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AVALIAÇÃO FUNCIONAL DE PRÓTESES TOTAIS E SATISFAÇÃO DO PACIENTE: CORRELAÇÃO COM PERFORMANCE MASTIGATÓRIA E LIMIAR DE DEGLUTIÇÃO

Dissertação apresentada à Faculdade de Odontologia de Piracicaba, da Universidade Estadual de Campinas, para obtenção do título de Mestre em Clínica Odontológica – Área de Prótese Dental.

Orientadora: Profa. Dra. Altair Antoninha Del Bel Cury

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RESUMO

O sucesso da reabilitação com prótese total está condicionado ao atendimento de requisitos técnicos e da satisfação do paciente. Dentre os requisitos técnicos, usuários de prótese apontam a mastigação como mais importante, porém, estudos têm sugerido uma fraca associação entre a qualidade técnica da prótese e a satisfação dos pacientes. Desta forma, o objetivo deste estudo foi verificar a correlação entre a avaliação de próteses totais feita pelo paciente e pelo cirurgião-dentista, assim como investigar a correlação destas duas variáveis com medidas objetivas da função mastigatória. Foram selecionados 28 voluntários (cinco homens e 23 mulheres, idade média 71,1 anos), usuários de próteses totais há pelo menos seis meses, com boa saúde geral e sem sinais ou sintomas de disfunção temporomandibular. A avaliação da satisfação com as próteses pelo paciente foi realizada com auxílio da escala visual analógica (escores de 0-100) e a qualidade técnica das próteses foi avaliada por um cirurgião-dentista que atribuiu escore de 0 a 9 considerando aspectos funcionais. Os dentes posteriores das próteses foram avaliados quanto ao desgaste dental, considerando a presença ou ausência de anatomia oclusal. A função mastigatória foi avaliada pelo método de fracionamento de peneiras, no qual o voluntário mastigava porções de 17 cubos de Optocal. A performance mastigatória (PM) foi avaliada após 40 ciclos mastigatórios pelo tamanho mediano de partícula. O limiar de deglutição (LD) foi determinado pelo número de ciclos mastigatórios contados até o voluntário sentir vontade de deglutir e tamanho mediano da partícula obtida após esses ciclos. As correlações entre os resultados da avaliação da prótese pelo profissional com a satisfação do paciente e com a função mastigatória foram obtidas pelo coeficiente de Spearman. A correlação entre satisfação do paciente e a função mastigatória foi determinada pelo coeficiente de Pearson. O Teste t foi aplicado para comparar os escores de satisfação entre as próteses superiores e inferiores e a função mastigatória entre indivíduos com e sem desgaste dental. O nível de confiança estabelecido foi de 95%. A satisfação geral dos pacientes com ambas as próteses obteve escore 49,1. A prótese superior obteve maiores escores de satisfação que a inferior para todos os fatores avaliados, mas apenas

para estabilidade houve diferença estatisticamente significante (p=0,002). A avaliação da qualidade das próteses pelo profissional obteve escore mediano de 6 e não apresentou correlação com a satisfação do paciente. A análise da performance mastigatória e limiar de deglutição mostrou tamanho mediano de partícula de 5,5 (±1,0) mm e 4.9 (±1,2) mm, respectivamente. Os dados de ambos os testes mastigatórios não apresentaram correlação significativa com a satisfação do paciente (p>0,05). A correlação entre a função mastigatória e a qualidade da prótese não foi estatisticamente significante (PM: r=-0,103; LD: r=0,011) e não houve diferença do grau de trituração do alimento teste para as próteses com ou sem desgaste dental (PM: p=0,137; LD: p=0,589). Dentro das limitações do trabalho, pode-se concluir que não houve correlação entre a avaliação funcional das próteses totais e a satisfação do paciente e não foi observada correlação destas variáveis com a função mastigatória.

Palavras-chave: Prótese Total, Satisfação do Paciente, Mastigação

ABSTRACT

For a successful rehabilitation, it is important for complete dentures to accomplish adequate technical requirements and patients' satisfaction. Dentures wearers have pointed out an adequate mastication as the most important aspect of prosthetic rehabilitation, however, studies have suggested a poor association between patients' satisfaction and denture quality. Thus, the aim of this study was to evaluate the relation between patients' and dentists' assessment of dentures and the correlation of these variables with objective measures of masticatory function. Twenty eight volunteers (five men and 23 women, mean age 71.1 years), who wore both complete dentures for at least 6 months, with good general health and no signs or symptoms of temporomandibular joint disorders, were selected. Their level of satisfaction with dentures was assessed on a visual analogue scale (scores from 0 to 100) and the technical condition of dentures were evaluated by an experienced dentist that attributed scores from 0 to 9 considering functional aspects. Tooth wear was also assessed on posterior teeth of dentures considering the presence of occlusal anatomy. The evaluations of masticatory function were performed using a sieving method in which the volunteers were instructed to chew portions of 17 cubes of a standardized artificial test food, Optocal. The masticatory performance (MP) was assessed after 40 masticatory cycles by the median particle size. The swallowing threshold (ST) was determined by the number of cycles performed until the time the volunteers felt the urge to swallow and by the median particles size of comminuted food. The correlation of functional assessment of denture by dentist with volunteers' satisfaction and masticatory function were calculated by Spearman's correlation coefficients. The correlation between volunteers' satisfaction scores and masticatory function was performed by Pearson's correlation coefficient. Student t test was used to compare satisfaction scores between upper and lower dentures and also to compare masticatory function of subjects wearing dentures with and without excessive tooth wear. The significance level was fixed at 95%. The mean general satisfaction score of the volunteers with both dentures was 49.1. The means satisfaction scores for upper dentures were superior to the lower ones for all factors evaluated but significant

