POLYANNE JUNQUEIRA SILVA ANDRESEN STRINI

ASSOCIATION BETWEEN ORAL HEALTH, QUALITY OF LIFE, SALIVARY CORTISOL LEVELS AND ALPHA-AMYLASE ACTIVITY IN INSTITUTIONALIZED ELDERLY

ASSOCIAÇÃO ENTRE SAÚDE BUCAL, QUALIDADE DE VIDA, NÍVEIS SALIVARES DE CORTISOL E ALFA-AMILASE EM IDOSOS INSTITUCIONALIZADOS

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Universidade Estadual de Campinas

Faculdade de Odontologia de Piracicaba

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Thesis presented to the Piracicaba School of Dentistry of the University of Campinas in partial fulfillment of the requirements for the degree of Doctor in Oral Dental Biology, in the Anatomy area.

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Orientadora: Profª Drª Maria Beatriz Duarte Gavião

Este exemplar corresponde à versão final da tese defendida por Polyanne Junqueira Silva Andresen Strini e orientada pela Profª Drª Maria Beatriz Duarte Gavião.

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RESUMO

O número de idosos está aumentando mundialmente, fato que sugere a necessidade de melhor entendimento de fatores individuais e ambientais relacionados ao envelhecimento. O objetivo deste estudo foi analisar a qualidade de vida geral, a avaliação subjetiva das condições bucais, os níveis de depressão e estresse percebido, presença de disfunções orofaciais e níveis salivares de cortisol e alfa-amilase em idosos institucionalizados. A amostra foi composta por 76 indivíduos de ambos os gêneros, com idade mínima de 60 anos, submetidos a exame clínico intraoral para a verificação da presença de próteses. Foram aplicados os questionários "*Medical Outcomes Study 36-Item Short-Form Health Survey*" (SF-36) para a avaliação da qualidade de vida geral; "*Oral Health Assessment Index*" (GOHAI) para a avaliação subjetiva das condições bucais; *"Perceived Stress Scale"* (PSS), para avaliação da percepção de situações estressantes; *"Geriatric Depression Scale"* (GDS-15) para a avaliação da presença de depressão e *"Nordic Orofacial Test – Screening"* (NOT-S) para a avaliação da presença de disfunções orofaciais. As amostras de saliva foram coletadas durante dois dias, ao acordar e 30 minutos após, obtendo a Resposta do Cortisol ao Acordar - ACR e a Resposta da Alfa-amilase ao Acordar - AAAR. Os dados foram submetidos à análise estatística por meio do coeficiente de correlação de Spearman, regressão linear múltipla (α=0.05), teste Chi-square ou Exato de Fisher e teste Kruskal-Wallis. Os resultados mostraram correlação positiva entre o valor total de GOHAI e SF-36, correlação negativa entre o domínio função física de GOHAI e PSS e escores de GDS-15. A regressão linear múltipla mostrou uma interrelação entre os escores de PSS e domínio físico do GOHAI porém não houve associação com ACR e AAAR. Correlação positiva foi observada entre o domínio Função Psicossocial de GOHAI e NOT-S para os indíviduos com próteses em ambas arcadas dentárias e entre GOHAI total e NOT-S para os indivíduos com pelo menos uma prótese. Pode-se concluir que os indivíduos avaliaram a condição bucal como desfavorável e da mesma forma consideraram a saúde geral como inapropriada. Da mesma forma, os indivíduos portadores de próteses ou não podem apresentar dificuldades relacionadas com aspectos físicos e psicológicos, que podem causar dor e desconforto ocasionando impactos na qualidade de vida.

Palavras-chave: Idosos. Qualidade de vida. Saúde bucal. Cortisol salivar. Alfa-amilase. Disfunção orofacial.

ABSTRACT

The number of elderly is increasing worldwide, which suggests the need for better understanding of individual and environmental factors related to aging. The aim of this study was to assess overall quality of life and subjective assessment of oral conditions, levels of depression and perceived stress, presence of orofacial dysfunctions and levels of salivary cortisol and alpha-amylase in institutionalized elderly. The sample comprised 76 subjects of both genders, with minimum age 60 years, submitted to intraoral clinical examination to verify the presence of prostheses. Questionnaire "Medical Outcomes Study 36-Item Short-Form Health Survey" (SF-36) was applied to assess overall quality of life; "Oral Health Assessment Index" (GOHAI) for the subjective assessment of oral conditions; "Perceived Stress Scale" (PSS), to evaluate the perception of stressful situations; "Geriatric Depression Scale" (GDS-15) for evaluating the presence of depression and "Nordic Orofacial Test - Screening" (NOT-S) to assess the presence of orofacial dysfunctions. Multiple linear regression showed an interrelationship between PSS scores and physical domain of GOHAI but there was no association with ACR and AAAR. Positive correlation was observed between Psychosocial Function GOHAI domain and NOT-S for individuals with prostheses in both dental arches and between total NOT-S and GOHAI for individuals with at least one prostheses. Similarly, individuals with prostheses or not may present difficulties related to physical and psychological aspects, which may cause pain and discomfort impacting on quality of life.

Key words: Elderly. Quality of life. Oral health. Salivary cortisol. Alpha-amylase. Orofacial dysfunction.

SUMÁRIO

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“Dedico este feito a meus pais Waldemir Strini e Maria Augusta Junqueira Silva Strini por todo empenho e suporte familiar para permitir a realização de mais este sonho”

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INTRODUÇÃO

O envelhecimento da população tem sido amplamente discutido já que o número de idosos está aumentando mundialmente (Rodrigues *et al.,* 2003). No Brasil, estíma-se que a população com essa faixa etária deve passar de 14,9 milhões (7,4% do total), em 2013, para 58,4 milhões (26,7% do total), em 2060 (IGBE, 2010). No período, a expectativa média de vida do brasileiro deve aumentar dos atuais 75 anos para 81 anos. Por isso há necessidade de se quantificar e qualificar as condições de saúde bucal (Carneiro *et al.,* 2005), já que há uma maior busca por qualidade de vida por meio de atividades culturais, físicas entre outras (Rodrigues *et al.,* 2003). A qualidade de vida relacionada à saúde geralmente é definida de acordo com um contexto que envolve a percepção dos indivíduos sobre bem-estar (Pelegrino *et al.,* 2010), bem como seus objetivos e preocupações (WHOQOL, 1993), abrangendo domínios como físico, psicológico e social (Pelegrino *et al.,* 2010).

Com isso, pode ocorrer o aumento da expectativa de vida da população e a necessidade de maior atenção no que diz respeito às condições bucais (Pinnelli & Sabatello, 1993). Esta preocupação existe devido à relação entre saúde bucal e bem-estar/qualidade de vida baseados em alguns fatores como saúde mental, saúde biológica, continuidade de papéis familiares, entre outros (Neri, 1993). Tal fato sugere a necessidade de melhor entendimento sobre a influência de fatores individuais e ambientais relacionados à saúde/qualidade de vida (Baker *et al.,* 2010), bem como considerar a autopercepção, do indivíduo sobre suas condições de saúde bucal e as necessidades de tratamento, como ocorre na população idosa (Silva *et al.,* 2005).

Da mesma forma, estes indivíduos podem ser acometidos por alterações que interferem na função orofacial. Esta é considerada como o resultado de atividades complexas integradas do sistema nervoso central e do sistema neuromuscular (Lund, 1991; Miller, 2003). Inclui grande número de ações vitais tais como respiração, mastigação e deglutição e atua como base para interação social relativa à fala, comunicação emocional, expressão facial e aparência (Bakke *et al.,* 2007). Por outro lado, os aspectos morfológicos do sistema estomatognático são de influência na função orofacial e vice-versa, como ocorre nas disfunções orofaciais (Bakke *et al.,* 2007). Isto sugere a necessidade de melhor

entendimento sobre a autopercepção das condições de saúde bucal e das necessidades de tratamento na população idosa (Silva *et al.,* 2005).

