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# Autoperception of food conditions of elderly dental prosthetic users

## *Autopercepção das condições alimentares de idosos usuários de prótese dentária*

### Keywords

Elderly  
 Dental Prosthesis  
 Self Perception  
 Food  
 Quality of Life

### Descritores

Idoso  
 Prótese Dentária  
 Autopercepção  
 Alimentação  
 Qualidade de Vida

### ABSTRACT

**Purpose:** To evaluate the self-perception of the food conditions of elderly users of dental prosthesis, in order to verify the interference that dental prosthesis has in their feeding. **Methods:** The present study counted with 60 elderly, participants of the *Centro de Convivência Nair Ventorin Gurgacz* (Community Center), aged between 60 and 88 years old. All participants answered to a questionnaire elaborated by the researchers and the Geriatric Oral Health Assessment Index (GOHAI). **Results:** The elderly who participated in this study, mostly women, used a bimaxillary removable prosthesis for over 30 years; although they classified their nutrition as “good” and did not present preference for specific food consistency, they frequently felt pain while chewing. The average score of the GOHAI was 29.73, considered “low”, the index dimension with worst score was physical function, that includes eating, speaking and swallowing. No relation was observed between time of use of dental prosthesis, age and the GOHAI scores. **Conclusion:** The elderly rarely complaint about discomfort or embarrassment on feeding, however, they present an average lower than expected in the GOHAI index, which indicates that, although they do not report it, many deteriorations, that seem to be natural may be happening and may be the cause of worst quality of life.

### RESUMO

**Objetivo:** Avaliar a autopercepção das condições alimentares de idosos usuários de prótese dentária, verificando sua interferência na alimentação. **Método:** Participaram 60 idosos com idade entre 60 e 88 anos, usuários de prótese dentária total ou parcial, que frequentam assiduamente o Centro de Convivência Nair Ventorin Gurgacz – FAG em Cascavel, Paraná. Todos os indivíduos responderam a um questionário de identificação e ao protocolo Índice de Determinação da Saúde Bucal Geriátrica (GOHAI). **Resultados:** Os idosos do estudo, maioria mulheres e usuários de prótese removível bimaxilar com mais de 30 anos, classificam sua alimentação como “boa” e não possuem preferência por consistência alimentar, embora frequentemente sintam dor ao mastigar os alimentos. A média pontuada no protocolo GOHAI foi classificada como “ruim” e o maior prejuízo dos idosos ocorreu no domínio físico, que engloba questões relacionadas à mastigação, deglutição e fala. Não foram constatadas relações entre o tempo de utilização da prótese dentária com a idade e os escores do GOHAI. **Conclusão:** Embora os idosos raramente tenham queixa sobre o modo de se alimentar, referindo desconforto ou constrangimento, apresentam uma média abaixo do esperado no protocolo, indicando que, ainda que não relatem, muitas modificações podem estar acontecendo, gradativamente, e que soam como naturais, gerando prejuízos à qualidade de vida em alimentação do idoso.

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## INTRODUCTION

Nutrition is vital to human survival. In addition to ensuring nutritional supply, which is essential for the body to perform its daily activities, it also plays an important role in cultural and social aspects and it symbolizes different meanings. Culturally and socially food is not only a nutritious subsistence; it is also a manner and style of eating, a condition that defines not only what is being ingested, but also the person who is eating<sup>(1)</sup>.

In the Brazilian culture<sup>(2)</sup>, eating is a very pleasurable moment. Pleasure is what differs food from nutriment; nutriment is what keeps the person alive and well-fed while food is everything that is eaten with pleasure and therefore, becomes an identity.

A proper mastication is one of the essential factors to guarantee an enjoyable and pleasant feeding. For this to be possible, several organic and functional factors are necessary, such as adequate and complete dentition, muscular strength allowing mastication and breakdown of solid food added to a healthy oral cavity with no lesions<sup>(3)</sup>.

The masticatory system is considered to be a functional unit. It is composed of teeth, maxillary and mandibular periodontal structures, the temporomandibular joints, the muscles involved in mastication, the muscles of the lips, cheek and tongue, soft tissues that cover these structures and the nervous and vascular system that supply these tissues<sup>(4)</sup>. The masticatory capacity depends on six factors: the number of teeth; loss of occlusal support; quality of the prosthesis; maximum bite force; no oral sequelae and consistency of the diet<sup>(5)</sup>. Alteration in any one of these structures leads to impairments that will affect chewing and compromise the swallowing process<sup>(6)</sup>.

