* 2003;16:307–312.
15. Heydecke G, Locker D, Awad MA, Lund JP, Feine JS. Oral and general health-related quality of life with conventional and implant dentures. *Community Dent Oral Epidemiol* 2003b;31:161-168.
16. John MT, Reissmann DR, Szentpetery A, Steele J. An approach to define clinical significance in prosthodontics. *J Prosthodont* 2009;18:455–460.
17. John MT, Slade GD, Szentpetery A, Setz JM. Oral health-related quality of life in patients treated with fixed, removable, and complete dentures 1 month and 6 to 12 months after treatment. *Int J Prosthodont* 2004;17:503–511.
18. John MT, Szentpetery A, Steele JG. Association between factors related to the time of wearing complete dentures and oral health-related quality of life in patients who maintained a recall. *Int J Prosthodont* 2007;20:31–36.
19. Kim HY, Jang MS, Chung CP, Paik DI, Park YD, Patton LL et al. Chewing function impacts oral health-related quality of life among institutionalized and community-dwelling Korean elders. *Community Dent Oral Epidemiol* 2009; 37: 468-76.
20. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics* 1977;33:159–174
21. Mesas AE, de Andrade SM, Cabrera MA. Factors associated with negative self-perception of oral health among elderly people in a Brazilian community. *Gerodontology* 2008;25:49–56
22. Nevalainen MJ, Rantanen T, Narhi T, Ainamo A. Complete dentures in the prosthetic rehabilitation of elderly persons: five different criteria to evaluate the need for replacement. *J Oral Rehabil* 1997;24:251-258.
23. Pan S, Awad M, Thomason JM, Dufresne E, Kobayashi T, Kimoto S. Sex differences in denture satisfaction. *J Dent* 2008;36:301–308.
24. Pera P, Bassi F, Schierano G, Appendino P, Preti G. Implant anchored complete mandibular denture: evaluation of masticatory efficiency, oral function and degree of satisfaction. *J Oral Rehabil* 1998;25:462–467.
25. Pietrokovski J, Harfin J, Mostavoy R, Levy F. Oral findings in elderly nursing home residents in selected countries: quality of and satisfaction with complete dentures. *J Prosthet Dent* 1995;73:132–135.
26. van Waas M, Meeuwissen JH, Meeuwissen R, Kayser AF, Kalk W, Van't Hof MA. Relationship between wearing a removable partial denture and satisfaction in the elderly. *Community Dent Oral Epidemiol* 1994;22:315-318.
27. Veyrone JL, Tubert-Jeannin S, Duthheil C, Riordan PJ. Impact of new prostheses on the oral health related quality of life of edentulous patients. *Gerodontology* 2005;22:3–9.
28. Walls AWG, Steele JG, Sheiham A, Marcenes W, Moynihan PJ. Oral health and nutrition in older people. *J Public Health Dent* 2000;60:304-307.
29. Weinstein M, Schuchman J, Rosen P. Age and denture experience as determinants in patient satisfaction. *J of Prosthet Dent* 1988;59:327.
30. Weyant RJ, Pandav RS, Plowman JL, Ganguli M. Medical and cognitive correlates of denture wearing in older community-dwelling adults. *J Am Geriatr Soc* 2004;52:596–600.
31. Wolff A, Gadre A, Begleiter A, Moskona D, Cardash H. Correlation between patient satisfaction with complete dentures and denture quality, oral condition, and flow rate of submandibular/sublingual salivary glands. *Int J Prosthodont* 2003;16:45–48.