O comprometimento relacionado aos aspectos físicos podem estar associados à sintomas de depressão, frequentemente observados em idosos. Esta condição possui componentes que envolvem fatores vitais, genéticos, sensações de abandono e doenças incapacitantes (Stella *et al.,* 2002) entre outros, levando ao surgimento de um contexto de perda de qualidade de vida (Plati *et al.,* 2006), isolamento social e aparecimento de doenças graves (Stella *et al.,* 2002). Sendo assim, os idosos podem ser submetidos à influência de agentes estressores como morte de entes queridos, aposentadoria, mudanças de papéis sociais, no entanto, a forma com que eles percebem esses agentes é um fator determinante de como eles são afetados (Luft *et al.,* 2007).

Além disso, os idosos apresentam frequentemente condições bucais precárias, relatando impactos no bem-estar emocional e social ficando expostos às situações estressantes (Luecken & Lemery, 2004). Fisiologicamente, estas situações levam ao aumento plasmático de hormônios, tais como catecolaminas e cortisol. Tais respostas fisiológicas a fatores emocionais estressantes visam preparar o corpo para enfrentar a ameaça física ou psíquica, por meio do desvio da utilização de glicose para o sistema nervoso central, aumentando o rendimento cardíaco e suprimindo funções periféricas, ditas "não-essenciais", como as atividades digestiva, imune e reprodutora (Luecken & Lemery, 2004). As reações são desencadeadas por meio da ativação do eixo hipotálamo-hipófise-adrenocortical e do sistema simpato-adrenomedular que são responsáveis, entre outras funções, pela liberação de cortisol e catecolaminas, respectivamente (Luecken & Lemery, 2004). Estas respostas são eficientes e adaptativas num curto espaço de tempo, entretanto, quando pronunciadas, de forma repetitiva e prolongada, podem levar ao desenvolvimento de distúrbios cardiovasculares e neuroendócrinos, resultantes do desequilíbrio entre a demanda e a capacidade de resposta de cada indivíduo (Luecken & Lemery, 2004).

O cortisol é um hormônio-chave presente na resposta a agentes estressantes físicos e psicossociais produzido pelo eixo hipotálamo-hipófise-adrenocortical (Takai *et al.,* 2004). Sua atividade é avaliada por meio da quantificação do cortisol salivar, sendo um método simples, não invasivo e que independe do fluxo salivar. Outro parâmetro confiável, não

invasivo, utilizado na avaliação do estresse é a enzima alfa-amilase, que não possui relação com os outros marcadores biológicos (Takai *et al.,* 2004; Nater *et al.,* 2006). É uma proteína salivar de ação aminolítica, secretada continuamente pelas células acinares através de exocitose, processo este primariamente controlado pelo sistema nervoso autônomo (Turner & Sugiya, 2002). Estudos sugerem que a ativação autonômica das glândulas salivares em situações de estresse físico e psicossocial induzem sua secreção e, assim, um aumento na atividade desta enzima (Takai *et al.,* 2004; Nater *et al.,* 2005, 2006; van Stegeren *et al.,* 2006), principalmente em razão da atividade simpática nessas ocasiões (Ehlert *et al.,* 2005; Nater *et al.,* 2006).

Com isso, torna-se fundamental analisar os fatores capazes de comprometer o funcionamento das estruturas biológicas afetando o bem-estar do paciente. A avaliação objetiva torna-se relevante, por meio de metodologias específicas, bem como a avaliação subjetiva, por meio de instrumentos capazes de mensurar o impacto causado por essas alterações na qualidade de vida dos idosos.

Sendo assim, o objetivo geral desta pesquisa foi avaliar a qualidade de vida geral, a avaliação subjetiva das condições bucais, os níveis de depressão e estresse percebido, presença de disfunções orofaciais e níveis salivares de cortisol e alfa-amilase em indivíduos residentes em instituições de acolhimento aos idosos.

Da mesma forma os objetivos específicos deste trabalho foram:

- Avaliação da presença de próteses por meio de exame clínico;

- Avaliação da qualidade de vida geral por meio do questionário "Medical Outcomes Study 36-Item Short-Form Health Survey" (SF-36);

- Avaliação subjetiva das condições bucais pelo "Oral Health Assessment Index" (GOHAI);

- Avaliação subjetiva das condições bucais pelo "Perceived Stress Scale" (PSS);

- Avaliação da presença de depressão pelo "Geriatric Depression Scale" (GDS-15);

- Avaliação da presença de disfunções orofaciais pela utilização do "Nordic Orofacial Test – Screening" (NOT-S);

- Quantificação do hormônio cortisol e da enzima alfa-amilase em saliva.

CAPÍTULO 1

Subjective oral health perceptions, quality of life, stress, salivary cortisol levels and alpha-amylase activity in institutionalized elderly

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ABSTRACT

Objective: To evaluate the subjective oral health perceptions, quality of life, stress, depression and salivary cortisol levels as well as alpha-amylase activity in institutionalized elderly individuals over 60 years of age. **Design**: Seventy-three individuals of both genders (73.8±10.1 years) participated. The oral conditions were evaluated by clinical examination, checking for the presence of dental prostheses. The following instruments were applied: the Oral Health Assessment Index (GOHAI) for the subjective evaluation of oral conditions; the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) for quality of life; the Perceived Stress Scale (PSS) for the perception of stressful situations; and the Geriatric Depression Scale (GDS-15) for evaluation of the patient's psychological condition. Saliva samples were collected during two days, once at awakening and again 30 minutes later to obtain the awakening cortisol response (ACR) and the awakening alpha-amylase response (AAAR). The data were analyzed by descriptive statistics, Spearman's correlation coefficient and multiple linear regression (α=0.05). **Results**: A significant positive correlation was observed between the total GOHAI and SF-36 scores, and a negative correlation was observed between the PSS and GDS-15 scores in the Physical Function domain of the GOHAI. Multiple linear regression identified a significant interrelationship between the PSS score and the Physical function domain of the GOHAI. There was no association with ACR or AAAR. **Conclusions**: The results showed that the individuals evaluated their oral condition as unfavorable, associated with overall health that was also considered unacceptable. Thus, it is believed that general health may be influenced by subjective aspects and by clinical signs that must be related to depression and stress levels.

Key words: Elderly, quality of life, salivary cortisol, alpha-amilase, oral health.

INTRODUCTION

The aging population has been widely discussed because the number of elderly is increasing worldwide (Rodrigues *et al.,* 2003), demonstrating that the process of advancing age influences physical aspects in this group of individuals. This fact points to the need for increased care for the maintenance of health and functional capacity, particularly in the performance of daily activities. Among the aspects that may affect the general health status of this population are the oral health conditions, which may result in pain, discomfort and changes in eating habits and communication, leading to embarrassment, low self-esteem and social problems that negatively affect the quality of life (Benyamini *et al.,* 2004). According to Pellegrino *et al.* (2010), the health-related quality of life is usually defined using a context that involves the individual's perception of well-being as well as his or her goals and concerns (WHOQOL, 1993) covering areas such as physical, psychological and social (Pellegrino *et al.,* 2010) conditions.

As the life expectancy of the population increases, there is a need for greater attention to oral health conditions (Pinnelli & Sabatello, 1993). In this context, the evaluation of intraoral clinical conditions continues to be an important tool for the assessment of oral health, but it must be associated with subjective evaluation (Sánchez-García *et al.,* 2010). Concern exists because the relationship between oral health and well-being/quality of life is based on factors such as mental and biological health and the continuity of family roles, among others (Neri, 1993). Thus, the importance of the subjective aspects of oral conditions has gradually increased and can have psychological and nutritional repercussions (Sheiham & Steele, 2001).

The elderly may be submitted to the influence of stressors such as the death of loved ones, retirement and changes in social roles, but the way in which they perceive these agents is the determining factor about how they are affected (Luft *et al.,* 2007). Moreover, factors such as personal characteristics, lifestyle, daily events and sociodemographic variables may influence the degree of stress experienced by the individual (Feizi *et al.,* 2012). Some aspects often observed in elderly individuals, such as poor oral conditions, impact emotional and social well-being and may expose this population to stressful

situations (Luecken & Lemery, 2004). Studies have reported that biomarkers can be used to evaluate human psychobiological and socio-behavioral processes and assist researchers in introducing new concepts concerning the interaction of biological and social processes that may impact human health (Chrousos & Gold, 1992).