The aging process comes with several losses to the body and complications that compromise the body functions. One of these changes is the edentulism that is the total loss of teeth as a result of the aging process; it is one of the main complaints of the elderly regarding feeding.

The tooth extraction was very common in the past due to the professionals' lack of proper knowledge, thus, lack of accurate diagnosis. Also, there was very few rehabilitation technologies, therefore, extraction of all teeth, including the healthy ones, was very common in order to eliminate any problem. This procedure was the main cause of edentulism and resulted in the nowadays common use of dental prosthesis by elderly<sup>(7)</sup>. The increase of the average life expectancy leads to an increase in the use of total or partial dentures aiming to provide a better quality of life regarding feeding for the elderly population<sup>(8)</sup>.

The dental prosthesis is an alternative method to facilitate chewing and to reestablish nutrient intake by mouth. However, sometimes it can lead to complications related to chewing and swallowing. These complications are due to several factors, for example, maladaptation of dental prosthesis. This generates discomfort and/or pain while eating, and trouble biting and chewing, especially solid food, therefore, elderly people prefer eating pasty consistency, which may compromise their proper nutrition<sup>(9)</sup>.

The maladaptation of dental prosthesis generates some mastication characteristics; there is no simultaneous and stable dental contact between the teeth, thus, it is difficult to distribute the occlusal forces in more teeth, which alters the breakdown of ingested foods. The aging process also generates changes in the stomatognathic functions, hence, the risk of oral dysphagia increases. This higher risk added to presbyphagia and oral sensory impairment, makes mastication and swallowing alterations more severe; also, it may cause articulatory imprecision and distortions, muscular atrophy and reduction of the tongue mass that will reduce the control and propulsion of the bolus into the pharynx and generate muscular and/or skeletal changes<sup>(10)</sup>.

The presence of complaints regarding dental prosthesis is quite usual in the clinical practice. Different evaluation tools are used to assess the disadvantages on the quality of the feeding process in the elderly. These tools are commonly self-assessment protocols that aim to measure the feeding satisfaction with use of dental prosthesis by considering the individuals symptoms and complaints.

One of these tools is the GOHAI - Geriatric Oral Health Assessment Index – developed by Atchison and Dolan<sup>(11)</sup>. It has 12 questions to assess three dimensions: 1. physical functions regarding feeding, speech and swallowing; 2. psychosocial function which includes worry or concern about oral health, dissatisfaction with appearance, self-awareness regarding oral health and avoidance of social contacts due to oral problems; and 3. pain or discomfort while chewing using the dental prosthesis and items related to use of medications to relieve pain and discomfort. The assessment of these dimensions aims to quantify the level of self-perceived satisfaction of the elderly who use dental prosthesis while eating.

Even in healthy elderly people, difficulties to eat are evident due to the aging process itself and to maladaptation of dental prosthesis, which results in the alterations previously described. For this reason, it is frequent that medical doctors and dentists send their elderly patients to speech language pathologists due to their complaint related to chewing as a result of maladaptation of dental prosthesis, loss of teeth and reduced strength of the masticatory musculature. In addition to being nutritional, eating is an important social, cultural and emotional aspect, thus, it is important and necessary to investigate the elderly users of dental prosthesis self-assessment regarding their food conditions. Posteriorly, it will be possible to develop strategies and practices to reduce difficulties and to provide better quality of life regarding feeding in this population.

Therefore, the aim of the present study is to evaluate the self-perception of the food conditions of elderly users of dental prosthesis, in order to verify the interference that dental prosthesis has in their feeding.

## METHODS

This study was submitted to the Committee for Ethics in Research and was approved under the protocol number CAAE 67114617.9.0000.5219.

This was a field and cross-sectional study with a quantitative and descriptive approach. This study was developed with participants of the *Centro de Convivência Nair Ventorin Gurgacz* (Community Center) – FAG in *Cascavel, Paraná*. This center aims to gather elderly groups to propitiate them with moments of relaxation, interaction and activities that may contribute for their personal and social development.

