



# The impact of oral rehabilitation on quality of life by installing a fixed prosthesis with immediate loading in edentulous mandibles

O impacto da reabilitação bucal na qualidade de vida através da instalação de prótese implanto-suportada sob carga imediata em mandíbulas edêntulas

Pamella Valente PALMA<sup>1</sup>, Eduardo Machado VILELA<sup>2</sup>, Isabel Cristina Gonçalves LEITE<sup>1</sup>

1 - School of Medicine - Federal University of Juiz de Fora – Juiz de Fora – MG – Brazil.

2 - Dental Clinic Department - School of Dentistry - Federal University of Juiz de Fora – Juiz de Fora – MG - Brazil.

## ABSTRACT

**Objective:** This study assessed the impact of oral rehabilitation with immediate-loading fixed prostheses on the quality of life of patients with mandibular edentulism. **Material and Methods:** A longitudinal study was conducted on an outpatient basis. The sample included 14 patients over 18 years of age, treated in the Implantology Specialization programs of the Brazilian Dental Association (in Juiz de Fora, Brazil) and the School of Dentistry, Federal University of Juiz de Fora. Participants were interviewed about identification data, self-perceived general health and oral health, and socioeconomic data. The Oral Health Impact Profile (OHIP-14) was used. After the Kolmogorov-Smirnov normality test, the OHIP-14 central tendency values were compared using the Wilcoxon paired test with a 5% significance level. **Results:** The overall mean found for the quality of life questionnaire was 30.14 (before) and 48.93 (after). There was a significant reduction of impact in all areas in the post-surgical period, except for functional limitation. No impact was identified for the dimensions of physical pain and disability after installing implants. **Conclusion:** Prosthetic rehabilitation and self-perception have high impact on oral health, thus emphasizing the need for care, careful observation of all the factors that may have an influence on infirmities, and not only their signs and symptoms.

## KEYWORDS

Dental implantation; Immediate load dental implant; Implant-supported dental prosthesis; Quality of life.

## RESUMO

**Objetivo:** Este estudo avaliou o impacto da reabilitação bucal na qualidade de vida através da instalação de prótese implanto-suportada sob carga imediata em mandíbulas edêntulas. **Material e Métodos:** Foi realizado um estudo longitudinal de base ambulatorial reunindo 14 pacientes com idade igual ou superior a 18 anos, atendidos nos cursos de especialização em Implantodontia da Associação Brasileira de Odontologia (Juiz de Fora) e da Faculdade de Odontologia da UFJF. Os participantes foram entrevistados sobre dados de identificação, auto percepção de saúde geral e saúde bucal e dados socioeconômicos. Foi utilizado o Oral Health Impact Profile (OHIP-14). Após o teste de normalidade Kolmogorov-Smirnov os valores de tendência central do OHIP-14 foram comparados pelo teste de Wilcoxon pareado com nível de significância de 5%. **Resultados:** A pontuação média do questionário de qualidade de vida foi 30,14 (antes) e 48,93 (depois). Houve redução significativa do impacto em todos os domínios no período pós cirúrgico, exceto na limitação funcional que se manteve inalterada. Não foi identificado impacto das dimensões dor física e deficiência pós a instalação de implantes. **Conclusão:** A reabilitação protética e autopercepção são impactantes na saúde bucal, por isso vale ressaltar a necessidade do cuidado, da observação criteriosa de todos os fatores que possuem influência sob as enfermidades, e não somente aos seus sinais e sintomas.

## PALAVRAS-CHAVE

Carga imediata em implante dentário; Implantação dentária; Prótese dentária fixada por implante; Qualidade de vida.

## INTRODUCTION

The loss of teeth is a condition as old as man himself and is due to numerous factors such as poor hygiene, trauma, pathologies, endodontic complications, iatrogenies, among others. The progression of dental caries and the advance of periodontal disease stand out as the main causes of edentulism, either partially or totally. And since both depend on effective plaque removal, the importance of health promotion practices and proper oral hygiene habits is emphasized, to help maintain the teeth, and oral health as well [1].

A few years ago, it could be said that tooth loss was seen, socially, as a natural condition attributed to aging, and can be explained by the antiquated public policies that were essentially curative and mutilating. This resulted in a reality marked by a high prevalence of missing teeth and a great need for rehabilitation services using prostheses, which generates an even greater public cost [2].