Physiological responses to stressful emotional factors aimed at preparing the body to face physical or psychological threats include the deviation of utilization of glucose by the Central Nervous System (CNS), increased cardiac output and the suppression of peripheral functions that are considered "non-essential," such as digestive, immune and reproductive activities (Luecken & Lemery, 2004). The reactions are triggered by activation of the hypothalamic-pituitary-adrenal (HPA) axis (Fremont & Bird, 2000) and the sympathetic-adrenomedullary system, which are responsible, among other functions, for the release and increased levels of hormones in plasma (Luecken & Lemery, 2004).

Two biomarkers may be found in saliva, highlighting the hormone cortisol and the enzyme alpha-amylase (α-amylase). Cortisol is a key hormone present in the response to physical and psychosocial stressors that is produced by the HPA axis (Fremont & Bird, 2000; Takai *et al.,* 2004.). Cortisol stands out among the stress-related hormones because of its important regulatory role in the central nervous system and in the immune and metabolic systems (Miller *et al.,* 1995). Furthermore, cortisol has important functions related to the access of energy reserves, the mobilization of fats and increased protein and the regulation of inflammatory responses (Sapolsky, 2005). Its activity is assessed by quantifying salivary cortisol, which is a simple, non-invasive method and is independent of the salivary flow. According to Karb *et al.* (2012), there is a preference for the use of average cortisol levels from collection in the morning and evening, although there is a small number of collections reported in the literature; however, currently, there is a trend toward not only considering the average levels of this hormone but also the decline of its secretion throughout the day.

Alpha-amylase is a non-invasive biomarker that is easy to obtain (Strahler *et al.,* 2011; Nater *et al.,* 2013) and is used in the evaluation of stress. This enzyme is secreted by the salivary glands under the action of the sympathetic branch of the Autonomic Nervous System (ANS) (Nater & Rohleder, 2009) in response to psychological and physiological stimuli (Granger *et al.,* 2007), and it has no relationship to other biological markers (Takai

et al., 2004; Nater *et al.,* 2006). Alpha-amylase is a salivary protein with aminolytic action that is continuously secreted by the acinar cells via exocytosis, a process primarily controlled by the ANS (Turner & Sugiya, 2002). Studies suggest that autonomic activation of the salivary glands in situations of physical and psychosocial stress induces secretion and thus an increase in the activity of this enzyme (Takai *et al.,* 2004; Nater *et al.,* 2006; van Stegeren *et al.,* 2006), mainly due to the sympathetic activity on these occasions (Ehlert *et al.,* 2005; Nater *et al.,* 2006).

Few studies have evaluated age-related differences concerning the daily secretion of alpha-amylase (Nater *et al.,* 2013). Furthermore, a study by Ben-Aryeh *et al.* (1990) suggested that individuals of advanced age have a high activity of salivary alpha-amylase from a single measurement; similarly, Strahler *et al.* (2010) reported that the daily activity of this enzyme is higher in elderly subjects than in young adults. Moreover, comparative studies have shown that changes in the levels of alpha-amylase stress indicators are more accurate than changes in the levels of other indicators because alpha-amylase levels are more sensitive to the performance of the Sympathetic Nervous System (SNS) than the release of cortisol, which is a result of action of the HPA (Rashkowa *et al.,* 2012).

Thus, it is essential to analyze the factors that implicate how the function of biological structures affects the well-being of the individual. According to Ocampo (2005), the assessment of the health conditions of elderly individuals must go beyond the traditional clinical history, and aspects such as psychological, familial, social, economic and functional dimensions must also be considered. Then, the objective assessment becomes relevant, through specific methodologies, as well as through subjective evaluations using instruments capable of measuring the impact of these changes on the quality of life of the elderly patient. It is worth mentioning that the evaluation of the health state of elderly individuals implies subjectivity because it depends on the interaction of functional abilities, psychological conditions, social support and psychological well-being. The aim of the present study was to evaluate the subjective oral health perceptions, quality of life, stress and depression in institutionalized elderly individuals more than 60 years of age. Furthermore, salivary cortisol levels and alpha-amylase activity were also assessed.

METHODS

This project was developed in host institutions for the elderly located in the city of Piracicaba (São Paulo, Brazil), and the sample was composed by seventy-three individuals of both genders, with minimum age of 60 years. To set the sample size was the standard error of 5%, the confidence interval of 95% and standard deviations of the variables analyzed. The 80% power (Power = 0.8) was considered to provide reliable comparative analyzes. The anamnesis was performed through interviews with the subject, verifying the medical and dental history. At that time, data that characterized the exclusion criteria for research were searched, including the presence of systemic diseases such as Cushing's syndrome and Sjögren's syndrome, which could impair the progress of the research, and the use of drugs that may interfere in the salivary flow and hormone levels, such as sedatives, anti-inflammatories, corticosteroids and diuretics. Moreover, individuals who had cognitive problems that may have hindered their comprehension of the questionnaires were also excluded from the sample.

ASSESSMENT OF OVERALL QUALITY OF LIFE

The evaluation was performed using the Medical Outcomes Study 36 - Item Short-Form Health Survey (SF-36), validated for the Brazilian population by Ciconelli *et al.* (1999). This is a multidimensional, easily administered generic instrument used to assess quality of life (Ciconelli *et al.,* 1999) that measures two major aspects, physical and mental health (Ware, 1988). Furthermore, this instrument is sensitive to changes related to the health of the general population, including those related to increasing age and socioeconomic and disease states (Hemingway *et al.,* 1997).

The questionnaire consists of 36 questions: one is related to the current health issue compared with the previous year; 35 additional are items divided into 10 other issues emphasizing the health status of the last four weeks. The SF-36 consists of eight domains divided into two major groups: physical health, which concerns functional capacity, physical aspects, pain and general health; and mental health, which concerns mental,

emotional and social health and vitality (Nicodemo et al, 2008). The answers to the questions in each domain are coded, summed and transformed into scores ranging from 0 to 100 (Neto *et al.,* 2012), in which zero corresponds to the worst health and 100 corresponds to a satisfactory health condition (Nicodemo *et al.,* 2008).

ORAL CONDITIONS

Intra-oral evaluation

The presence or absence of dental prostheses was verified. The presence of dentures was recorded for each dental arch and was divided according to the absence of dentures and the presence of fixed and/or removable dentures (WHO, 1999).

Subjective Assessment

For this evaluation, the Geriatric Oral Health Assessment Index (GOHAI), a questionnaire developed by Atchison & Dolan (1990) and translated and validated for the Brazilian population by Silva & Fernandes (2001) was used. This instrument has been used to evaluate how older people perceive their own oral health, according to self-reports by the individuals (da Costa *et al.,* 2010). The instrument consists of 12 multiple-choice questions and is divided into three domains: physical/functional (including eating, speaking and swallowing), represented by questions 1, 2, 3 and 4; psychosocial/psychological (including worry or care about oral health, dissatisfaction with appearance, self-awareness of dental health, and privation from social life due to oral problems), represented by questions 6, 7, 9, 10 and 11; and pain / discomfort (including the use of medications that can affect physical condition and functioning or that may have psychological side effects to treat dental problems or pain and discomfort in the elderly in the past three months), represented by questions 5, 8 and 12 (Atchison & Dolan, 1990; da Costa *et al.,* 2010). Each question has three choices for the answers, and their scores are: "always" (1), "sometimes" (2) and "never" (3). The score of each individual may vary from 12 to 36 and is classified as high (34 to 36), moderate (31-33) or low (less than 30) (Silva *et al.,* 2005; da Costa *et al.,* 2010);

lower scores indicate poorer oral health and, consequently, worse individual perception of oral health (Silva & Fernandes, 2001).

PERCEPTION OF STRESSFUL SITUATIONS

The Perceived Stress Scale (PSS) developed by Cohen *et al.* (1983) was translated and validated into Portuguese by Luft *et al.* (2007) and measures the subject's level of stress. It consists of a short and easy scale that may be used in various age groups, from teenagers to the elderly, and in several types of samples (healthy or diseased populations, various socioeconomic contexts) because the questions are general in nature and are relatively free of specific content.

