



Comparison between patients rehabilitated with full-arch fixed implant-supported prostheses and complete denture regarding well-being, self-esteem and quality of life

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ABSTRACT

Objective: To evaluate and compare satisfaction and OHRQoL in patients using complete dentures or full-arch fixed implant-supported prostheses.

Material and Methods: 200 patients were divided into two groups: 1) Test group (TG): patients rehabilitated with lower full-arch fixed implant-supported prosthesis; and 2) Control group - (CG): patients using complete dentures. Patients had Oral Health-related Quality of Life (OHRQoL) assessed through 4 validated questionnaires: 1) Oral Health Impact Profile (OHIP-14); 2) Rosenberg Self-Esteem Scale (RSS); 3) Orthognathic Quality of Life Questionnaire (OQLQ); and 4) Short Form Health Survey (SF-8). Statistical analysis was done by using the Wilcoxon test, considering a level of significance of 5%.

Results: The results demonstrated that the TG presented better results ($p < 0.001$) than the CG in relation to OHIP-14 (9.0 ± 2.36 and 21.0 ± 3.17 , respectively), including functional limitation, physical pain, physical and psychological disability, and social and physical disability. Moreover, TG presents better outcomes than CG for RSS (35.0 ± 2.31 and 31.0 ± 2.31 , respectively) and OQLQ (16.0 ± 3.19 and 27.5 ± 3.22 , respectively), but without difference ($p = 0.79$) for SF-8 (83.1 ± 6.64 and 83.1 ± 8.16 , respectively).

Conclusion: Patients with lower full-arch fixed implant-supported prostheses, compared to patients using complete dentures, present a better perception regarding their general well-being, higher self-esteem and quality of life.

KEYWORDS: Quality of life; Rehabilitation; Dental implants; Denture, Complete

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INTRODUCTION

Nowadays, there is a change in the age profile of the world population, with a progressive increase in the population age. In South America, for example, is expected that by 2030 about 17.5% of the population will be older than 60 years (Gaio et al. 2012; Cano-Gutiérrez et al. 2015). In Brazil, it is estimated an increase of more than 30 million elderly people in the next decade, which will bring consequences for the population's health (Gaio et al., 2012; Peres et al., 2013).

The aging of the population intensifies the oral health problems, including a large increase of edentulism, which affects a great part of the world population (Hanioka et al., 2007; Müller et al., 2007; Musacchio et al., 2007; Peres et al., 2013; Kailembo et al., 2016). In Brazil, according to data from the 2010 epidemiological survey of the oral health conditions of the Brazilian population, more than half of the Brazilian elderly population is edentulous (Peres et al. 2013). Studies have shown that edentulous individuals present poor oral health-related quality of life (OHRQoL) (Cano-Gutiérrez et al., 2015; Hewlett et al., 2015; Oh et al., 2016), mainly related to difficulty in chewing (Michaud et al. 2012).

Among these edentulous individuals, more than half (55%) perceive the need to use complete denture (CD) (Souza et al. 2016). However, only 65% of the patients who are rehabilitated with CD continue to use the prosthesis after 1 year (da Conceição Araujo et al., 2018). The withdrawal is associated with several factors, but the main one is the lack of stability of the prosthesis (da Conceição Araujo et al., 2018), mainly in lower CD (Limpuangthip et al. 2017). Moreover, rehabilitation with CD implies in low satisfaction and low quality of life (Sánchez-Siles et al. 2018), without significant improvements in the perception about quality of life in relation to edentulous patients (Cano-Gutiérrez et al. 2015). Therefore, there is a need for a more stable rehabilitation for this population (Oh et al. 2016).

The treatment of edentulous individuals with dental implants is usually performed to obtain greater stability of the prosthesis and, as a consequence, a better quality of life, either with overdenture (Yunus et al. 2016; Brignardello-Petersen 2017; Kutkut et al. 2018) or full-arch fixed implant-supported prosthesis (TFP) (Box et al. 2018;



Limmer *et al.*, 2014), usually without differences between que the type of implant-support prosthesis (Oh *et al.* 2016). A recent systematic review has shown that the use of overdentures improves patients satisfaction, quality of life and masticatory capability (Kroll *et al.*, 2018). However, the data are limited in relation to the use of TFP in the mandible (Box *et al.* 2018; Kroll *et al.* 2018; Limmer *et al.*, 2014).