differences were observed only for stability (p=0.002). Dentures assessment by dentist had a median score of 6 and had no correlation with patients' satisfaction. The median particle size anchieved by volunteers for masticatory performance and swallowing thresholds was of 5.5 (±1.0) mm and 4.9 (±1.2) mm, respectively. Data of both masticatory tests showed no significant correlation with patients satisfaction scores (p>0.05). No significant correlation was observed between masticatory function and dentist evaluation of dentures (MP: r=-0.103; SWT: r=0.011) and there was no different of food comminution between subjects with and without excessive tooth wear. (MP: p=0.137; SWT: p=0.589). Within the limitations of this study, it can be concluded that there was no correlation between functional assessment of dentures and patients' satisfaction and no correlation was observed between these variables and masticatory function

Key Words: Complete Denture, Patient Satisfaction, Mastication

SUMÁRIO

INTRODUÇÃO

A melhora da qualidade de vida e o avanço das ciências médicas proporcionaram um aumento da expectativa de vida e um consequente crescimento da população idosa. Do ponto de vista da saúde oral, levantamentos epidemiológicos feitos nesta parcela da população têm revelado grande número de perdas dentais e uma prevalência de edentulismo que varia de 7 a 78% em diferentes regiões do mundo (Petersen *et al.*, 2005). No Brasil, o número de indivíduos totalmente edêntulos é bastante elevado (Moreira *et al.*, 2005; Rihs *et al.*, 2009) e observa-se uma proporção de até 84% de idosos nestas condições quando são avaliadas populações institucionalizadas (Moreira *et al.*, 2005).

A perda dos dentes tem impacto significativo na vida do indivíduo com prejuízos de funções orais, principalmente da mastigação, provocando mudanças na dieta do paciente e que pode levar a uma diminuição da ingestão de nutrientes com consequente aumento na taxa de desnutrição e mortalidade entre os idosos (Joshipura *et al.*, 1996; Shimazaki *et al.*, 2001; Chai *et al.*, 2006; Holm-Pedersen *et al.*, 2008; Tsakos *et al.*, 2010). A fala e a estética também estão comprometidas em pacientes edêntulos o que reduz sua auto-estima e auto-confiança. Essas alterações funcionais e psicológicas interferem diretamente no bem estar, nas relações pessoais e atividades sociais do indivíduo (Fiske *et al.*, 1998).

Considerando as situações expostas é possível dimensionar a importância da reabilitação protética para os pacientes desdentados. A instalação de uma prótese total representa a devolução da harmonia do sistema estomatognático restabelecendo, função, estética e saúde, promovendo melhoras significativas na sua qualidade de vida (McGrath & Bedi, 2001; Ellis *et al.*, 2007). Para que a prótese dental possa trazer todos esses benefícios ao seu usuário é fundamental que satisfaça aspectos relacionados à retenção, estabilidade, adaptação, dimensão vertical, oclusão e estética (Berg, 1993; de Baat *et al.*, 1997). Destaca-se que durante muito tempo, uma prótese tecnicamente perfeita foi considerada como fator suficiente para o sucesso do tratamento. Porém, isto começou a ser

questionado desde que Langer *et al*. em 1961, encontraram uma fraca correlação entre a qualidade das próteses e a satisfação do paciente com as mesmas o que despertou um crescente interesse e diversos pesquisadores passaram a investigar esta correlação (Heyink *et al*., 1986; van Waas, 1990b; Pietrokovski *et al*., 1995; Fenlon *et al*., 2002; Heydecke *et al*., 2003; Wolff *et al*., 2003).

Entretanto, ao avaliar-se os trabalhos na literatura, observa-se resultados contraditórios. A correlação entre a qualidade da prótese e a satisfação do paciente é reportada como moderada, fraca ou até mesmo ausente (Langer *et al*., 1961; Heyink *et al*., 1986; van Waas, 1990b; Pietrokovski *et al*., 1995; Fenlon *et al*., 2002; Heydecke *et al*., 2003; Wolff *et al*., 2003), podendo inferir-se que o sucesso da reabilitação com próteses totais parece ser muito mais complexo do que o suposto. O fato de uma prótese inadequada ser bem tolerada por um paciente enquanto outra bem executada não obter sucesso tem sido freqüente motivo de frustração para os clínicos (Brunello & Mandikos, 1998). Segundo van Waas, 1990b), a qualidade técnica da prótese é responsável por apenas 13% da satisfação dos pacientes e esta parece ser influenciada por outros fatores. Dentre os fatores envolvidos no resultado final do tratamento citam-se o número de próteses usadas previamente, a expectativa e a personalidade do paciente, a relação paciente-profissional e a própria avaliação do indivíduo quanto às habilidades e qualificações do cirurgião-dentista (van Waas, 1990c; van Waas, 1990a; Fenlon *et al*., 2000; Smith & McCord, 2004; Ozdemir *et al*., 2006; Fenlon & Sherriff, 2008).