This scale evaluates the perceptions of individuals about their own lives, considering them as uncontrollable, unpredictable and/or overloaded (Stella *et al.,* 2002). According to Luft *et al.* (2007), the results from a shortened version consisting of 14 questions were consistent with those of the original version created by Cohen *et al.* (1983) and with those of previous validations applied in other cultural groups. There are five options for the responses that range from zero to four (0 = never, 1 = almost never, 2 = sometimes, 3 = often, 4 = always). Questions 4, 5, 6, 7, 9, 10 and 13 are considered to have positive connotations that show the absence of stress and therefore have an inverted score as follows: 0=4, 1=3, 2=2, 3=1 and 4=0; questions 1, 2, 3, 8, 11, 12 and 14 are considered to have negative connotations and therefore show the presence of stress, and these scores should be added directly. The total of the scores of these 14 questions may vary from zero to 56 (Luft *et al.,* 2007). The scores are presented continuously and therefore should be analyzed as a continuous variable to observe the set of individual factors, and scores may not be grouped or summed (Luft *et al.,* 2007). The PSS is not a diagnostic tool, and it has no cutoff score; however, high scores indicate high perceived stress and high risk of psychological and somatic symptoms (Kopp *et al.,* 2010).

EVALUATION OF DEPRESSION

To evaluate the presence of depression, the short version of the Geriatric Depression Scale, with 15 items (GDS-15), was used. It is considered a screening tool that takes a short time to apply (Sheikh and Yesavage, 1986) and has also been used because of its specificity and appropriate clinical application (Mitchell *et al.,* 2010). The short version was translated and validated for the Brazilian population by Almeida & Almeida (1999) and consists of questions whose possible answers are "yes" or "no," thus avoiding responses related to somatic complaints; higher scores indicate the presence of symptoms of depression (D'Ath *et al.,* 1994). This questionnaire allows the researcher to establish a cutoff of high sensitivity and specificity for the assessment of depression in the elderly, defined as 5/6 (not case/case) (Almeida & Almeida, 1999). Moreover, the levels of depression are defined according to the scores: values from zero to 5 indicate the absence of depression; values from 6-10 indicate mild to moderate depression; values from 11-15 indicate severe depression (Almeida & Almeida, 1999; Linhares *et al.,* 2003).

QUANTIFICATION OF SALIVARY CORTISOL AND EVALUATION OF ALPHA-AMYLASE ACTIVITY

Saliva collection

The verbal and written instructions about the procedure for saliva collection were given to the participants prior to beginning the collection, and in addition, numbered tubes coated with polypropylene (Salivette ®, Sarstedst, Germany) were provided by the institutions for saliva collection. Two samples were collected, the first immediately upon waking and the second after 30 minutes (due to peak cortisol at this time). The remaining saliva samples were collected on the following day, under the same conditions as those of the initial collection, and were stored in the refrigerator. The subjects were instructed to abstain from food and drink one hour before the collection, and only water intake was permitted (Larsson, 2009). In addition, the subjects were instructed to avoid physical exercise as well as coffee, tea and soda intake before the day of collection, as they may

cause interference in cortisol levels (Pruessner *et al.,* 1997; Kunz-Ebrecht *et al.* 2004, Harris *et al.,* 2007). Printed instructions about care restrictions and pre-collection were previously provided to the host institution for the elderly and were also confirmed immediately before collection.

Saliva collection was performed using sterile cotton rolls placed under the tongue of the subject for 3 to 4 minutes. Samples containing visible signs of blood were discarded due to the possibility of contamination by plasma cortisol (Miller *et al.* 1995). After being soaked in saliva, the cotton was placed in a Salivette, which was stored in a refrigerator until it was conducted to the laboratory. The samples were centrifuged and stored in a freezer for later analysis until sufficient quantities of saliva were obtained to perform the laboratory procedures. The collected saliva samples were divided for the evaluation of cortisol and alpha-amylase at different periods. All steps including collection, storage and transportation of the saliva collection were performed by the examiner.

Salivary cortisol analyses

The Salivettes were centrifuged at 3500 rpm for 5 minutes, and the debris was discarded; only the supernatant was used. The samples were stored at -80 °C until hormone quantification. Salivary cortisol was measured using an enzyme immunoassay kit (EIA - HSCortisol) (product No. 1-1102; Salimetrics, State College, PA, USA) at room temperature (25° C). The sample volume used for the analysis was 25 µl, and the incubation time was 60 minutes.

The samples were measured in duplicate, so that samples from the same individual were analyzed in the same assay. The procedure followed the basic principle of enzyme immunoassays, where there is competition between unlabeled antigen and enzyme-labeled antigen for a specific number of binding sites on the antibody. The test was performed in a microtiter plate coated with monoclonal antibodies for cortisol. The standard and unknown cortisol compete with cortisol linked to horseradish peroxidase, an enzyme isolated from horseradish that can act as an antigen for antibody binding sites. After incubation, the deactivated components were removed by washing. Cortisol-bound peroxidase was measured by the reaction of the peroxidase enzyme to the tetramethylbenzidine (TMB)

substrate, which produced a blue color. A yellow color was formed after completing the reaction with sulfuric acid. The optical density was measured by reading the absorbance of the solution at 450 nm using a microplate reader (Grajeda & Perez-Escamilla, 2002; Raff *et al.,* 2003) with 490 nm to 630 nm filter correction. The amount of cortisol peroxidase detected by color intensity was inversely proportional to the amount of cortisol present.

Evaluation of salivary amylase activity

The activity of salivary alpha-amylase (α-amylase) was measured using an enzyme immunoassay kit (Salivary α-Amylase Assay Kit Product No. 1-1902-5; Salimetrics, State College, PA, USA). Initially, the saliva samples were diluted using the α-amylase diluent solution (1:200 dilution) and stirred. The volume for both the patient samples and the controls was 8 µL, and they were measured on the same plate at a temperature of 37ºC. This method uses a chromogenic substrate, 2-chloro-p-nitrophenol associated to maltotriose. The substrate was preheated to 37 °C, and 320 µL of solution was added to each well. The enzymatic action of alpha-amylase on this substrate yields 2-chloro-p-nitrophenol and is directly proportional to the alpha-amylase activity in the sample. The optical density was measured by reading the absorbance of the solution at 405 nm for 3 minutes. The reading continued minute by minute, using the following formula to calculate the concentrations of alpha-amylase:

$$\frac{\Delta Abs./min \times Tv \times DF}{MMA \times Sv \times LP} = U/mL \text{ of active alpha-amylase}$$

ΔAbs. / Min = absorbance difference per minute
Tv = Total volume of the assay (0.328 mL)
DF = Dilution factor
MMA Absorptivity = millimolar 2-chloro-p-nitrophenol (12.9)
Sv = Sample volume (0.008 ml)
LP = Light path (0.97 - specific value for microplate kit)

STATISTICAL ANALYSIS

Statistical analysis was performed using Bioestat 5.0 (Mamirauá, Belém, PA, Brazil) and SPSS 9.0 (SPSS, Chicago, IL, USA) with a 5% significance level, and normality was assessed using the Kolmogorov-Smirnov test. Descriptive statistics were performed, and the data are presented as percentages, means and standard deviations and median and interquartile ranges for the GOHAI floor and ceiling effects. Spearman's correlation coefficients were used to assess the correlations between the GOHAI total and domain scores with age, with the SF-36, PSS and GDS-15 scores and with salivary levels of alpha-amylase and cortisol. Next, multiple linear regression analyses were performed for the GOHAI total and its domain scores as dependent variables with the other variables of this study described above, including gender. This approach was used to manage potential confounding. Confounding can result in an overestimation or underestimation of the strength of the association between exposure and outcome variables and can change the direction of the relationship. Consequently, variables that are not significant at the bivariate level can emerge as significant in multivariate analysis (Locker *et al.,* 2007).

RESULTS

Table 1 presents the characteristics of the participants in terms of prevalence, mean (standard deviation), median (interquartile range) and the range of possible scores.

Table 1. Summary data on sample characteristics (n= 73).

	n (%)	Mean (SD)	Median (IQR)	Range
Age (years)		73.8 (10.1)	-	60-93
Gender				
Male	37 (50.7)	-	-	-
Female	36 (49.3)	-	-	-
Use of dental prostheses				
Superior	60 (82.2)	-	-	-
Inferior	54 (74.0)	-	-	-
SF-36 score [0-100]	-	71.8 (20.3)	80.0 (30.0)	15-97
PSS score [0-56]	-	17.4 (10.4)	16.0 (14.0)	1-51
GDS-15 score [0-15]	-	7.0 (1.5)	7.0 (2.0)	4-12
ACR (μg/dl)	-	0.0 (0.2)	-7.7 (62.2)	-
AAAR (U/ml)	-	-23.7 (111.9)	-7.7 (62.2)	-

SD, standard deviation; IQR, interquartile range; SF-36, 36-item short form health survey; PSS, perceived stress scale, GDS-15, geriatric depression scale-15; ACR, awakening cortisol response; AAAR, awakening alpha-amylase response. Values in square brackets indicate range of possible scores.