Moreover, most studies on patients' perceptions have limitations. The number of individuals in the sample is always small, below 50, and the instrument invariably used is the OHIP-14, with few studies using different ways of evaluating other aspects like well-being and self-esteem.

Therefore, the aim of this study was to compare satisfaction and OHRQoL in patients using CD or TFP.

MATERIAL AND METHODS

This qualitative study aimed to access OHRQoL in a self-reported way by the patients and assisted by the interviewer. The procedures were performed in accordance with the principles of research ethics and with Helsinki Declaration the 1964 (revised in 2008). The study was approved by the Ethics and Research Committee on Human Beings of the Ingá University Center - Uningá, (protocol number 2.080.728).

The volunteers were selected at the Dental Specialties Center in the cities of Guarantã do Norte - MT and Sinop - MT in the years 2015 and 2016. The patients were divided in two groups: Test Group (TG) with 100 patients, 6 months after the rehabilitation with lower full-arch fixed implant-supported fixed prosthesis (TFP) and maxillary complete denture (CD); and Control Group (CG) with 100 fully edentulous patients treated with CD.

After agreeing to participate in the research, the selected volunteers signed a free and informed consent form. All questionnaires, validated in Portuguese, were applied in the CG and TG individually by the same interviewer. The TG patients had exactly the same treatment protocol, as well as the same surgeon, prosthodontist and dental technician.

The OHRQoL was evaluated by means of questionnaires proposed in the literature for this purpose: Oral Health Impact Profile (OHIP-14), Rosenberg Self-Esteem



Scale (RSS), Orthognathic Quality of Life Questionnaire (OQLQ) and A Short Form Health Survey (SF-8).

The OHIP-14 was used to measure the influence of oral conditions on the individual's perception of their general well-being (Slade 1997; Oliveira, Nadanovsky 2005). Besides, this instrument is divided into seven dimensions: functional limitation, physical pain, psychological discomfort, physical incapacity, psychological incapacity, social incapacity and difficulty in doing habitual work. The RSS was used to measure self-esteem (Rosenberg 1965; Dini 2004). The OQLQ was used to access the quality of life of individuals with dentofacial deformities and the impact of its corrective treatment (Cunningham et al. 2000; Bortoluzzi et al. 2011). The SF-8 was used to measure quality of life based on the health condition of the individual in the last 4 weeks (Ware, Sherbourne 1992; Ciconelli et al. 1999; Campolina et al. 2011).

The final score of each instrument, calculated for each patient, was obtained as follows:

OHIP-14: The sum of all questions was calculated, ranging from 0 to 56. A low total score means good general well-being. Besides that, its items are divided into 7 different dimensions: functional limitation, physical pain, psychological discomfort, physical incapacity, psychological incapacity, social incapacity and difficulty in doing habitual work. Each dimension was evaluated individually.

RSS: The score of questions 2, 5, 6, 8 and 9 is inverted, the sum of all questions is calculated, ranging from 10 to 40. A high total score means good self-esteem.

OQLQ: The sum of all questions is calculated, ranging from 0 to 88. A low total score means a good quality of life.

SF-8: The score of the questions is standardized so that it ranges from 0 to 100. The mean of all standardized questions is calculated, ranging from 0 to 100. A high total score means a good quality of life in the last 4 weeks.

Initially, a descriptive analysis of the results was performed by median and standard deviation. The normal distribution hypothesis was rejected by the Shapiro-Wilk test ($p < 0.001$) for the four instruments. Thus, Wilcoxon's non-parametric test was used to compare the scores of the groups. The level of significance was set at 5% and all analyzes were performed with the help of the R Development Core Team (R Development Core Team 2015).



RESULTS

Two hundred subjects (100 in TG and 100 in CG) participated in this study. The demographic data of the two groups are shown in Table 1. Of the 200 patients, 57 (28.5%) were men and 143 (71.5%) were women, with a mean age of 57.4 years.

The final OHIP-14 scores were higher ($p < 0.001$) for the CG patients (21.0 ± 3.17) compared to those that belong to the TG (9.0 ± 2.36) indicating a better general well-being in those who use TFP (Table 2). In the individual assessment of the OHIP-14 dimensions, only the psychological discomfort had no difference between groups ($p = 0.07$), indicating that the use of TFP, compared to the use of CD, provides a better well-being in relation to the functional limitation, physical pain, physical and psychological incapacity, and physical and social disability ($p < 0.001$).