Do ponto de vista dos pacientes, uma das principais expectativas com relação à instalação de uma prótese total é a melhora da função mastigatória (Jokovic & Locker, 1997; de Souza e Silva *et al*., 2009) e, há uma maior aceitação da prótese quando esta é considerada satisfatória pelo paciente (Garrett *et al*., 1996). Entretanto, a auto-avaliação da função mastigatória, feita geralmente através de questionários, é subjetiva e parece estar mais associada à ausência de dor e de movimento das próteses durante a mastigação do que propriamente ao grau de trituração do alimento alcançado pelo indivíduo (Obrez & Grussing, 1999).

Adicionalmente, pode ocorrer um processo de adaptação destes pacientes às suas limitações funcionais os quais, muitas vezes, habituam-se a deglutir partículas maiores de alimento com consequente deficiência na digestão e inadequado funcionamento gastrointestinal (Brodeur *et al.*, 1993; Pera *et al.*, 2002).

Desta forma, medidas objetivas da função mastigatória fornecem informações importantes da real capacidade dos indivíduos de triturarem os alimentos. A literatura descreve diversos métodos para mensuração do grau de trituração do alimento alcançado pelo indivíduo e que permitem calcular variáveis como a perfomance mastigatória e limiar de deglutição (Olthoff *et al.*, 1984; Slagter *et al.*, 1993; Fontijn-Tekamp *et al.*, 2000; Fontijn-Tekamp *et al.*, 2004). Considerando que o objetivo primordial de qualquer reabilitação protética é o restabelecimento da mastigação, estas medidas podem ser usadas como indicadores do adequado funcionamento das próteses diante da freqüente discrepância entre as avaliações de próteses totais feitas pelos profissionais e por seus usuários.

Tendo em vista o exposto, o objetivo neste trabalho foi investigar a correlação entre a avaliação funcional de próteses totais, segundo avaliação do profissional e a satisfação de seus usuários bem como a correlação destas variáveis com medidas objetivas da função mastigatória.

Title: Patients' satisfaction and functional assessment of existing complete dentures: correlation with objective masticatory function

Running Title: Patients' and dentist's assessment of dentures

Key words: Complete Denture, Denture quality, Patient's Satisfaction, Masticatory Performance, Swallowing Threshold.

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Abstract

Considering the discrepancies between patients' and dentists' assessment of dentures, the correlation of these variables with masticatory function could be useful to elucidate which one is the best indicator of an adequate prosthetic rehabilitation. The aim of this study was to evaluate the correlation between patients' and dentist's assessment of dentures and to investigate their correlation with objective measures of masticatory function. A sample of 28 edentulous individuals was selected, all wearing both complete dentures for at least 6 months and with no signs or symptoms of temporomandibular joint disorders. They rated their level of satisfaction with their dentures by means of a visual analogue scale and dentures were scored by a dentist considering functional aspects. Posterior teeth wear was assessed. Masticatory performance and swallowing threshold tests were performed with an artificial test food (Optocal) and the median particle size was determined. Data from subjects' satisfaction were correlated with dentists' evaluation of dentures and both variables were correlated with the results obtained from masticatory tests. The results showed a moderate satisfaction of volunteers with their dentures that, in general, had a fair functional condition according dentist's evaluation. No correlation was observed between patients' and dentists' assessment of dentures. Data from both masticatory tests revealed a poor masticatory function of the volunteers and showed no significant correlation either with patients' satisfaction scores or dentist's evaluation of dentures. Within the limitations of this study, it can be concluded that neither dentist's nor patient's evaluation is a good predictor of an adequate denture.

Introduction

The main objective of a prosthetic rehabilitation is to provide function, esthetic and oral health to the patients, especially to those who have experienced complete tooth loss. Although implant therapy has proved to be a successful solution for edentulism, conventional complete dentures remain the only treatment option for the great majority of patients due to economical or biological limitations (1).

The success of rehabilitation with complete dentures cannot be achieved without technical requirements such as retention and stability (2). However, the provision of a technical satisfactory denture is not necessarily a predictor of patients' satisfaction considering that for some individuals a denture in excellent conditions may results in a failure while others are satisfied with their prosthesis despite their poor quality (3). Many studies have investigated the relationship between patients' and dentists' assessment of dentures but there is no consensus considering the reports of strong, moderate, weak or even no correlation (4-9) between these two variables. This divergence between patients' and dentists' judgment of denture quality may become a reason of uncertainty for clinicians when making the decision of replacing or not a denture.

The denture wearers' complaints are frequently related to esthetics, speech, stability and comfort but the possibility of being able to chew properly has been pointed out as a determining factor for the good acceptance of the prostheses (2, 10, 11). However, some studies have found a weak correlation between the self-assessed chewing ability and the capacity of subject to triturate food particles (12-14). Although it has been increasingly accepted that patients' perception of their oral health status is an important outcome and that the assessment of masticatory function should be based on patients judgments (15), the ability to comminute foods should not be undervalued. Subjects with a compromised function may adapt to these limitations by swallowing larger food particles what have a negative impact on the digestive process and can affect gastrointestinal function (16).