Scores from the GOHAI total scale ranged from 20 to 35, with a mean score of 29.4 and a standard deviation of 2.8 (Table 2), revealing that the perception of their oral health by the elderly individuals had substantial variability. No floor or ceiling effects were apparent because no subjects had a maximum GOHAI total score. The domain scores also showed substantial variability, with modest ceiling effects and no floor effects, ranging from 8.2 to 9.6% for physical and psychological functions, respectively.

Table 2. Descriptive statistics for the GOHAI total and domain scores and sample distribution for floor and ceiling effects (n=73).

	Number of items	Mean (SD)	Median (IQR)	Range	Floor effect*		Ceiling effect†	
					n	%	n	%
Total scale [12-36]	12	29.4 (2.8)	30.0 (3.0)	20-35	0	0.0	0	0.0
Domains								
Physical function [1-12]	4	9.2 (1.7)	10.0 (1.0)	4-12	0	0.0	6	8.2
Psychosocial function [1-15]	5	13.0 (1.3)	13.0 (1.0)	9-15	0	0.0	10	13.7
Pain and discomfort [1-9]	3	7.1 (0.9)	7.0 (0.0)	5-9	0	0.0	7	9.6

GOHAI, geriatric oral health assessment index; SD, standard deviation; IQR, interquartile range.

* Percentage of participants with minimum score.

† Percentage of participants with maximum score.

Values in square brackets indicate range of possible scores.

Table 3 shows the distribution of responses to the GOHAI items by the participants. Using the percentage of the responses ‘all the time’ and ‘sometimes’ as indicators, the most commonly reported issues were discomfort with swallowing (83.6%), limited contact with others (72.6%) and worry or concern (56.2%).

Table 3. Percentage of distribution of responses to GOHAI items (n=73).

	All the time	Sometimes	Never
	%	%	%
Physical function			
Limit kinds or amounts of food	8.2	8.2	83.6
Trouble biting/chewing food	20.5	17.8	61.7
Uncomfortable to swallow	83.6	8.2	8.2
Prevented from speaking	5.5	8.2	86.3
Psychosocial function			
Limit contact with others	72.6	15.1	12.3
Unhappy with appearance	1.4	6.8	91.8
Worried or concerned	56.2	15.1	28.8
Nervous or self-conscious	0.0	4.1	95.9
Uncomfortable eating in front of people	8.2	9.6	82.2
Pain and discomfort			
Discomfort when eating	9.6	2.7	87.7
Use of medication to relieve pain	1.4	8.2	90.4
Teeth, gums sensitive to hot/cold	6.8	11.0	82.2

GOHAI, geriatric oral health assessment índex.

According to Table 4, the GOHAI total score was positively correlated with the SF-36 score (r=0.26; $P<0.05$), while the physical function domain score was negatively correlated with the PSS (r=-0.25; $P<0.05$) and GDS-15 scores (r=-0.32; $P<0.01$).

Table 4. Correlations between GOHAI total and domain scores and independent variables (n= 73).

	GOHAI	Domains		
	total	Physical function	Psychosocial function	Pain and discomfort
Age (years)	-0.05	-0.06	-0.04	0.09
SF-36 score	0.26*	0.18	0.12	0.06
PSS score	-0.20	-0.25*	-0.02	-0.03
GDS-15 score	-0.18	-0.32**	0.08	0.00
ACR (µg/dl)	0.09	0.05	0.00	0.13
AAAR (U/ml)	0.08	0.18	0.05	0.05

GOHAI, geriatric oral health assessment index; SF-36, 36-item short form health survey; PSS, perceived stress scale, GDS-15, geriatric depression scale-15; ACR, awakening cortisol response; AAAR, awakening alpha-amylase response.

*p<0.05; **p<0.01 (obtained from Spearman's correlation test).

The results of the multiple linear regression analysis for the GOHAI total and domain scores showed that a significant interrelationship was only found between the PSS score and the GOHAI physical function domain score (β =-2.234; P=0.029). The other values were not significant (Appendix 1).

DISCUSSION

The purpose of this study was to evaluate the possible factors implicated in the functioning of oral structures that could affect the quality of life for elderly individuals. The characteristics of the sample are shown in Table 1. It was possible to observe a high mean age (73.8±10.1), being that the major age noted was 93 years old in a voluntary with physical conditions and cognitive status preserved, fact that may indicate an increase in life expectancy of the elderly population. Low GOHAI scores were found (Table 2), suggesting unsatisfactory oral health perception; these results are in accord with those of previous studies in which low scores indicated a negative impact on quality of life (Silva *et al.,* 2005;

da Costa *et al.,* 2010; de Andrade *et al.,* 2012), possibly due to a decline in oral health (Mariño *et al.,* 2008). Thus, in this study, it is possible that the elderly did not consider their oral health to be satisfactory, most likely due to denture use or due to the aging process.

The results presented in Table 3 showed that more individuals reported discomfort during swallowing, which may be justified because tooth loss was a common among this population, as indicated by the number of dental prostheses users. It is noted in the literature that tooth loss or dental prostheses may interfere with chewing ability and may cause difficulties in forming a bolus. Bolus size was reported to increase with an increasing number of missing teeth, with larger boluses potentially interfering with optimal swallowing (Furuta & Yamashita, 2013). Additionally, studies of wearers of removable dentures affirmed that these individuals may lose precision in controlling the force needed to crush food, a loss that is directly correlated to the need for prostheses (Mishellany *et al.,* 2008). In an intermediate situation, partially edentulous subjects with impaired dental status could not produce a food bolus with the same particle size distribution as individuals who still had all of their own teeth (Lassauzay *et al.,* 2000). The reduction in proprioception due to the lack of functional dental units could not be fully compensated by the mucosal sensitivity re-attained when the individuals were wearing their prostheses (Grigoriadis, *et al.,* 2011). Furthermore, the individuals evaluated in this research reported discomfort with swallowing and limitation of their contact with other people, with few subjects reporting pain or discomfort with their oral condition. Thus, it is believed that the subjective aspects have a greater impact on self-rated oral health than do the clinical signs, so it is recommended that complaints from individuals about their weaknesses be taken into account when performing a clinical assessment (Piuvezam & Lima, 2012).

A statistically significant positive correlation of the GOHAI and the SF-36 (Table 4) showed that the individuals evaluated their oral condition as unfavorable and that they also considered their overall health as unacceptable because the correlation test indicated that individuals with low GOHAI scores also presented a decrease in SF-36 scores, suggesting that worse perception of oral health conditions created a sensation of negative general health status. This result corroborates the findings of authors who stated that elderly people tend to consider themselves ill when they experience acute manifestations of oral disease

(Piuvezam & Lima, 2012). According to Silva & Fernandes (2001) the lack of demand for dental care for the elderly could be a contributing factor, as they may have difficulties in recognizing the need for oral health care. In this context, it is known that the prevalence of oral health problems increases with age, highlighting the importance of caring for the mouth and associated structures, a concept that reflects aspects of quality of life.

Further considering the results of Table 4, the physical aspects of the GOHAI also showed a statistically significant negative correlation to the GDS-15. Thus, lower values for the GOHAI indicated a worse perception of individuals related to physical aspects, while higher values for the GDS-15 indicated the presence of depression. It is likely that these findings were observed because individuals with poor oral health may present impairments involving tooth loss, the use of prostheses and other conditions that affect psychological and social aspects, leading to depression. According to the literature, characteristics of depression may be linked to factors such as the presence of medical comorbidities and cognitive impairment, which makes the diagnosis of depression in individuals of all age groups a challenge for professionals (Ferrari & Dalacorte, 2007). Thus, as noted in the present study, as an individual perceives an unsatisfactory oral condition, his or her level of depression tends to increase, in accord with the findings of de Andrade *et al.* (2012), who reported that individuals with a poor GOHAI score were more likely to be depressed and to rate their health as poor. These findings suggest that specific or general care for the elderly is needed to prevent the emergence of feelings of abandonment and isolation, as well as to prevent reduced self-esteem, because these factors can also be associated with changes in oral health (Akhter *et al.,* 2008).