The elderly who were included in this study were using complete or partial dental prosthesis, the years of use was not an exclusion criteria. Also, they had to be able to answer the questionnaire, not have any neurological or degenerative disease or any other condition that could negatively influence swallowing; also, they could not present signs of cognitive impairment while responding to the questionnaire (comprehension difficulties observed by the evaluator).

To present the objectives, risk and benefits of the study, a small presentation of approximately 15 minutes was performed. Next, the participant who agreed to participate signed an informed consent form.

Two tools were used for data collection: a questionnaire elaborated by the researchers with 10 closed questions regarding, gender, age, years of education, type of dental prosthesis, time of use of the dental prosthesis and others, that was later used to characterize the sample (Appendix 1); and the Brazilian version of the Geriatric Oral Health Assessment Index (GOHAI) - (Annex 1). The Brazilian version of this index was validated and culturally adapted by Silva and Castellanos Fernandes in 2001 and called “Índice de Determinação da Saúde Bucal Geriátrica”. This protocol has 12 closed questions that aim to assess the elderly feeling in three dimensions:

- Dimension of physical function: that includes eating, speaking and swallowing (questions 1 to 5);
- Dimension of psychosocial function: that included worry or concern about oral health, dissatisfaction with appearance, self-awareness regarding oral health and avoidance of social contacts due to oral problems (questions 6, 7, 9, 10 and 11);
- Dimension of pain and discomfort in the mouth: related to oral discomfort while eating due to the use of dental prosthesis (questions 8 and 12).

For each question there are three possible answers: always, sometimes and never that are scored as 1, 2 and 3, respectively. The simple sum of the answers provides the index score; the total score ranges from 12 to 36 points. Higher scores represent better self-perception regarding the use of the dental prosthesis. Score values between 34 and 36 are considered ‘high’; between 31 and 33, ‘moderate’; and smaller than 30 are considered ‘low’.

The application of the questionnaire took in average 15 minutes per person. The questions were read out loud by the researchers to each participant. The participants answers had no intervention from the evaluator. The sample counted

with 60 individuals aged between 60 and 88 years old. Two (2) individuals did not fit the inclusion criteria and were excluded.

An Excel spreadsheet was used to organize all data. The statistical analysis used parametric tests, the significance level was set at 0.05 (5%) and a 95% confidence interval was constructed.

## RESULTS

The present study counted with 60 elderly individuals between 60 and 88 years old, an average age of 69.1 years old. Information from the descriptive analysis of the data showed there was 92% (n = 55) of women and 8% (n = 5) of men (p-value <0.001). Regarding the years of education, most participants completed the Elementary School, 62% (n = 37), followed by High School, 22% (n = 13) and only 5% (n = 3) were illiterate; there was statistical difference among all years of education.

In regard to the “Classification of Nutrition”, 38% (n=23) of the elderly classified it as “Good”, 32% (n=19) as “regular”, 25% (n=15) as “very good” and only 5% (n=3) as “bad” (p-value<0.001). Most of the elderly (73%) reported to eat all types of consistencies, on the other hand, 27% reported not being able to do so (p-value<0.001) (Table 1).

Still related to this, it was possible to observe that individuals that reported to eat all types of consistencies were most likely to classify their nutrition as “Good” (52%); while the elderly who could not, were most likely to classify it as “regular” (69%) (Table 2).

Statistical differences were found for the frequency of pain while chewing; 47% (n=28) reported to “Always” feel pain, 45% (n=27) reported to feel pain “Sometimes” and only 8% (n=5) of

**Table 1.** Frequency of Responses for “Classification of Nutrition” and “Eat all types of consistencies”

		N	%	P-value
Classification of Nutrition	Very good	15	25	0.116
	Good	23	38	Ref.
	Regular	19	32	0.444
	Bad	3	5	<0.001
		N	%	P-value
Eat all types of consistencies	Yes	44	73	<0.001
	No	16	27	<0.001

Two-Proportion Equality Test

**Caption:** N = Individuals number

**Table 2.** Relation between “Eat all types of consistencies” and “Classification of Nutrition”

	Yes		No		Total	
	N	%	N	%	N	%
Very good	13	30	2	13	15	25
Good	23	52	0	0	23	38
Regular	8	18	11	69	19	32
Bad	0	0	3	19	3	5
Total	44	73	16	27	60	100

**Caption:** N = Individuals number

the analyzed sample referred to never feel pain ( $p$ -value $<0.001$ ). This data is contradictory to the “Classification of Nutrition”; 73% reported being able to eat all types of consistencies. However, most of the participants reported to feel pain “always” or “sometimes” while eating which was associated to the use of dental prosthesis.