Considering the importance of having masticatory function evaluated objectively and to establish the correlation of this data with patients' and dentists' assessment of dentures, the aim of this study was to evaluate the relation between patients' and dentists' assessment of dentures and to investigate which of these variables are correlated to masticatory performance and swallowing threshold.

MATERIALS AND METHODS

Experimental Design

This *in vivo* study had a cross-sectional design and was conducted in a group of both complete maxillary and mandibular denture wearers. Their level of satisfaction with the current dentures was assessed by means of a visual analogue scale. Also, an experienced dentist, blind to the rates of patients' satisfaction, performed the functional assessment of dentures and evaluated the presence of artificial teeth wear. Masticatory function was objectively measured by means of masticatory performance and swallowing thresholds test. Data from subjects' satisfaction were correlated with dentists' evaluation of dentures and both variables were correlated with the results obtained from masticatory tests.

Subjects

After being approved by the local Research and Ethics Committees, the volunteers' selection was conducted in reunion groups of elderly people in Piracicaba, Brazil, and all participants signed a written inform consent. The inclusion criteria included subjects with a good general health and wore the current dentures for at least 6 months and as no-inclusion criteria, the presence of any signs or symptoms of temporomandibular joint disorders. The final sample comprised of 28 volunteers, 5 men and 23 women, at ages ranging from 52 to 88 years – mean age 71.1 (±8.6) years.

Anamnesis and clinical examination were performed and information of period of edentulism and time of denture usage were collected. Since it was not possible to make restrictions of medicament intake considering the advanced age

of the subjects, unstimulated whole salivary flow rate was measured. Subjects were instructed not to move their tongue or lips during procedure, in which saliva was allowed to accumulate in the mouth and expectorated into pre-weighted containers. The collection period was 5 minutes and the flow rate was expressed in mL/min. The saliva weight in grams was assumed to be equal to its quantity in milliliters, because the specific density of saliva is close to 1.0. The samples were collected in the morning between 7:30 and 10:30. The salivary flow rate was considered normal when it ranged from 0.3 to 0.4 mL/min (17).

Denture wearers' satisfaction

Volunteers were asked to rate their level of general satisfaction with their dentures and also to grade satisfaction with maxillary and mandibular dentures independently for esthetics, comfort, stability, ability to chew and to speak by means of a visual analogue scale (VAS). The VAS consisted of a horizontal 100 mm line anchored by the words "completely dissatisfied'' at the left extremity of the scale and by "completely satisfied'' at the other end (18). Subjects were instructed to mark a line at a point corresponding to their satisfaction level and the score was recorded as the distance in millimeters from the left end to the subject mark such that higher values indicated a high level of satisfaction.

Functional Assessment of Dentures by a dentist

Maxillary and mandibular dentures were evaluated by one dentist, that had no access to the answers given by the volunteers, using a 9-item criteria for functional assessment of dentures (19). Evaluations were done for freeway space, occlusion, retention, stability and each factor was scored as 0 (unsatisfactory) or 1 (satisfactory). A final score for each set of dentures was obtained by the sum of all items.

Additionally, tooth wear was assessed and each posterior artificial tooth was recorded as having occlusal anatomy maintained or having occlusal surface

chipped (13). If half of the posterior artificial teeth of at least one denture lacked occlusal anatomy, the volunteer was considered to have excessive tooth wear.

Masticatory function

Masticatory function was evaluated by means of masticatory performance and swallowing threshold tests that were performed with a standardized artificial test food, Optocal, based upon the silicone rubber Optosil (Bayer Dental, Leverkusen, Germany). The material was manipulated and inserted in molds to form cubes with edges with 5.6 mm in length. After 15 minutes, the cubes were removed and stored in an electric oven at 65°C for 16 hours to allow a complete polymerization. Then, the material was removed and portions of 17 cubes (approximately 3 cm^3 and 3.7 g) were separated and stored in plastic containers until the test (20, 21).

Prior to the tests, the participants chewed an initial portion of Optocal to be familiar with the material and to make sure that they fully understood the testing procedures. The resultant particles were discarded. For masticatory performance tests, a new portion of 17 cubes of Optocal was offered to the volunteer who was instructed to chew in their habitual way for 40 chewing strokes, counted by the operator. Then, the subject expectorated the chewed particles on a paper filter sitting on a glass container, and mouth and dentures were carefully rinsed with water. The rinsing was added to the expectorated particles and subjects' mouths were examined for retained pieces of the test material. For swallowing threshold tests, the volunteer was instructed to chew a new portion of the artificial test food until he felt the urge to swallow. At this moment, he should stop chewing and raise the hand to signalize to the examiner who recorded the number of cycles. The collection procedures of the comminuted particles were repeated as described above (21, 22).

The collected particles of both tests were air-dried for 1 week and then sieved for 20 minutes in a stack of 10 sieves, with square apertures decreasing from 5.6 to 0.5 mm and a bottom plate. The amount of test material on each sieve and the bottom plate was weighed on a 0.0001 g analytical balance. The degree

of fragmentation of the chewed food was given by the median particle size, X50, which is the aperture of a theoretical sieve through which 50% of the weight of the comminuted food could pass (20).