In accord with the findings of Wild *et al.* (2012), elderly individuals may have an increased risk of developing depression. The adverse effects of the passing years can be moderated by the adaptation processes related to aging (Wild *et al.,* 2012), in addition to impairment in physical capacity (Nyunt *et al.,* 2012). Similarly, reductions in psychological and emotional control may increase the risk of developing depression (Jorm, 2000) and, alone or combined, may be associated with daily, stressful life events (Chan *et al.,* 2012). Stress perception was evaluated in the present study, and a negative correlation with the GOHAI scores was noted (Table 4). Lower GOHAI scores indicated a worse perception of

physical aspects, while higher individual values for the PSS also indicated a higher perception of stressful situations because limitations in oral function may have led to disappointment and impairment in psychological conditions. Campbell & Ehlert (2012) considered stress to be a complex phenomenon resulting from the responses of various systems, namely the cognitive, emotional, behavioral and physiological systems, which may result from changes brought about by the aging process. In this study, the PSS showed a significant interrelationship with the physical aspects of the total GOHAI score; thus, the stress level may influence the subjective perception of oral conditions. The sample in this study, similar to those observed in the literature, showed higher scores for questions that referred to negative connotations, a fact that indicates a higher level of perceived stress (Luft *et al.,* 2007), and may suggest a higher risk of psychological and somatic symptoms (Kopp *et al.,* 2010).

On the other hand, in this study, stress was also assessed by quantifying salivary cortisol and alpha-amylase, but the results showed no statistically significant values when associated to the GOHAI. These findings suggest that the subjective perception of oral health did not influence the levels of cortisol and alpha-amylase and similarly, that its perception did not interfere in production of cortisol and alpha-amylase by the subjects. Although the physiological variables were not altered in relation to the GOHAI scores, the subjective aspects of stress were noted. Unlike other reports in the literature, the present study analyzed the relationship of cortisol and alpha-amylase to the GOHAI and not to the aging process. Previous studies that observed the influence of the aging process reported that individuals of older ages presented higher cortisol and SAA levels, suggesting age-related increases in the activity of the HPA axis and the ANS (Aguilera, 2011; Nater *et al.,* 2013). According to Nater *et al.* (2013), the observation of age-related increases in endocrine and autonomic functioning could reflect age-related accumulation of stress over the subject's lifetime, and further affirmed that there is age-related deterioration of biological stress systems. Furthermore, difficulty in accessing institutions, collection of saliva at various periods of the day without changing their routine and acceptance by individuals could be considered a limitation of the present study.

In conclusion, the results showed that the individuals evaluated their oral condition as unfavorable, which was associated with a perception of their overall health as unacceptable. Thus, it is believed that general health may be influenced by subjective aspects and by clinical signs that are related to depression and stress levels. Furthermore, additional studies are necessary to elucidate these associations and to understand the interaction of subjective and objective factors on quality of life.

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COMPETING INTEREST

The authors have no conflict of interest.

ETHICAL APPROVAL

The research was approved by the Ethical Committee of Piracicaba Dental School. University of Campinas. Protocol number 134/2011.

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REFERENCES

1. Aguilera G. HPA axis responsiveness to stress: implications for healthy aging. Exp. Gerontol 2011;46:90-5.

2. Akhter R, Hassan NM, Aida J, Zaman KU, Morita M. Risk indicators for tooth loss due to caries and periodontal disease in recipients of free dental treatment in an adult population in Bangladesh. Oral Health Prev Dent. 2008;6(3):199-207.

3. Almeida OP, Almeida SA. Confiabilidade da versão brasileira da Escala de Depressão em Geriatria (GDS) versão reduzida. Arq Neuro-Psiquiatr. 1999;57:421-6.

4. Almeida OP, Almeida SA. Short versions of the geriatric depression scale: a study of their validity for the diagnosis of a major depressive episode according to ICD-10 na DSM-IV. Int J Geriatr Psychiatry 1999;14:858-65.

5. Atchison KA, Dolan TA. Development of the Geriatric Oral Health Assessment Index. J Dental Educ 1990;54:680-7.

6. Ben-Aryeh H, Fisher M, Szargel R, Laufer D. Composition of whole unstimulated saliva of healthy children: changes with age. Arch. Oral Biol 1990;35:929—31.

7. Benyamini Y, Leventhal H, Leventhal EA. Self-rated oral health as an independent predictor of self-rated general health, self-esteem and life satisfaction. Social Science & Medicine 2004;59:1109–16.

8. Campbell J, Ehlert U. Acute psychosocial stress: Does the emotional stress response correspond with physiological responses? Psychoneuroendocrinology 2012;37:1111-34.

9. Chan D, Kwok A, Leung J, Yuen K, Choy D, Leung PC. Association between life events and change in depressive symptoms in Hong Kong Chinese elderly. Journal of Affective Disorders 2012;136:963–70.

10. Chrousos GP, Gold PW. The concepts of stress and stress system disorders. JAMA 1992;267(9):1244-52.

11. Ciconelli RM, Ferraz MB, Santos W, Meinão I, Quaresma MR. Brazilian-Portuguese version of the SF-36: a reliable and valid quality of life outcome measure. Rev Bras Reumatol 1999;39:143–50.

12. Cohen S, Karmack T, Mermelsteinm R. A global measure of perceived stress. J Health Soc Behav 1983;24:385-96.

13. da Costa EHM, Saintrain MVL, Vieira APGF. Autopercepção da condição de saúde bucal em idosos institucionalizados e não institucionalizados. Ciência & Saúde Coletiva 2010;15(6):2925-30.

14. D'Ath P, Katona P, Mullan E, Evans S, Katona C. Screening, detection and management of depression in elderly primary care attenders. I: the acceptability and performance of the 15 item Geriatric Depression Scale (GDS15) and the development of short versions. Family Practice 1994;11:260–6.

15. de Andrade FB, Lebrão ML, Santos JLF, Teixeira DSC, Duarte YAO. Relationship Between Oral Health–Related Quality of Life, Oral Health, Socioeconomic, and General Health Factors in Elderly Brazilians. J Am Geriatr Soc. 2012;60(9):1755-60.

16. Ehlert U, Erni K, Hebisch G, Nater UM. Effects of yohimbine challenge on salivary alpha-amylase secretion. Psychosom Med 2005;67: A-92.

17. Feizi A, Aliyari R, Roohafza H. Association of perceived stress with stressful life events, lifestyle and sociodemographic factors: a large-scale community-based study using logistic quantile regression. Comput Math Methods Med. 2012;2012:151865. doi: 10.1155/2012/151865.

18. Ferrari JF, Dalacorte RR. Uso da Escala de Depressão Geriátrica de Yesavage para avaliar a prevalência de depressão em idosos hospitalizados. Scientia Medica 2007;17(1):3-8.

19. Fremont AM, Bird CE. Social and psychological factors, physiological processes, and physical health. In Handbook of medical sociology. 2000. New Jersey: Prentice-Hall, Inc.

20. Furuta M, Yamashita Y. Oral health and swallowing problems. Curr Phys Med Rehabil Rep 2013;1:216–22.

21. Grajeda R, Pérez Escamilla R. Stress during labor and delivery is associated with delayed onset of lactation among urban Guatemalan women. J Nutr 2002;132:3055-60.

22. Granger DA, Kivlighan KT, El-Sheikh M, Gordis EB, Stroud L. Salivary alphaamylasein biobehavioral research: recent developments and applications. Ann N Y Acad Sci 2007;1098:122–44.

23. Grigoriadis A, Johansson RS, Trulsson M. Adaptability of mastication in people with implant-supported bridges. J Clin Periodontol 2011;38(4):395‐404.

24. Harris A, Ursin H, Murison R, Eriksen H. Coffee, stress and cortisol in nursing staff. Psychoneuroendocrinology 2007;32:322–30.