Similar occurs for “Preference on type of consistency”, 72% ( $n= 43$ ) of the elderly did not have preference to eat a specific consistency. However, 25% preferred pasty food probably due to its easy intake. Another contradiction is the high frequency of elderly without preference for a specific consistency (72%), yet, most of them referred to “always” or “sometimes” feel pain while chewing (47% and 45%, respectively) (Table 3). This indicates that the elderly individuals eat all types of consistencies despite of feeling discomfort with harder food; plus, this can indicate that they have already made natural adaptations, so solid food is not even considered for their diet.

Regarding the “Type of Dental Prosthesis”, removable bimaxillary total dental prosthesis was the most frequent among the study sample, 62% ( $n=37$ ), followed by 35% ( $n=21$ ) with removable superior total dental prosthesis, and the least frequent was the removable inferior total dental prosthesis, 3% ( $n=2$ ), ( $p$ -value  $<0.001$ ) (Figure 1).

The time of use of the dental prosthesis and its relation with proper adaptation was measured by grouping responses in a 10 years range, from the lowest to the highest years of use. Most of the participants, 42%, used the dental prosthesis from 31 to 40 years (Figure 2).

The answers of the GOHAI were presented according to each dimension for a better analysis. Questions 1 to 5 assess the dimension of physical function (Chart 1).

Considering this dimension, 57% of the elderly respondents said they had never had limitation regarding the kind and amount of food, 48% said never to have trouble while biting or chewing. Also, nearly half of the analyzed individuals did not report trouble speaking due to the use of dental prosthesis. High frequency of elderly individuals (77%) reported to eat without discomfort and to swallow comfortably; however, few participants (13%) reported trouble biting or chewing, which indicates possible alteration in the breakdown of food, which may be due to the use of dental prosthesis.

Regarding the dimension of psychosocial function, assessed with the questions 6, 7, 9, 10 and 11, it was possible to observe that most of the individuals never limited contacts with people (88%) neither avoided eating in front of people (85%) due to their teeth or dental prosthesis. Plus, most referred being pleased with their appearance regarding their teeth (60%); also, there was no worry or concern related to their teeth, dental prosthesis and gums (77%). However, although most of the participants (63%) reported no worries related to their dental care, a small part of the participants was worried and asked the researchers about specialize clinics for dental health care (Chart 1).

In the questions related to pain and discomfort (question 8 and question 12), the large majority of the elderly reported never

having used medication to relieve pain or discomfort (78%), and more than half reported no sensitivity to hot, cold or sweets (62%) (Chart 1).

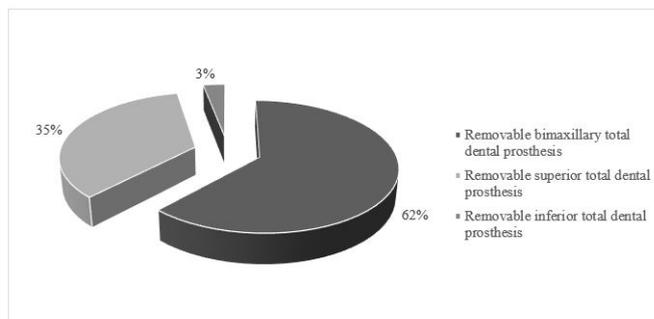
Considering all three dimensions of the GOHAI, the predominant answer was “never”, followed by “sometimes”. Thus, the GOHAI average score was 29.73. It is worth mentioning that the answers classified as “always”, “sometimes” and “never” receive the scores 1, 2 and 3, respectively. Therefore, the score of the GOHAI is a simple sum of these answers; the total score ranges from 12 to 36. The lower proportional average was observed for the dimension of physical function, with a mean of 12.22 points (Table 4).