Statistical Analysis

The data were analyzed with SPSS software with a significance level fixed at 5%. The correlation of functional assessment of denture by dentist with volunteers' satisfaction and masticatory function were calculated by Spearman's correlation coefficients. The correlation between volunteers' satisfaction scores and masticatory function was performed by Pearson's correlation coefficients. Student t test was used to compare satisfaction scores between upper and lower dentures and also to compare masticatory performance and swallowing thresholds data of subjects wearing dentures with and without excessive tooth wear.

RESULTS

Oral Health Characteristics of study population

The mean period of edentulism for maxilla and mandible was 38.2 (±11.1) and 36.1 (±12.9) years respectively and 82.1% (n=23) of volunteers wore their current dentures for more than five years (Table 1). The volunteers presented a reduced unstimulated salivary flow rate with a mean value of 0.13 (±0.09) mL/min.

Table 1. Frequency of subjects by time of denture usage for maxillary and mandibular dentures (n=28)

Time of denture usage (years)	Maxillary Denture (%)	Mandibular Denture (%)
0,5-5	17.9	17.9
6-15	35.7	32.1
16-25	7.1	14.3
26-35	21.4	21.4
36-45	17.9	14.3

Denture-related variables

Denture wearers' satisfaction: The mean score of the volunteers for general satisfaction with dentures was 49.1 (±33.6). It was observed that the 32.1% of subjects were very satisfied with their dentures (general satisfaction score ranging from 75 to 100) while 39.3% were very dissatisfied (general satisfaction scores ranging from 0 to 25). The scores for general satisfaction showed no significant correlation with dentures age (p=0.510; r=0.130) or period of edentulism (p=0.255; r=0.222). Although the means satisfaction scores for upper dentures were superior than the scores for the lower ones for all factors evaluated, significant differences were observed only for stability (p = 0.002) (Figure 1). General satisfaction showed correlation with almost all individuals factors evaluated (Table 2). The volunteers' judgment of their ability to chew showed significant correlation with their satisfaction with stability (upper denture: p=0.000;r=0.723; lower denture: p=0.000;r=0.735) and comfort (upper denture: p=0.001;r=0.586; lower denture: p=0.000;r=0.644).

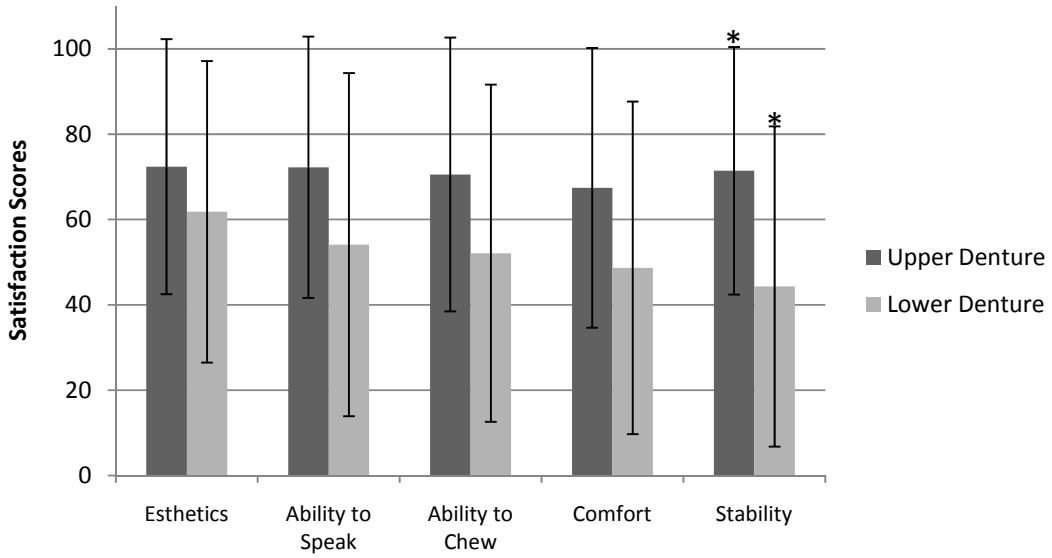

Figure 1. Means scores of patients' satisfaction for upper and lower dentures (*p=0.002)

Table 2. Pearson's coefficient correlation between patients' general satisfaction and satisfaction with upper and lower dentures for each factor evaluated.

	General Satisfaction
Esthetics	
Upper Denture	0.551*
Lower Denture	0.341
Ability to Speak	
Upper Denture	0.437*
Lower Denture	0.256
Ability to Chew	
Upper Denture	0.678*
Lower Denture	0.442*
Comfort	
Upper Denture	0.445*
Lower Denture	0.226
Stability	
Upper Denture	0.540*
Lower Denture	0.447*

(*$p<0.05$)

Functional assessment of Dentures: The median score for functional assessment of dentures was 6 and ranged from 3 to 8. In general, the upper denture showed good functional conditions considering that retention and stability were adequate for more than 80% of these dentures. Otherwise, 82.1% of lower dentures presented some stability problems.