25. Hemingway H, Stafford M, Stansfield S, Shipley M, Marmot M. Is the SF-36 a valid measure of change in population health? Results from the Whitehall II study. BMJ 1997;315:1273-9.

26. Jorm AF. Does old age reduce the risk of anxiety and depression? A review of epidemiological studies across the adult life span. Psychol Med 2000;30(1):11–22.

27. Karb RA, Elliott MR, Dowd JB, Morenoff JD. Neighborhood-level stressors, social support, and diurnal patterns of cortisol: The Chicago Community Adult Health Study. Social Science & Medicine 2012;75: 1038-47.

28. Kopp MS, Thege BK, Balog P, Stauder A, Salavecz G, Rózsa S, Purebl G, Ádám S. Measures of stress in epidemiological research. Journal of Psychosomatic Research 2010;69:211–25.

29. Kunz-Ebrecht SR, Kirschbaum C, Marmot M, Steptoe A. Differences in cortisol awakening response on work days and weekends in women and men from the Whitehall II cohort. Psychoneuroendocrinology 2004;29:516-28.

30. Larsson CA, Gullberg B, Råstam L, Lindblad U. Salivary cortisol differs with age and sex and shows inverse associations with WHR in Swedish women: a cross-sectional study. BMC Endocrine Disorders 2009;9:16.

31. Lassauzay C, Peyron MA, Albuisson E, Dransfield E, Woda A. Variability of the masticatory process during chewing of elastic model foods. Eur J Oral Sci 2000;108(6):484-92.

32. Linhares CRC, Coelho VLD, Guimarães RM, Campos APM, Carvalho NT. Perfil da Clientela de um Ambulatório de Geriatria do Distrito Federal. Psicologia: Reflexão e Crítica 2003;16:319-26.

33. Locker D. Disparities in oral health-related quality of life in a population of Canadian children. Community Dent Oral Epidemiol. 2007;35(5):348-56.

34. Luecken LJ, Lemery KS. Early caregiving and physiological stress responses. Clin Psychol Rev 2004;24:171-91.

35. Luft CD, Sanches SO, Mazo GZ, Andrade A. Versão brasileira da Escala de Estresse Percebido: tradução e validação para idosos. Rev Saúde Pública 2007;41:606-15.

36. Mariño R, Schofield M, Wright C, Calache H, Minichiello. Self-reported and clinically determined oral health status predictors for quality of life in dentate older migrant adults. Community Dent. Oral Epidemiol 2008;36:85–94.

37. Miller CS, Dembo JB, Falace DA, Kaplan AL. Salivary cortisol response to dental treatment of varying stress. Oral Surg Oral Med Oral Pathol 1995;79:436-41.

38. Mishellany-Dutour A, Renaud J, Peyron MA, Rimek F, Woda A. Is the goal of mastication reached in young dentates, aged dentates and aged denture wearers? Br J Nutr 2008;99(1):121-8.
39. Mitchell AJ, Bird V, Rizzo M, Meader N. Diagnostic validity and added value of the Geriatric Depression Scale for depression in primary care: a meta-analysis of GDS30 and GDS15. Journal of Affective Disorders 2010;125:10–7.
40. Nater UM, Hoppmann CA, Scott SB. Diurnal profiles of salivary cortisol and alpha-amylase change across the adult lifespan: Evidence of repeated daily life assessments. Psychoneuroendocrinology 2013;38:3167—71.
41. Nater UM, La Marca R, Florin L, Moses A, Langhans W, Koller MM, Ehlert U. Stress-induced changes in human salivary alpha-amylase activity – associations with adrenergic activity. Psychoneuroendocrinology 2006;31:49-58.
42. Nater UM, Rohleder N. Salivary alpha-amylase as a non- invasive biomarker for the sympathetic nervous system: current state of research. Psychoneuroendocrinology 2009;34:486—96.
43. Neri AL. Qualidade de vida e idade madura. Campinas (SP): Papirus; 1993.
44. Neto LSS, Karnikowiski MGO, Tavares AB, Lima RM. Association between sarcopenia, sarcopenic obesity, muscle strength and quality of life variables in elderly women. Rev Bras Fisioter 2012;16(5):360-7.
45. Nicodemo D, Pereira MD, Ferreira LM. Effect of orthognathic surgery for class III correction on quality of life as measured by SF-36. Int J OralMaxillofac Surig 2008;37:131–4.
46. Nyunt MSZ, Lim ML, Yap BK, Ng TP. Changes in depressive symptoms and functional disability among community-dwelling depressive older adults. International Psychogeriatrics 2012;24:10:1633–41.
47. Ocampo JM. Evaluación geriátrica multidimensional del anciano en cuidados paliativos. P & B 2005;9:45-58.
48. Pellegrino R, Formica V, Portarena I, Mariotti S, Grenga I, Del-Monte G, Roselli M. Caregiver Distress in the Early Phases of Cancer. Anticancer Res. 2010;30(11):4657-63.

49. Pinnelli A, Sabatello E. Determinants of the health and survival of the elderly: suggestions from two different experiences-Italy and Israel. Conference on Health and Mortality Trends Among Elderly Populations: Determinants and Implications – United Nations/IUSSP/WHO;1993; 21-5.

50. Piuvezam G, de Lima KC. Self-perceived oral health status in institutionalized elderly in Brazil. Archives of Gerontology and Geriatrics 2012;55:5-11.

51. Pruessner JC, Wolf OT, Hellhammer DH, Buske-Kirschabum A, von Auer K, Jobst S, Kaspers F, Kirschbaum C. Free cortisol levels after awakening: a reliable biological marker for the assessment of adrenocortical activity. Life Sci 1997;61:2539–49.

52. Raff H, Homar PJ, Skoner DP. New enzyme immunoassay for salivary cortisol. Clin Chem 2003;49:203-4.

53. Rashkowa MR, Ribagin LS, Toneva NG. Correlation between salivary α-amylase and stress-related anxiety. Folia Medica 2012;54(2):46-51.

54. Rodrigues MC, Leal CARAA, Garcia PCO. A extensão buscando contribuir na melhoria da qualidade de vida dos idosos. Revista da UFG. 2003;5.

55. Sánchez-García S, Heredia-Ponce E, Juarez-Cedillo T. Psychometric properties of the General Oral Health Assessment Index (GOHAI) and dental status of an elderly Mexican population. J Public Health Dent 2010;70:300–7.

56. Sapolsky, RM. The influence of social hierarchy on primate health. Science 2005;308(5722):648-52.

57. Sheiham A, Steele J. Does the condition of the mouth and teeth affect the ability to eat certain foods, nutrient and dietary intake and nutritional status amongst older people? Public Health Nutr. 2001;4:797–803.

58. Sheikh JI, Yesavage JA. Geriatric Depression Scale (GDS): recent findings and development of a shorter version. In: Brink, T.L. (Ed.), Clinical gerontology: a guide to assessment and intervention. Howarth Press, New York. 1986.
59. Silva DD, Sousa MLR, Wada RS. Autopercepção e condições de saúde bucal em uma população de idosos. Cad Saúde Pública 2005;21:1251-9.
60. Silva SRC, Fernandes RAC. Autopercepção das condições de saúde bucal por idosos. Rev Saúde Pública 2001;35:359-455.
61. Stella F, Gobbi S, Corazza DI, Costa JLR. Depressão no Idoso: Diagnóstico, Tratamento e Benefícios da Atividade Física. Motriz 2002;8:91-8.
62. Strahler J, Berndt C, Kirschbaum C, Rohleder N. Aging diurnal rhythms and chronic stress: distinct alteration of diurnal rhythmicity of salivary alpha-amylase and cortisol. Biol. Psychol 2010;84:248—56.
63. Strahler J, Kirschbaum C, Rohleder N. Association of blood pressure and antihypertensive drugs with diurnal alpha-amylase activity. International Journal of Psychophysiology 2011;81:31–7.
64. Takai N, Yamaguchi M, Aragaki T, Eto K, Uchihashi K, Nishikawa Y. Effect of psychological stress on the salivary cortisol and amylase levels in healthy young adults. Arch Oral Biol 2004;49:963-8.
65. Turner RJ, Sugiya H. Salivary glands and saliva. Understanding salivary fluid and protein secretion. Oral Dis 2002;8:3-11.
66. van Stegeren A, Rohleder N, Everaerd W, Wolf OT. Salivary alpha amylase as marker for adrenergic activity during stress: effect of betablockade. Psychoneuroendocrinology 2006;31:137-41.
67. Ware JE. How to score the revised MOS Short-Form Health Scale (SF-36). Boston, MA: The Health Institute, New England Medical Center Hospitals; 1988.
68. World Health Organization Epidemiological survey of basic oral health. 4th ed. São Paulo, Ed Santos, 1999.