**Table 3.** Frequency of Responses for “Pain while chewing” and “Preference on type of consistency”

Preference on type of consistency	N	%	P-value
No	43	72	Ref.
Liquid	2	3	$<0.001$
Pasty	15	25	$<0.001$
Pain while chewing	N	%	P-value
Always	28	47	Ref.
Sometimes	27	45	0.855
Almost Never	5	8	$<0.001$

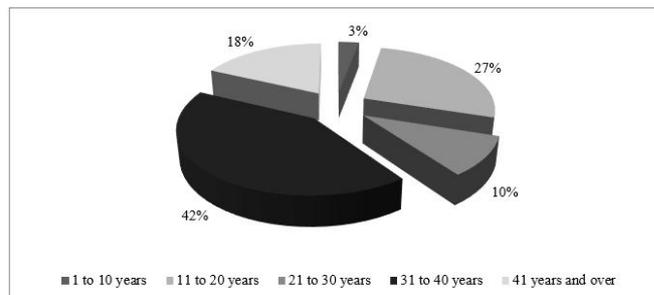
Two-Proportion Equality Test

**Caption:** N = Individuals number



Two-Proportion Equality Test

**Figure 1.** Type of Dental Prosthesis



Two-Proportion Equality Test

**Figure 2.** Distribution of “Time of use of dental prosthesis”

**Chart 1.** Frequency of Responses to Individual GOHAI Questions

GOHAI	"Dimension of physical function"					
	Always		Sometimes		Never	
	N	%	N	%	N	%
Question 1 - "Diminuiu a quantidade de alimentos ou mudou o tipo de alimentos por causa dos dentes?" / Did you limit the kinds or amounts of food you eat because of problems with your teeth or dentures?	14	23	12	20	34	57
Question 2 - "Teve problema para mastigar os alimentos?" / Did you have trouble biting or chewing any kinds of food, such as firm meat or apples?	8	13	23	38	29	48
Question 3 - "Teve dor ou desconforto para engolir os alimentos?" / Did you feel pain or discomfort while swallowing?	4	7	10	17	46	77
Question 4 - "Mudou o seu modo de falar por causa dos problemas da sua boca?" / Have your teeth or dentures prevented you from speaking the way you wanted?	12	20	4	7	44	73
Question 5 - "Sentiu algum desconforto ao comer algum alimento?" / Did you feel discomfort while eating?	9	15	24	40	27	45
"Dimension of Psychosocial functions"						
Question 6 - "Deixou de se encontrar com outras pessoas por causa da sua boca?" / Did you limit contacts with people because of the condition of your teeth or dentures?	3	5	4	7	53	88
Question 7 - "Sentiu-se insatisfeito ou infeliz com a aparência da sua boca?" / Were you displeased or unhappy with the looks of your teeth and gums, or dentures?	36	60	9	15	15	25
Question 9 - "Teve algum problema na sua boca que o deixou preocupado?" / Were you worried or concern about the problems with your teeth, gums, or dentures?	7	12	15	25	38	63
Question 10 - "Chegou a sentir-se nervoso por causa dos problemas na sua boca?" / Did you feel nervous or self-conscious because of problems with your teeth, gums, or dentures?	9	15	5	8	46	77
Question 11 - "Evitou comer junto de outras pessoas por causa de problemas na boca?" / Did you avoid eating in front of people because of problems with your teeth or dentures? -	3	5	6	10	51	85
"Dimension of pain and discomfort"						
Question 8 - "Teve que tomar medicamentos para passar a dor ou desconforto da sua boca?" / Did you use medication to relieve pain or discomfort from around your mouth?	3	5	9	15	47	78
Question 12 - "Sentiu os seus dentes ou gengivas ficarem sensíveis a alimentos ou líquidos?" / Were your teeth or gums sensitive to hot, cold or sweets?	13	22	10	17	37	62

**Table 4.** Description of Quantitative Variables

	Description	Average	Median	Standard Deviation	CV %
<b>GOHAI</b>	Physical	12.22	13	2.73	22
	Psychosocial problems	12.42	13	1.69	14
	Pain and discomfort problems	5.10	6	1.16	23
	GOHAI Total	29.73	31	4.48	15

Confidence Intervals for Mean

**Caption:** CV = Coefficient of Variation

## DISCUSSION

This study aimed to evaluate the self-perception of the food conditions of users of dental prosthesis. It counted with 60 elderly people aged between 60 and 88 years old, with an average age of 69.1 years old. Most of the elderly had completed Elementary School, which is in accordance to previous study with similar objective and that used the same index<sup>(12)</sup>. According to the Census<sup>(13)</sup>, 16 million people, corresponding to approximately 15% of the national population, with more than 25 years old, have completed Elementary School but did not finish High School. In this age range, only 35% completed at least High School.