Some studies have comparatively evaluated the use of conventional dentures and implant overdentures [3,4] and found that patients undergoing implant treatment were significantly more satisfied with their ability to chew, stability, support, and speaking. This is mainly due to the longevity that this treatment provides and the ability to reduce the pressure exerted on the teeth and mouth structures causing discomfort to the patient. In addition, unnecessary wasting of a natural tooth to support conventional fixed bridges is avoided, and the alveolar bone is preserved as well, since bone resorption from tooth loss does not occur.

According to the WHO (World Health Organization), the functional incapacity caused by edentulism significantly affects the quality of life of individuals, especially the more elderly, due to frequent total edentulism. In addition, tooth loss reduces masticatory function and therefore alters one's choice of foods, which can

lead to insufficiencies of certain nutrients and, consequently, to an increased risk of the onset of other diseases. Its aesthetic and social impact can also cause the individual to experience low self-esteem and become introspective, feeling embarrassed to be with other people and isolating themselves from others. In view of this situation, it can be said that tooth loss is indicated as a serious public health problem and is an important way of assessing the oral health status of a population [5].

There are several quality of life indexes related to health in populations with chronic diseases, such as periodontal disease (one of the main causes of edentulism), allowing us to determine the impact of health care practices, especially when a cure does not exist [6]. The OHIP-14 has been one of the most commonly used indexes to measure the impact of oral health on quality of life in patients with oral infirmities, and is currently considered a good indicator for capturing individuals' perceptions and feelings about their own oral health and their expectations regarding dental treatment and services [7].

Thus the aim of this study was to evaluate the impact of oral rehabilitation on quality of life, through the installation of implants and fixed prostheses with immediate loading in adult mandibular edentulous patients, using the Oral Health Impact Profile (OHIP) questionnaire, identification data, self-perceived general health and oral health, and socioeconomic and clinical data.

## MATERIAL AND METHODS

This is a longitudinal study carried out in the Implantology Specialization programs of the Brazilian Dental Association in Juiz de Fora (ABO-JF) and the School of Dentistry, Federal University of Juiz de Fora (FO/UFJF).

Included in this study were patients receiving treatment in the Implantology specialty for the installation of implant-supported

complete lower prostheses, under immediate load, at these institutions in the period from May 2015 to August 2016.

The inclusion criteria adopted were: patients at least 18 years old who were being treated in the Implantology specialty for the installation of an implant-supported lower prosthesis, under immediate load, at the ABO-JF or FO/UFJF; mandibular edentulous patients; patients who agreed to follow the implant-supported prosthesis maintenance program established by the institution's professional team, including consultations for the purpose of this research, 4 months after the implant; understanding and consent to conduct the research, as well as to disseminate treatment results; patients with available bone equal to or greater than that required for the installation of implants of at least 3.75 mm in diameter and 10 mm in length.

The exclusion criteria adopted were: patients undergoing radiotherapy or chemotherapy; patients who presented any decompensated systemic health problems; those who could not comprehend or answer the questions asked, such as those with neurological and cognitive disorders; patients seeking retreatment due to a previous failure with the technique.

During this period, 16 patients were treated, and in one patient it was not possible to immediately load the implants because there was little intraosseous locking, while a second loss occurred due to the patient withdrawing from the treatment. Thus, the total sample included 14 patients who had implant-supported complete lower prostheses installed under immediate load and were monitored for at least 4 months after installation.

The patients were interviewed regarding identification and socioeconomic

data, according to the Brazilian Association of Research Companies (ABEP) economic classification criteria, as well as about self-perceived general health and oral health, and clinical data. All the patients involved responded to the Oral Health Impact Profile (OHIP-14) developed by Slade and Spencer [8] in a validated version adapted to Portuguese for Brazil (Figure 1) [9]. The authors' chose to interview the participants to avoid information bias, potentially attributable to level of schooling. The interviewer was limited to reading the questions aloud, as written, and showing participants the response cards [9].

Data were collected in an initial consultation for anamnesis and physical examination, prior to the surgery in which the implants were installed, and 4 months after surgery, when the osseointegration of the implants had already occurred [10]. This interview was conducted as follows: the interviewer read the questions, giving the patient options for objective responses numbered from 1 to 5 (with 1 = never, 2 = rarely, 3 = sometimes, 4 = frequently, 5 = always). The same order was always used, to minimize memory problems, which would play an important role in the process of choosing the answers. The interviewer showed a card with the five possible answers to the OHIP questions, and read them aloud. The interviewer did not change the questions, nor explain in any way other than what was written, so as not to influence the answers. All eligible patients were invited in the order of their scheduled appointments to participate in the study.