Masticatory Function

Subjects presented a poor masticatory performance with a median particle size of 5.5 mm (±1.0). For swallowing threshold, the volunteers achieved a particle size of 4.9 mm (±1.2) after a mean of 70.6 (±36.7) masticatory cycles. It was observed a moderate correlation between the level of comminuting of masticatory

performance and swallowing thresholds tests (r=0.428; p=0.023) suggesting that subjects with poor masticatory performance swallow larger particles of food.

Correlations

Functional assessment of Dentures x Patients' satisfaction: No significant correlation was found between functional assessment of denture and patients' satisfaction for any of the factors evaluated (Table 3).

Masticatory Function x Patients' satisfaction: It was not observed statistical significant correlation between masticatory function outcomes and subjects satisfaction with chewing ability, comfort and stability of dentures (Table 3).

Table 3. Correlation of functional assessment of dentures and masticatory function with patients' satisfaction scores.

Factors	Functional Assessment of Dentures†	Masticatory Performance‡	Swallowing Thresholds‡
General Satisfaction	-0.280	0.247	-0.194
Comfort (Upper)	-0.167	-0.034	0.302
Comfort (Lower)	-0.22	0.178	0.244
Stability (Upper)	-0.116	0.067	0.277
Stability (Lower)	-0.198	0.216	0.083
Abilitiy to chew (Upper)	-0.199	-0.083	0.076
Abilitiy to chew (Lower)	-0.213	0.076	0.174
Ability to Speak (Upper)	-0.231	-	-
Ability to Speak (Lower)	-0.121	-	-
Esthetics (Upper)	-0.10	-	-
Esthetics (Lower)	0.186	-	-

† Spearman's correlation coefficient; ‡ Pearson's correlation coefficient

Masticatory Function x Dentists' assessment of denture: Masticatory performance and swallowing thresholds showed no significant correlation with the results of functional assessment of denture (r=-0.103 and r=0.011, respectively). Also no statistical difference on comminution of artificial test food was observed

between subjects with and without excessive tooth wear. (masticatory perfomance: p=0.137 and swallowing thresholds: p=0.589)

DISCUSSION

The relationship between denture quality and patients' satisfaction has been extensively investigated in literature (4-9, 23-25). However, there is little information on the correlation of both variables with quantitative indicators of an adequate denture performance (26). The present study, we intended to make clear whether patient or dentists' assessment of dentures would be a good predictor of objective measures of masticatory function considering its importance for psychological and physiological health aspects. Additionally to masticatory performance, the inclusion of swallowing threshold provided reliable information about the impact of masticatory impairment on digestive process.

The results of the present study showed no significant correlation between functional assessment of dentures by dentist and patients' satisfaction scores. Similar findings have been previously reported by other authors (6, 9), what suggests that technical aspects of prosthesis, although important, are not sufficient to predict the success of rehabilitation in patients' point of view. van Wass (8), investigating a group of subjects who received new complete dentures, found that only 13% of the variance in patients' satisfaction could be explained by the variance in the quality of dentures. In this regard, it has been suggested that other factors such as attitude toward dentures, number of previous dentures, patients' personality and expectations, patient-dentist relationship and even the judgment of dentists' qualifications and skills, may have an important role on subjects' final judgment of treatment (27, 28). Additionally, the concept of success is often defined differently by dentists and patients. Dentists assess dentures using predetermined criteria for success based on technical standards which usually do not take into account the needs and attitudes of individual patients (29).

From the sample, 39.3% of volunteers graded extremely low scores for general satisfaction, a higher proportion of dissatisfied denture wearers than the

values reported by literature (3, 30). This result could be expected considering that most of the subjects who were interested to participate in the study wished to replace their prosthesis and were more dissatisfied with current dentures than the general population of edentulous people. However, it must be clarified that, during volunteers' selection, no offer of new dentures was made to avoid any bias. Probably, due to this precaution, a surprising finding of a significant number of volunteers that were very satisfied despite their advanced dentures age was observed. The long period of denture usage may have resulted in a neuromuscular adaptation of patients that overcame problems related to bone resorption. It can be hypothesized that these denture wearers volunteered to participate of the research for the opportunity of having a professional evaluation of their dentures and not necessarily for considering that their prosthesis were inadequate.

The tendency of a poorer satisfaction with mandibular dentures when compared to maxillary ones is in agreement with the reports of Petrokovski et al. (7). Some authors suggested that the overall satisfaction with complete dentures is closely related to the successful use of the lower one (25). However, this was not observed in the present sample considering the higher correlation of general satisfaction with upper denture scores.

Despite the advanced age of dentures, the functional assessment scores were generally high. This could be attributed to the fact that the main problems observed on these dentures – small denture base fractures, presence of biofilm, stains, deterioration of denture base resin – did not necessarily reflect on functional problems. These conditions were not considered on examiner's judgment of dentures because they have no influence on the mastication-related variables evaluated in this study.

The masticatory performance of the sample was extremely poor. Although denture wearers have an expected reduced chewing ability (20), the degree of artificial food comminution observed in the present study was lower than the ones reported by other authors in the same test conditions (20, 31). Even for swallowing thresholds, the median particle size was high. A possible explanation for this

impairment in masticatory function is the reduced salivary flow of subjects given that saliva plays an important role in chewing and bolus formation (32). Although this association was not found by some studies in dentate subjects (17), it must be pointed out that, for removable denture wearers, saliva has an additional function in denture retention and protection of the denture-bearing tissues. Subjects with oral dryness are more likely to report soreness when eating what may affect mastication (33). The reduced salivary flow of the sample was probably induced by medication intake. This factor could not be excluded considering that it is extremely difficult to select denture-wearing patients with no medication and therefore unaffected salivary flow rates (9).