According to the Brazilian Institute for Geography and Statistics – IBGE<sup>(14)</sup>, the official Brazilians' population estimate of life expectancy at birth has increased for both genders, as

the life expectancy at all ages. The increase was even higher in the female population, which justifies the presence of more women in this study sample (92%).

The IBGE analysis regarding the years to come, between the years 2000 and 2030, states that there will be a predominance of the female population. Considering an estimated population of over 210 million in 2018, 90 million will be women and around 80 million will be men<sup>(15)</sup>.

It is believed that one of the causes that lead to the reduction of the male population are diseases caused by aging, including diseases of the circulatory system, that are responsible for 42.7% of the male population death; in the female population this rate of death is only 36.7%<sup>(16)</sup>. Moreover, this study was performed in a Community Center for elderly. Women are more active and involved in this type of activity, which may also justify more women in the analyzed population.

Similar is observed for "Preference on type of consistency": 72% (n= 43) of the elderly reported not to have a preference, however, some did report a preference for pasty (25%), what can be related to its easy intake.

Another contradiction was observed in the high responses of no preference for any food consistency (72%) and the report of feeling pain always or sometimes while chewing (47% and 45%, respectively), that was assessed with another question (Table 3). This indicates that elderly people eat all kinds of consistency despite the discomfort with harder food. Also, they can have already made natural adaptations, so solid food is not even considered for their diet. This hypothesis is proven

by analyzing that there was no choice for solid consistency which leads to the assumption that harder food, that causes pain or discomfort, may be directly related to maladaptation of dental prosthesis.

Considering these findings, it is possible to infer that the elderly people make natural adaptations that are often unconscious to help them to chew and swallow. These adaptations can be cutting solid foods, like meat, into smaller pieces, eating more food with pasty consistency, breakdown of food into a bolus of a swallow-ready consistency for a better intake, cut the food using the molar teeth, among other adaptations that can be performed in the daily life of the elderly using dental prosthesis.

In this sense, another factor involved in the chewing process may be the imbalance of the Stomatognathic System. The mobility, tone and function of this system's structures have direct influence in the masticatory process; even the aging process of these structures impair the ability to control the bolus and to correctly perform the chewing steps. These steps are related with the chewing and swallowing intrinsic and extrinsic muscles that, added with maladaptation of dental prosthesis, intensify the difficulties<sup>(17)</sup>.

The loss of teeth changes the homeostasis of the Stomatognathic System due to the deterioration of part of the facial bones, associated with loss of bone mass and neuromuscular responses. These deteriorations interfere in chewing properly and in the swallowing and speaking functions, which will restrict and interfere with social and family activities. The dental prosthesis aims to reestablish these aspects changed due to the edentulism and to provide better quality of life regarding feeding and, consequently, improving the elderly general health condition<sup>(18)</sup>.

In relation to the "Type of Dental Prosthesis" removable bimaxillary total dental prosthesis was the most frequent among the study sample, 62% (n=37), followed by 35% (n=21) with removable superior total dental prosthesis, and the least frequent was the removable inferior total dental prosthesis, 3% (n=2). These findings are similar to previous study<sup>(19)</sup> that also found the removable bimaxillary total dental prosthesis to be the most frequent followed by the removable superior total dental prosthesis.

The total dental prosthesis was the most frequent in the study due to edentulism, that is the total loss of teeth. Many factors can lead to this throughout life, such as the shortage of dental care; what can currently be reversed using new technologies, providing proper guidelines and doing preventive actions of oral health care for people from all economic levels<sup>(20)</sup>. It is noteworthy that dental prosthesis, besides helping to restore the Stomatognathic System functions, is related to facial aesthetics, providing facial harmony, better facial expressions and dental prosthesis user's well-being<sup>(21)</sup>.

Over half of the participants in this study used dental prosthesis for more than 30 years. Some authors state that the dental prosthesis has an estimated useful life and should be changed every 5 or 6 years; other authors state it should be changed every 5 to 11 years<sup>(22)</sup>.