The table 3 shows a significant difference between the groups for the RSS and OQLQ instruments, without significant difference for SF-8. It can be noted that the RSS instrument showed a significant difference between TG (35.0 ± 2.31) and CG (31.0 ± 1.98), indicating a higher self-esteem in individuals using the TFP.

Besides that, there was a significant difference ($p < 0.001$) between TG and CG for OQLQ (16.0 ± 3.19 and 27.5 ± 3.22 , respectively), indicating the use of CD provides a lower quality of life and that the placement of TFP has a positive impact on it.

Finally, contrary to what was observed in the other instruments, the SF-8 presented a TG score (83.1 ± 6.64) equal to that of the CG (83.1 ± 8.16) ($p = 0.790$) indicating that there was no difference quality of life in the last 4 weeks between groups.

DISCUSSION

In the present study, the quality of life related to oral health was evaluated by different instruments using validated questionnaires with different objectives. The results confirmed that TFP in the lower arch improves the individual's general well-being perception (OHIP-14), improves self-esteem (RSS) and quality of life (OQLQ), but does not interfere with the individual's perception of improvement of physical health (SF-8) when compared to CD users.



When evaluating the oral health-related quality of life, OHIP-14 is one of the main instruments used. It assesses the general well-being of the individual and has been used to evaluate various forms of dental treatments, including different types of prosthesis. Regarding the use of TFP, some studies using OHIP-14 have shown that this type of rehabilitation improves the quality of life of CD users or mandibular edentulous patients (Berrentin-Felix *et al.* 2008; Preciado *et al.* 2013; Oh *et al.*, 2016; Alzoubi *et al.* 2017), similar to what was demonstrated in the present study. This is due to the fact that the inferior TFP, while increasing the prosthesis' stability, as a consequence, facilitates masticatory function, improves occlusal force and brings greater comfort to the patient (Alzoubi *et al.* 2017). In reference to the different dimensions assessed by OHIP-14, the present study demonstrated that TFP did not interfere with psychological discomfort, but it positively affects functional limitation, physical pain, physical and psychological deficiency and social and physical disability, similar to the outcomes found in the literature (Berretin-Felix *et al.* 2008; Preciado *et al.* 2013; Oh *et al.*, 2016). This improvement in quality of life was expected, since patients who use CD have a substantial functional limitation (Koshino *et al.* 2006), although understanding health-related quality of life as a vast concept, representing the combination of absolute health, perceptions of current or potential health and/or disability (Gift *et al.* 1997).

Individual perception of self-esteem is evaluated efficiently in different areas of health through RSS. In dentistry, this questionnaire is not frequently used (Özhayat 2013, Johal *et al.*, 2015, Lukez *et al.*, 2015) and, as far as we know, this is the first study to use RSS in patients who have been rehabilitated with TFP. The present study demonstrated that patients using TFP have a higher self-esteem than those with a CD. Other study, using open-ended questions, demonstrated that implants actually improve patients' self-esteem (Johannsen *et al.* 2012). This can be explained by the fact that edentulous patients have less comfort when eating or in social interaction, have lower satisfaction with oral health and lower self-esteem (Raghoebar *et al.* 2003). Obviously, self-esteem is not influenced by an isolated fact, being a very complex area, which varies at different phases of life and which considers many factors such as facial and body images, anxiety and depression stages, and social acceptance (Johal *et al.* 2015).

OQLQ is a useful parameter for assessing the impact of dentofacial deformities on individuals' quality of life (Bortoluzzi *et al.* 2011). This instrument has demonstrated



that orthodontic/orthognathic treatment improves patients' quality of life (Alanko et al. 2010; Sun et al. 2018). However, it was used for the first time in cases of rehabilitation of edentulous patients and demonstrated that TFP rehabilitation has a positive impact on the individuals' quality of life. The edentulous condition should be considered a facial deformity due to the fact that edentulous patients, even with CD, demonstrate significantly lower masticatory efficiency (Fontijn-Tekamp et al. 2000), smaller masticatory cycles (Piancino et al. 2005) and reduced muscle activity and occlusal strength (Alzoubi et al. 2017). Thus, nutrition is compromised by the limitation of food choice (Millwood & Heath 2000).