It was observed a correlation between masticatory performance and swallowing thresholds suggesting that, as a result of their functional limitation and impaired mastication, denture wearers may lead to cope strategies for feeding by swallowing larger food particles (34).

In the present study, it was not observed significant correlation of objective masticatory measures and patients' satisfaction scores even for chewing ability, a result that agrees with other studies (12-14, 35). It can be stated that patients' perception of oral function is not based on the degree of food triturating but on comfort and stability during mastication (26, 34), a correlation that was also observed for the present sample.

The dentists' evaluation of prosthesis also showed no correlation with masticatory function. Similarly, Garrett et al. (22) found that was no difference in masticatory performance after improvements of poorly fitting dentures and, even 12 weeks after the insertion of new dentures, the masticatory performance barely reached the level of the old ones. Different results were observed by some authors that found a positive association of denture quality and food comminuting (13, 35). On the other hand, these authors observed no influence of teeth occlusal surface on masticatory function. This report agrees with the results of the present study that found no difference on the median particle sizes achieved by volunteers with and without excessive posterior tooth wear.

This study investigated whether patient or dentist assessment of denture would be a good predictor of an adequate masticatory function but no correlation was found among these variables. However, the present findings that some individuals with poor quality dentures were satisfied and had a fair masticatory function must be carefully interpreted and generalizations should be avoided. Although some may argue that patient-based outcomes must be used to assess treatment success, the importance of adequate denture conditions should not be denied. In fact, the rehabilitation of edentulous patients involves psychological, behavioral and neuromuscular factors, especially concerning masticatory function, and this complex process deserves further investigations.

Acknowledgements

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CONCLUSÃO

Dentro das limitações do trabalho, pode-se concluir que não houve correlação entre a avaliação funcional das próteses totais e a satisfação do paciente com as mesmas. Adicionalmente, não foi observada correlação destas variáveis com a performance mastigatória e limiar de deglutição.

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* De acordo com a norma da UNICAMP/FOP, baseadas na norma do International Commitee of Medical Journal Editors - Grupo de Vancouver. Abreviatura dos periódicos em conformidade com o Medline

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Anexo 1 – Certificado de Aprovação do Comitê de Ética em Pesquisa da Faculdade de Odontologia de Piracicaba

COMITÊ DE ÉTICA EM PESQUISA
FACULDADE DE ODONTOLOGIA DE PIRACICABA
UNIVERSIDADE ESTADUAL DE CAMPINAS

CERTIFICADO

O Comitê de Ética em Pesquisa da FOP-UNICAMP certifica que o projeto de pesquisa "**Condição de próteses dentais removíveis: Influência sobre a performance mastigatória, compostos sulfurados voláteis e a presença de biofilme**", protocolo nº 068/2008, dos pesquisadores Altair Antoninha Del Bel Cury, Renata Cunha Matheus Rodrigues Garcia, Silvia Carneiro de Lucena, Simone Guimarães Farias Gomes e Wander José da Silva, satisfaz as exigências do Conselho Nacional de Saúde - Ministério da Saúde para as pesquisas em seres humanos e foi aprovado por este comitê em 05/05/2009.

The Ethics Committee in Research of the School of Dentistry of Piracicaba - State University of Campinas, certify that the project "**Denture condition: Influency on masticatory performance, volatile sulfur compounds and presence of biofilm**", register number 068/2008, of Altair Antoninha Del Bel Cury, Renata Cunha Matheus Rodrigues Garcia, Silvia Carneiro de Lucena, Simone Guimarães Farias Gomes and Wander José da Silva, comply with the recommendations of the National Health Council - Ministry of Health of Brazil for research in human subjects and therefore was approved by this committee at 05/05/2009.

Prof. Dr. Pablo Agustin Vargas
Secretário
CEP/FOP/UNICAMP

Prof. Dr. Jacks Jorge Junior
Coordenador
CEP/FOP/UNICAMP

Nota: O título do protocolo aparece como fornecido pelos pesquisadores, sem qualquer edição.
Notice: The title of the project appears as provided by the authors, without editing.