Orthodontic treatment methods have been created to improve the quality of life regarding oral health, such as the dental implant that aims to restore the aesthetics of the teeth,

allowing the individual to speak, laugh or eat safely, feeling more comfortable and safer. This dental treatment artificially replaces the root of the tooth, with a piece of titanium or a biocompatible metal that will heal inside the bone and have osseointegration; it is considered to be a stable and functional treatment<sup>(23)</sup>. The Brazilian SUS (*Sistema Único de Saúde* - Unified Health System) began to offer this treatment in 2011, by the "Smiling Program" (*Programa Brasil Sorridente*) that aims to improve the oral health of Brazilians<sup>(24)</sup>.

Regarding the dimension of physical function, 57% of the elderly respondents said they had never had limitation regarding the kind and amount of food, 48% said never to have trouble while biting or chewing, nearly half of the analyzed elderly did not report trouble speaking due to the use of dental prosthesis. However, there was a high frequency of elderly (77%) that reported to eat without discomfort and to swallow comfortably, confirming that a few participants (13%) have trouble biting or chewing which indicates possible alteration in the breakdown of food, probably be due to the use of dental prosthesis.

The data shows that despite using dental prosthesis for a long period of time, although not efficient to guarantee proper chewing, the elderly have made adaptations and do not feel disadvantages but believe it is something that helps them.

The aging process can be classified as natural, progressive, degenerative, universal and intrinsic<sup>(25)</sup>. Many factors may influence the type of food consistency and the elderly quality of life, such as organic alterations that lead to changes in the eating habits, making the elderly preferer food with easy intake such as soft foods, including pasty.

A previous research, similar to the present study that also used the GOHAI, found that over half of the studied sample preferred pasty food, which reinforces the present study findings and proves that elderly people have trouble biting or chewing harder foods such as apples<sup>(12)</sup>.

Regarding the dimension of psychosocial function, assessed with the questions 6, 7, 9, 10 and 11, it was possible to observe that most of the individuals never limited contacts with people (88%) neither avoided eating in front of people (85%) due to their teeth or dental prosthesis. Plus, most of them referred being pleased with their appearance regarding their teeth (60%); also, there was no worry or concern related to their teeth, dental prosthesis and gums (77%). However, although most of the participants (63%) reported no worries related to their dental care, a small part of the participants was worried and asked the researchers about specialize clinics for dental health care.

In the questions related to pain and discomfort (question 8 and question 12), the large majority of the elderly reported never having used medication to relieve pain or discomfort (78%), and more than half reported no sensitivity to hot, cold or sweets (62%).

The positive sensation regarding the elderly appearance is very important once it includes many factors like the participation in the social, family and love life, in addition to the oral communication that is the main way of socialization; the quality of life in this context is assessed by the absence of pain<sup>(26)</sup>. More than half of the participants showed absence of problems related to the dimension of pain and discomfort, which

is in accordance with previous study with same objective and with elderly individuals<sup>(27)</sup>.

Although many participants did not report bad self-perception regarding the use of dental prosthesis, this is not enough to guarantee a high GOHAI score. Therefore, there are still significant alterations in this population, as well as complaints regarding oral problems which must be addressed.

The GOHAI average score was 29.73, classified as “low” once it is below 30 points; this indicates that the elderly who participated in this study have a bad self-awareness regarding oral health<sup>(28)</sup>. The dimension of physical function had the lower proportional average score.

Another research compared the self-awareness regarding oral health in institutionalized and non-institutionalized elderly people. The average score of the index was below 30, which is considered as a low self-perception<sup>(29)</sup>.

The outcomes of this study showed there is no relation between “Time of use of dental prosthesis”, age and the GOHAI scores, thus, they are independent variables. Therefore, the time of use of dental prosthesis (1 to 40 years) and the age (60 to 88 years old) do not influence the GOHAI outcome. The elderly people self-perception related to their oral health is essential to elaborate an educational program in regard to self-diagnosis and self-care in addition to establish preventive and assertive actions for this population<sup>(30)</sup>. This study investigated the self-perception of the food conditions of elderly users of dental prosthesis; a deep investigation regarding most common complaints and adaptations was performed in the healthy elderly population.