After responding to the questionnaire, the patients underwent surgery to install the implants. Patients were treated with a similar medical protocol in the pre-surgical and postoperative periods.

Questions	Answers				
<b>Functional limitation</b>					
1. Have you had trouble pronouncing any words because of problems with your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
2. Have you felt that your sense of taste has worsened because of problems with your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
<b>Physical pain</b>					
3. Have you had painful aching in your mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
4. Have you found it uncomfortable to eat any foods because of problems with your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
<b>Psychological discomfort</b>					
5. Have you been self-conscious because of your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
6. Have you felt tense because of problems with your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
<b>Physical disability</b>					
7. Has been your diet been unsatisfactory because of problems with your teeth of mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
8. Have you had to interrupt meals because of problems with your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
<b>Psychological disability</b>					
9. Have you found it difficult to relax because of problems with your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
10. Have you been a bit embarrassed because of problems with your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
<b>Social incapacity</b>					
11. Have you been a bit irritable with other people because of problems with your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
12. Have you had difficulty doing your usual jobs because of problems with your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
<b>Disability</b>					
13. Have you felt that life, in general, was less satisfying because of problems with your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always
14. Have you been totally unable to function because of problems with your teeth or mouth	( ) Never	( ) Rarely	( ) Sometimes	( ) Often	( ) Always

Figure 1 - Oral Health Profile Questionnaire – OHIP-14.

### Statistical analysis

For the descriptive analysis of the OHIP, a count was taken, for each dimension, dichotomizing the responses as “with impact” for the responses “frequently” and “always”, and “without impact” for the “sometimes”, “rarely”, and “never” responses.

The final OHIP-14 total score can be up to 56 points: each domain has 2 questions, each with a maximum score of 4 points, thus 8 per domain (total of 7 domains).

Based on the results of the Kolmogorov-Smirnov normality test, all the OHIP-14 scores were submitted to a paired nonparametric

statistical test (paired Wilcoxon test), to analyze the relationship between the independent variables selected (self-reported skin color, gender, socioeconomic status, and age of the interviewees) and the dependent variable (impact of oral health on quality of life). The same analysis compared cases before / after the installation of the prosthesis. Spearman's correlation allowed the comparison of the OHIP-14 performance in relation to the self-perceived general and oral health variables. The level of statistical significance was 5%.

The present study complied with all the ethical principles contained in the Declaration of Helsinki which establishes guidelines and regulatory standards for research involving human beings. The present research was submitted and approved by the UFJF Committee on Ethics and Research on Human Beings (Opinion no. 1.047.307).

## RESULTS

The results showed that the population of this study was composed mostly of women (64.3%), patient mean age being 63.6 years, with a minimum age of 52 and a maximum of 85 years (standard deviation = 8,48). As for educational level, the majority had a high school diploma (71.4%). Regarding economic classification, according to the ABEP, 42.9% of the patients belonged to class C1, whose average monthly gross family income was R\$ 2,409.01, i.e., approximately 2.89 x minimum wage, considering the average minimum wage at the time of data collection was USD 256.00. Of the sample interviewed, 50% classified their general health status as very good, while in relation to self-perception of oral health, 42.9% classified it as poor. Regarding the choice of treatment, the majority preferred the prosthesis with implant (92.9%) compared to the conventional one.

Regarding the frequency of impact of each OHIP-14 domain (Table I), it was observed that before the implant surgery, the psychological