Anexo 2 – Figuras

Figura 1. Materiais utilizados na formulação do Optocal (Vaselina Sólida, Gesso Pedra, Alginato, Dentifrício, Silicone Pesado e catalisador)

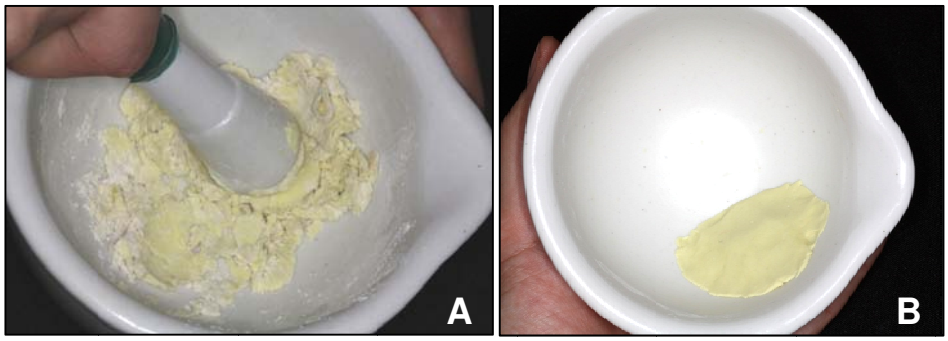

Figura 2. Manipulação do Optocal com auxílio de gral e pistilo cerâmicos (A) para obtenção de uma massa homogênea (B)

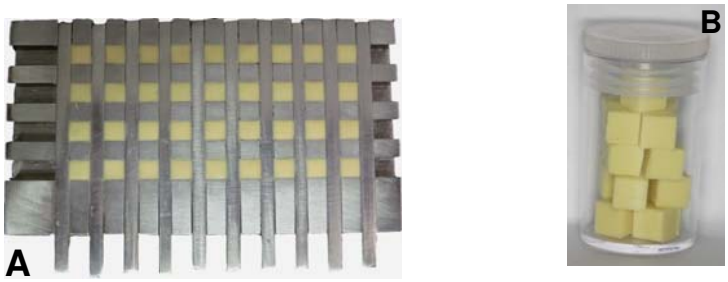

Figura 3. Material inserido em matriz metálica (A) para modelagem dos cubos de 5,6 mm de aresta e porção com 17 cubos de Optocal pronta para os testes (B)

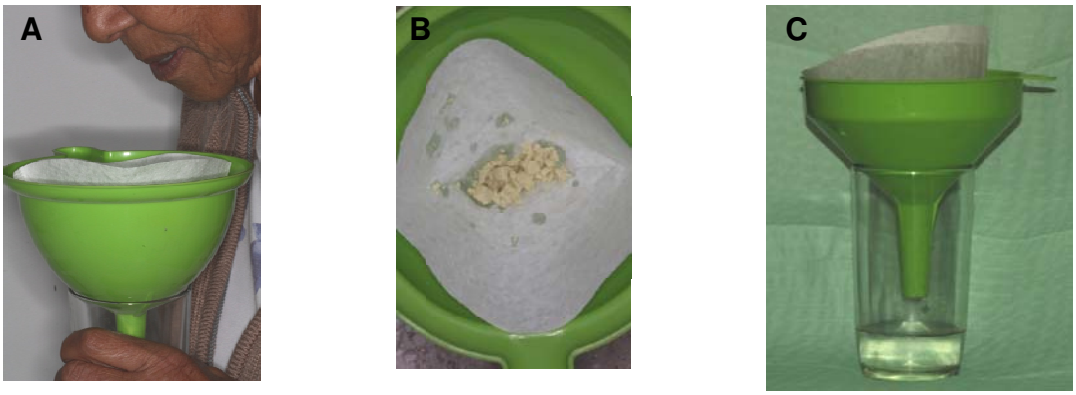

Figura 4. Voluntário expelindo o material triturado em papel filtro (A), material recuperado após o teste (B) e secagem do material (C)

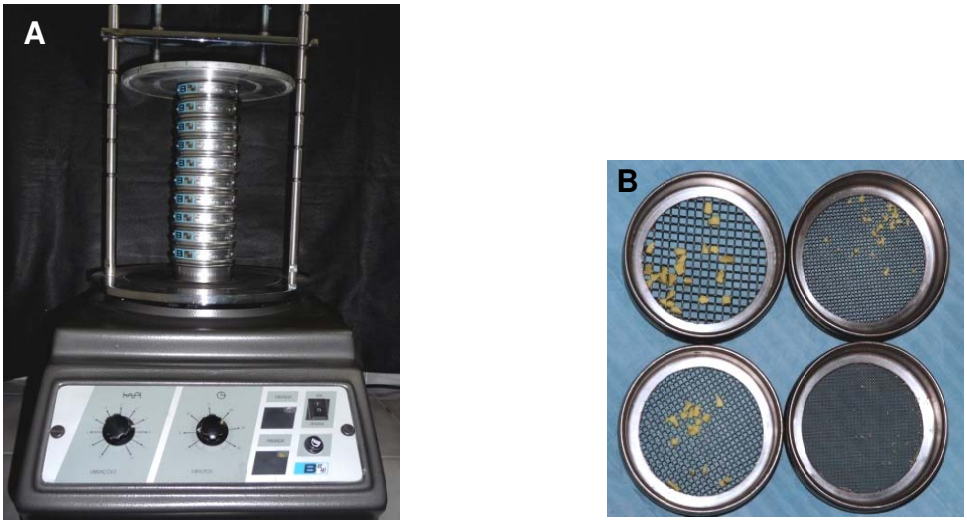

Figura 5. Conjunto Agitador + Tamises no qual o material triturado foi peneirado (A) e material retido em tamises com diferentes aberturas (B)

ANEXO 3 – Confirmação de submissão ao periódico *Journal of Oral Rehabilitation*

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Authors:	Lucena, Silvia Gomes, Simone Silva, Wander Del Bel Cury, Altair
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