This study showed that new researched must be performed considering a homogeneous sample regarding gender and age, as well as considering the clinical evaluation, using proper tools, in addition to the self-perception. Thus, the self-perception will be compared with the real chewing and swallowing condition and more inferences of adaptations due to the use of dental prosthesis and feeding quality will be possible. In addition, studies using qualitative tools to perform a subjective evaluation of self-perception of these individuals must be carried out, so, the participants answers will not be classified and receive a score, once this classification may not always indicate the real sensation of the individual.

## CONCLUSION

The present study concluded that elderly patients with dental prosthesis have an inadequate self-perception of food conditions. The elderly who participated in this study, mostly women, used a bimaxillary removable prosthesis for over 30 years; although they classified their nutrition as “good” and did not have preference for specific food consistency, they frequently felt pain while chewing. The GOHAI mean score was classified as “bad” and more impairment was observed in the dimension of physical function, which includes chewing, swallowing and speech aspects. There was no correlation between the time of use of the dental prosthesis with age and the GOHAI score.

The elderly rarely complaint about discomfort or embarrassment on feeding, however, they present an average score lower than expected in the GOHAI index, which indicates that, although

they do not report it, many deteriorations, that seem to be natural may be happening and may be the cause of worst quality of life.

Quality of life and nutrition are very closely related; food is more than just a nutritional supply, it is also part of social and family life.

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### Authors contributions

*JP participated of the study conception and delimitation, data collection and analysis, drafting the manuscript and revising it critically for important intellectual content, and final approval before publication; KC participated of the data analysis, drafting the manuscript and revising it critically for important intellectual content; ACL participated of drafting the manuscript and revising it critically for important intellectual content and final approval before publication.*

## Annex 1. Research Instrument – GOHAI Index

### GOHAI Index - Geriatric Oral Health Assessment Index

Developed by Atchison and Dolan (1990), translated and validated to the Brazilian Portuguese by Silva and Castellanos Fernandes (2001) and named “Índice de Determinação da Saúde Bucal Geriátrica”.

<i>Nos últimos três meses:</i>	<i>SEMPRE</i>	<i>ÀS VEZES</i>	<i>NUNCA</i>
<i>1. Diminuiu a quantidade de alimentos ou mudou o tipo de alimentação por causa dos seus dentes?</i>			
<i>2. Teve problemas para mastigar alimentos?</i>			
<i>3. Teve dor ou desconforto para engolir alimentos?</i>			
<i>4. Mudou o seu modo de falar por causa dos problemas da sua boca?</i>			
<i>5. Desconforto ao comer algum alimento?</i>			
<i>6. Deixou de se encontrar com outras pessoas por causa da sua boca?</i>			
<i>7. Sentiu-se satisfeito ou feliz com a aparência da sua boca?</i>			
<i>8. Teve que tomar medicamentos para passar a dor ou o desconforto da sua boca?</i>			
<i>9. Teve algum problema na sua boca que o deixou preocupado?</i>			
<i>10. Chegou a sentir-se nervoso por causa dos problemas na sua boca?</i>			
<i>11. Evitou comer junto de outras pessoas por causa de problemas na boca?</i>			
<i>12. Sentiu os seus dentes ou gengivas ficarem sensíveis a alimentos ou líquidos?</i>			

### Appendix 1. Research Instrument – Questionnaire translated to english

#### IDENTIFICATION

Date of the interview: \_\_/\_\_/2017.

1- Name: \_\_\_\_\_

2- Date of birth: \_\_/\_\_/\_\_\_\_ Age: \_\_\_\_ years old.

3- Gender: (1) Male (2) Female

4- Years of education:

- (1) Illiterate
- (2) Elementary School
- (3) High School
- (4) Higher education

5- Type of dental prosthesis:

- (1) Removable bimaxillary total dental prosthesis
- (2) Removable superior total dental prosthesis
- (3) Removable inferior total dental prosthesis

6- Time of use of dental prosthesis: \_\_\_\_ years.

7- How would you classify your nutrition:

- (1) Very good
- (2) Good
- (3) Regular
- (4) Bad
- (5) Very bad

8- Are you able to eat all types of consistencies? (1) Yes (2) No

9- Do you have preference on any type of consistency?

- (1) No (2) Liquid (3) Pasty (4) Solid

10- Are you able to chew the food without feeling pain?

- (1) Always (2) Sometimes (3) Almost Never (4) Never.