The SF-8 questionnaire was not previously used in implants' and prosthesis' literature, but its longer version (SF-36) has been used in some cases in dentistry (Lee et al. 2008; Khadka et al., 2011). It evaluates the quality of life in the last 4 weeks and showed no difference between groups in the present study. As the questionnaire was applied 6 months after the rehabilitation with TFP, the long time after treatment may have minimized the effects that could have been captured by SF-8 if it had been applied at one month post-rehabilitation.

Dental loss and the consequent use of CD, leads to emotional perception of aging and trauma, generating a psychological impact with loss of self-confidence and behavior change due to altered facial shape and food restriction (Fiske et al. 2000; Davis et al., 2000; Scott et al., 2001). This edentulous condition interferes with OHRQoL (Steele et al., 2004) and, as demonstrated in the present study, TFP rehabilitation promote an improvement in the patients' well-being, self-esteem and quality of life. The TFP is better for promoting greater stability and comfort by not pressing the mucosa during mastication and greater mastication capability (Alzoubi et al. 2017; Cardoso et al. 2016). In contrast, the protocol presents a superior cost for the patient, who will not always be able to afford the treatment costs. In these cases, the use of overdentures is an alternative with intermediate costs in relation to CD and TFP (Brennan et al. 2010).

Although the similar outcomes between the present study and the others that used OHIP-14 for evaluation of TFP of the lower arch, the present research evaluated a much larger number of patients (n = 100 each group) compared to the others (ranging from 15, 38) (Oh et al. 2016; Berretin-Felix et al. 2008; Preciado et al. 2013). Besides that, there is a lack of standardization regarding the number of implants used in each



patient, which is often not mentioned in the studies, as opposed to the current study in which all patients received 4 implants with the same surgeon and were rehabilitated by the same prosthodontist.

The present study also has some limitations. The evaluations occurred in a short period after rehabilitation (6 months) and new evaluations would be interesting after a longer follow-up period to check if the results found are maintained over the years. Other studies present different times after rehabilitation for the evaluation, ranging from 3 months (Berretin-Felix *et al.* 2008) to more than 3 years (Oh *et al.* 2016), but without standardization, as in the present study. Another important point that can influence the results is the patient's preference for the type of treatment, mainly when the patient is not blind to the treatment and the result is based on the evaluation of the treatment by the patient (Awad *et al.*, 2000b). In the present study, all patients in the CG used CD and sought to be rehabilitated with implants. In this way, future studies could include edentulous patients who do not want to receive rehabilitation through implants.

CONCLUSION

Therefore, it can be concluded that, when compared to CD users, patients rehabilitated with TFP present a better perception of general well-being, higher self-esteem and oral health-related quality of life.

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TABLES

Table 1 - Distribution of the patients included in the research according to the demographic characteristics.

	Control Group	Test Group	Total
GENDER– N (%)			
Male	21	36	57 (28.5%)
Female	79	64	143 (71.5%)
AGE – Mean (SD)	58.9 (8.2)	55.9 (9.2)	57.4 (8.8)



Table 2 - Results of the Wilcoxon test for comparison between the patients' scores of the control and test groups, for OHIP-14 and each of their domains.

Instrument	Median (standard deviation)		Wilcoxon
	Control	Test	S
OHIP-14 (total)	21.0 (3.17)	9.0 (2.36)	<0.001
Functional limitation	6.5 (1.40)	3.0 (1.24)	<0.001
Physical pain	2.0 (0.74)	1.0 (0.69)	<0.001
Psychological discomfort	3.0 (1.03)	3.0 (0.85)	0.070
Physical disability	2.0 (0.67)	0.0 (0.54)	<0.001
Psychological deficiency	1.0 (0.62)	0.0 (0.59)	<0.001
Social incapacity	2.0 (0.91)	1.0 (0.96)	<0.001
Physical disability	3.0 (1.20)	1.0 (0.97)	<0.001



Table 3 - Results of the Wilcoxon test for comparison between the scores of patients from the control and test groups for each instrument.

Instrument	Median (standard deviation)		Wilcoxon
	Control	Test	S
RSS	31.0 (1.98)	35.0 (2.31)	<0.001
OQLQ	27.5 (3.22)	16.0 (3.19)	<0.001
SF-8	83.1 (8.16)	83.1 (6.64)	0.790