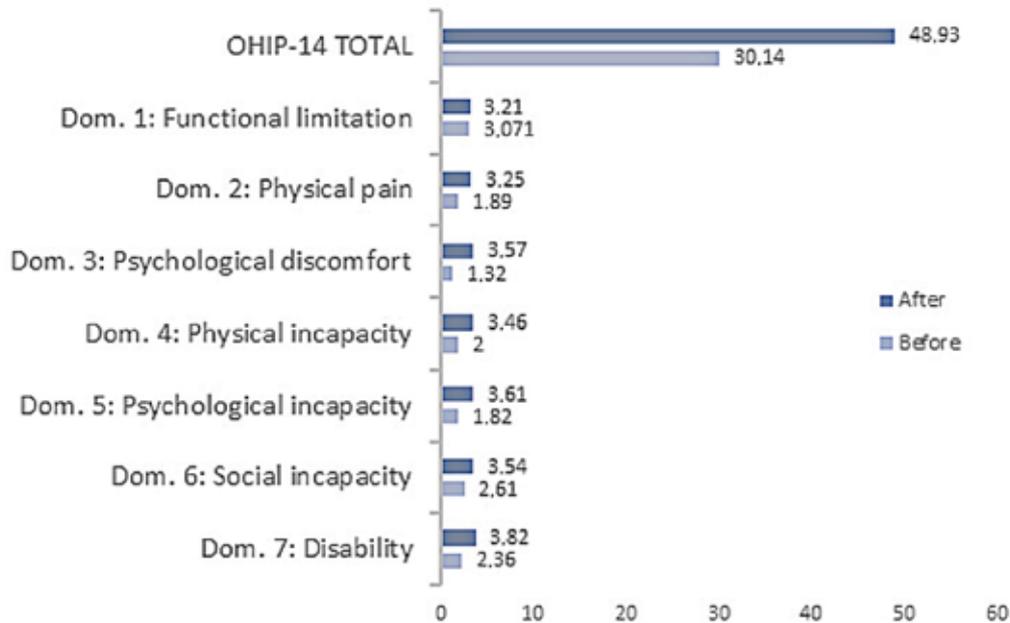
discomfort domain showed the most frequent impact (78.6%). In the second interview, after osseointegration, the domains that stand out for their low impact (100%) were physical pain and disability.

**Table I** - Frequency of the OHIP-14 domains, according to impact, before implant surgery and after the period of osseointegration, at the ABO-JF and the FO/UFJF, 2016

Oral Health Dimension	Before		After	
	Without impact n (%)	With impact n (%)	Without impact n (%)	With impact n (%)
Functional limitation	12 (85.7)	2 (14.3)	12 (85.7)	2 (14.3)
Physical pain	5 (35.7)	9 (64.3)	14 (100.0)	0
Psychological discomfort	3 (21.4)	11 (78.6)	13 (92.9)	1 (7.1)
Physical incapacity	5 (35.7)	9 (64.3)	13 (92.9)	1 (7.1)
Psychological incapacity	4 (28.3)	10 (71.4)	13 (92.9)	1 (7.1)
Social incapacity	11 (78.6)	3 (21.4)	12 (85.7)	2 (14.3)
Disability	6 (42.9)	8 (57.1)	14 (100.0)	0

Concerning the means found for each domain and for the OHIP-14 total, the domain that presented the highest mean before implant surgery (3.071) was functional limitation. The most prominent domain on the second interview occasion was disability, at 3.82. The post-implant OHIP-14 score was correlated with self-perceived oral health (p-value = 0.058). The total mean found for the OHIP-14 was 30.14 (before) and 48.93 (after), indicating a 62% increase in this score (figure 2). No sociodemographic variables were associated with the median OHIP-14 scores, pre- or post-implant.

With regard to the OHIP-14 (Figure 1), the question presenting the most frequent impact, on the first occasion (92.9%), was the one related to the psychological discomfort domain (Question 5). While on the second occasion, the questions presenting the most frequent (100%) lack of impact were related to the domains: psychological discomfort (Question 5), psychological incapacity (Question 10), social incapacity (Question 12), and disability (Questions 13 and 14).



**Figure 2** - Means for OHIP-14 total and by domain, for patients attended in the Implantology specialty at the ABO-JF and the FO/UFJF, 2016.

Finally, Table II shows that the value of the median OHIP total increased when compared to the first occasion, which means that oral health came to have less impact on quality of life. The only domain that did not change, i.e., did not have statistical significance, was functional limitation.

## DISCUSSION

In this study, it was observed that the quality of life of patients who underwent the installation of implant-supported prostheses, with immediate loading, in

edentulous mandibles, was mainly impacted by the psychological discomfort domain before surgery, and afterwards, the domains with lower impact were physical pain and disability. No sociodemographic variables were associated with median OHIP-14 scores, pre- or post-implant. The median OHIP total value increased in comparison with the preoperative period, showing the reduction of oral health impact on quality of life. The only domain that did not change at follow-up was functional limitation.

According to the study by Costa et al. [11], patients who have suffered tooth loss

**Table II** - Domains and OHIP-14 total expressed in median (Me) and semi-quartile amplitude (Q1 and Q3), at the ABO-JF and the FO/UFJF, 2016

Domain	Before			After			p-value*
	Me	Q1	Q3	Me	Q1	Q3	
Functional limitation	6	4.75	8	7	5	7.25	0.607
Physical pain	3	2.75	6	6	6	8	<b>0.002</b>
Psychological discomfort	2	0.75	4	8	6	8	<b>0.001</b>
Physical incapacity	3	2.75	5.25	7.5	6	8	<b>0.003</b>
Psychological incapacity	3.5	2	6	8	6	8	<b>0.001</b>
Social incapacity	5	4.75	6.25	8	6	8	<b>0.017</b>
Disability	5	3.75	6	8	7.75	8	<b>0.002</b>
OHIP-14 total	28.5	24.75	38.25	49	45.75	52.25	<b>0.001</b>

are more concerned with esthetics than with function. After the installation of conventional prostheses, it is possible to restore both aesthetic and functional conditions for these individuals. Thus, it is possible to attribute to the previous use of prostheses, by 85.8% of the sample, the fact that the functional limitation domain was the only one not statistically significant in the present study. In the study by Castro et al. [12], this domain was the one that presented the greatest impact on the quality of life, with food flavor being the biggest complaint by patients, therefore, this was a different result from that found in the present study. However, Castro et al.'s sample included both patients with prostheses with mandibular implants and maxillary implants, conventional and zygomatic, which may justify this divergence in the findings.

Socioeconomic factors are significantly related to people's quality of life. When applying an index to measure the impact of oral health on quality of life, sociodemographic factors such as gender, income, schooling, and age should be controlled in order to obtain a sample as homogeneous as possible [13].

There is a correlation between self-perceived oral health and the post-implant OHIP score ( $p$ -value = 0.058). Thus, this indicator manages to capture the need reported by the individual and, therefore, exhibits an overall view closer to his/her actual oral health condition. These findings are consistent with those of ASADI-LARI et al. [14] and Sanders et al. [15].

Among the aspects measured in the indexes applied in dentistry in relation to the quality of life, those most often reported by the users of implant-supported prostheses, as those that influenced negatively, were the psychological ones. This may be influenced by demographic factors, such as age and gender [16]. These factors determine lifestyle, housing, access to products, oral hygiene conditions, access to health services, educational level, among others. Such a situation can be exemplified by the results of this study, in which

the psychological discomfort and psychological incapacity domains had an impact of 78.6% and 71.4%, respectively, on the first interview occasion, and 92.9% were without impact, by the second interview. These results indicate how much the patient's psychological outlook was improved after treatment with osseointegrated implants.

Considering the literature consulted, [17,18] most studies concluded that the use of implant supported prostheses led to a reduction in the impact of oral health on quality of life. In this study, this was confirmed since there was an increase in the value of the final OHIP-14 total ( $p = 0.001$ ).

As a limitation of this study, one could consider the small sample number that did not allow analysis of variables associated with the outcome, such as sociodemographic variables, however, this was the result of the follow-up of all cases seen in the two services in this period.

Most people do not seek dental care because they do not perceive their needs. When they perceive their oral condition, they do it with a certain precision, although using different criteria than those employed by professionals. While the dental surgeon assesses the condition based on the absence or presence of disease, the patient places more importance on the symptoms and the functional and social problems that are brought on by the presence of disease.

Quality of life is a theme commonly found in the literature, and because of its multifactorial nature, its study becomes complex, assimilating its relation with clinical practice. It is worth stressing the need for caution, for careful observation of all factors that have an influence in cases of infirmity, and not only of their signs and symptoms. This vision helps in preventing edentulism and makes care more humanized and treats the individual as a whole.

Employing an indicator such as the OHIP can be useful for the planning of dental services, prioritizing the care of people with some degree of impact due to oral problems. New studies with

this indicator, or others related to health-related quality of life and the process of rehabilitation in oral health, should be encouraged. This will make it possible to improve and develop public policies in the area, as well as actions aimed at promoting health and awareness of the importance of proper oral hygiene habits, and thus obtain longevity from rehabilitative treatment.

## CONCLUSION

The results showed that the OHIP-14 dimensions, psychological discomfort and psychological incapacity, were the ones that presented the greatest impact on the first occasion; while on the occasion of the second interview, the domains that stand out for their low impact are physical pain and disability.

## ACKNOWLEDGMENTS

The authors are grateful for the opportunity to conduct this study in the Specialization Programs involved, under the coordination of professors Dr. Neuza M. S. Picorelli Souza and Dr. Alexandre Oliveira Gonçalves.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests regarding the publication of this paper.

## REFERENCES

1. Peltzer K, Hewlett S, Yawson AE, Moynihan P, Preet R, Wu F et al. Prevalence of loss of all teeth (edentulism) and associated factors in older adults in China, Ghana, India, Mexico, Russia and South Africa. *Int J Environ Res Public Health*. 2014;11(11):11308-24.
2. Ferreira CDO, Antunes JLF, Andrade FBD. Fatores associados à utilização dos serviços odontológicos por idosos brasileiros. *Rev Saúde Pública*. 2013;47(3):90-7.
3. Awad MA, Rashid F, Feine JS. The effect of mandibular 2-implant overdentures on oral health-related quality of life: an international multicentre study. *Clin Oral Implants Res*. 2014;25(1):46-51.
4. Thomason JM, Lund JP, Chehade A, Feine JS. Patient satisfaction with mandibular implant overdentures and conventional dentures 6 months after delivery. *Int J Prosthodont*. 2003;16(5):467-73.
5. World Health Organization. International classification of impairments, disabilities, and handicaps. Geneva: WHO; 1980.
6. Burckhardt CS, Anderson KL. The quality of life scale (QOLS): reliability, validity, and utilization. *Health and Quality of Life Outcomes*. 2003;30(1):1-7.
7. Miotto MHMB, Barcellos LA. Uma revisão sobre o indicador subjetivo de saúde bucal "Oral Health Impact Profile" OHIP. *UFES Rev Odontol*. 2001;3(1):32-8
8. Slade GD, Spencer AJ. Development and evaluation of the Oral Health Impact Profile. *Community Dent Health*. 1994;11(1):3-11.
9. Oliveira BHD, Nadanovsky P. Psychometric properties of the Brazilian version of the Oral Health Impact Profile—short form. *Community Dent Oral Epidemiol*. 2005 Aug;33(4):307-14.
10. Souza JR, Ramalho SA, Mantesso A, Simone JL. Instalação de implantes osseointegrados com carga imediata. *Rev Gaúch Odontol*. 2003;51(4):358-65.
11. Costa SC, Carvalho MCFS, Discacciati JAC, Abreu MHNG, Viana E, Adelário AK. Prótese total imediata: devolução do sorriso e da função do paciente. *Arq Odontol*. 2011;47(2):106-110.
12. Castro LMS, Souza LM, Wendel S, Mendonça R, Freitas A, Duarte LR. Avaliação da qualidade de vida de pacientes reabilitados com implantes osseointegrados submetidos à carga imediata: estudo longitudinal. *Rev Dental Press Periodontia Implantol*. 2010;4(2):74-82.
13. Papaioannou W, Oulis CJ, Latsou D, Yfantopoulos J. Oral Health-Related Quality of Life of Greek Adults: A Cross-Sectional Study. *Int J Dent*. 2011;2011:360292. doi: 10.1155/2011/360292. Epub 2011 Sep 5.
14. Asadi-lari M, Tamburini M, Gray D. Patients' needs, satisfaction, and health related quality of life: Towards a comprehensive model. *Health Qual Life Outcomes*. 2004;2(32):1-15.
15. Sanders AE, Slade GD, Lim S, Reisine ST. Impact of oral disease on quality of life in the US and Australian populations. *Community Dent Oral Epidemiol*. 2009;37(2):171-81.
16. Silva SRC, Fernandes RAC. Autopercepção das condições de saúde bucal por idosos. *Rev Saúde Pública*. 2001; 35(4):349-55.
17. Attard NJ, Zarb GA. Immediate and early implant loading protocols: a literature review of clinical studies. *J Prosthet Dent*. 2005;94(3):242-58.
18. Wang G, Gao X, Edward CM. Public perceptions of dental implants: a qualitative study. *J Dent*. 2015;43:798-805.

### Pamella Valente Palma (Corresponding address)

Avenue Barão do Rio Branco, 2721/903 Center  
36010-012 - Juiz de Fora, MG - Brasil  
Fone: (32) 988485823  
email: pamellavalente@hotmail.com

Date submitted: 2017 Apr 02

Accept submission: 2017 Apr 19