69. WHOQOL. Study protocol for the World Health Organization project to develop a Quality of Life assessment instrument. Qual Life Res 1993;2:153-9.

70. Wild B, Herzog W, Schellberg D, Lechner S, Niehoff D, Brenner H, Rothenbacher D, Stegmaier C, Raum E. Association between the prevalence of depression and age in a large representative German sample of people aged 53 to 80 years. Int J Geriatr Psychiatry 2012; 27:375–81.

CAPÍTULO 2

Self-perceptions of oral health and orofacial dysfunctions in Brazilian institutionalized elderly individuals

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ABSTRACT

The life expectancy of the elderly population is increasing, and their oral health status needs to be improved. The clinical intraoral conditions and subjective evaluations of the oral conditions of elderly individuals, which are associated with physiological orofacial function, are essential factors for improving their quality of life. **Objective**: To evaluate the self-perceptions of oral health, the presence of dental prostheses and orofacial dysfunctions in institutionalized elderly individuals more than 60 years of age. **Design**: Seventy-six individuals of both genders (73.8±10.1) participated. Their oral condition was evaluated by clinical examination, noting the presence of dentures. A questionnaire, the Geriatric Oral Health Assessment Index (GOHAI), was applied for the subjective evaluation of oral conditions, and the Nordic Orofacial Test-Screening (NOT-S) instrument was applied to evaluate the presence of orofacial dysfunction. The data were analyzed using the chi-squared test, Fisher's exact test, the Kruskal-Wallis test and Spearman's correlation coefficient. **Results**: Significant positive correlations were observed between the psychosocial function domain of the GOHAI and the NOT-S for the group that had both upper and lower prostheses and between the total GOHAI score and the NOT-S for the group with at least one prosthesis. **Conclusion**: Elderly individuals who use or do not use prostheses may present physical and psychological difficulties, which may cause pain and discomfort that has a negative impact on their quality of life.

Key words: Elderly, quality of life, oral function, oral health.

INTRODUCTION

Life expectancy is increasing for the elderly population; therefore, their oral health status has gained increasing importance in the last decades (Evren *et al.,* 2011). Consequently, preventive care related to the declining quality of life has become relevant (Moriya *et al.,* 2011). According to Sánchez-García et al. (2010), for the assessment of oral health, the evaluation of intraoral clinical conditions must be considered, but the clinical evaluation must be accompanied by complementary subjective evaluation so that it is possible to investigate how individuals perceive their oral health and how it may impact their quality of life (Schierz *et al.,* 2008). Thus, clinical measures are important for assessing morbidity, whereas subjective measures evaluate a patient's perceptions and judgment regarding his or her own health, which are individual and social.

Some aspects of oral health may have a negative influence on the general health of elderly individuals. These factors include changes in oral conditions such as the absence of teeth, the need for or use of dental prostheses, and dental caries, among others, all of which may reduce the masticatory ability but are considered normal parts of the aging process. These changes may result in discomfort or pain by impairing orofacial functions, which may cause changes in eating habits and communication, leading to low self-esteem and to social problems (Benyamini *et al.,* 2004; Mariño *et al.,* 2008; Tsakos *et al.,* 2009; Joaquim *et al.,* 2010; Sánchez-García *et al.,* 2010). Moreover, there are numerous reasons why people may lose their natural teeth, such as tobacco smoking, low levels of physical activity, low levels of social activity, and poor socioeconomic status. Poor oral health status is associated with a lack of dental care, polypharmacy, frailty, and living alone or in a nursing home (Swoboda *et al.,* 2006). The use of various medications by the elderly population may also be related to xerostomia, which is characterized by the presence of dry mouth and is associated with declining age; this disease and others can contribute to negative impacts on the patient's quality of life (Navazesh, 2002; Turner *et al.,* 2007; Liu *et al.,* 2012).

On the other hand, elderly individuals may present changes that affect the orofacial function resulting from complex activities of the central nervous system and the

neuromuscular system (Lund, 1991; Miller, 2003). Orofacial function includes a large number of vital actions such as chewing, swallowing and breathing and acts as a basis for social interaction through speech, emotional communication, facial expression and appearance (Bakke *et al.,* 2007). Moreover, the morphological aspects of the stomatognathic system may influence orofacial function and vice versa, as orofacial dysfunctions commonly occur in many genetic and congenital disorders (Leme *et al.,* 2012). This idea suggests the need for a better understanding of how elderly individuals perceive their own oral health status and treatment needs (Silva *et al.,* 2005).

The symptoms presented by the elderly population that may affect their quality of life can be mitigated when these institutionalized individuals receive appropriate care to maintain healthy physical and mental conditions (Kane *et al.,* 2003), which suggests that the maintenance of oral health for elderly residents of institutions can bring benefits and result in improved quality of life (Naito *et al.,* 2010). Moreover, de Andrade et al. (2011) noted the need for a multidisciplinary approach emphasizing the importance of tooth maintenance throughout life and of replacing damaged teeth by prostheses, among other factors. These statements indicate the need for dental professionals to recognize the importance of dental care for the elderly because this population has greater access to services related to general health than to dental care. Thus, the aim of this study was to evaluate the self-perceptions of oral health, the presence of dental prostheses and orofacial dysfunctions that could affect the quality of life in institutionalized elderly individuals.

METHODS

This project was developed in host institutions for the elderly, located at the city of Piracicaba (São Paulo, Brazil), and the sample was composed by seventy-six individuals of both genders, with minimum age of 60 years. To set the sample size was the standard error of 5%, the confidence interval of 95% and standard deviations of the variables analyzed. The 80% power (Power = 0.8) was considered to provide reliable comparative analyzes. The anamnesis was performed through interviews with the subject, verifying the medical and dental history. At that time data that characterizes the exclusion criteria were searched,

therefore individuals who have cognitive problems that may hinder the questionnaires comprehension were excluded.

USE OF PROSTHESIS

The use of dental prosthesis was evaluated by intra-oral examination, considering the absence or presence of fixed and/or removable dentures (WHO, 1999), defining the clinical groups.

SELF-PERCEPTIONS OF ORAL HEALTH

The Geriatric Oral Health Assessment Index (GOHAI) was used, as previously described (Chapter 1). Briefly, the participants answered the questionnaire, composed of 12 questions addressed for physical/functional, psychosocial/psychological and pain/discomfort domains, using a three point Likert-type scale of 1, 2 and 3 points, corresponding to "always", "sometimes" and "never". The respective scores range from 12 to 36. Higher scores mean better oral health (Silva & Fernandes, 2001). Values ranging from 34 to 36 are considered high, from 31 to 33 moderate and less than 30 are considered low (Silva *et al.,* 2005).

ASSESSMENT OF OROFACIAL FUNCTION

The presence of orofacial dysfunction was evaluated using the Nordic Orofacial Test-Screening (NOT-S) instrument, which is consistent and valid, and was culturally adapted to the Portuguese (Brazil) language by Leme et al. (2012). Twelve topics related to orofacial dysfunction were considered: six were assessed by structured interview, and six were evaluated during clinical examination. The domains assessed in the interview were: (I) sensory function, (II) breathing, (III) habits, (IV) chewing and swallowing, (V) drooling and (VI) dryness of the mouth. The domains evaluated in the clinical examination were: (1) face at rest, (2) nose breathing, (3) facial expression, (4) masticatory muscle and jaw

function, (5) oral motor function and (6) speech. Each domain contained between one and five items, reflecting the complexity of the specific function.

Both the interview and the clinical examination were conducted individually by the first author (P.J.S.A.S.) in a separate room in the institution. The NOT-S interview was carried out by asking the questions on the screening form. To assess orofacial dysfunction in the clinical examination, the examiner should make tasks for each item analyzed. The clinical examination was carried out in accordance with the NOT-S illustrated manual. Each item has criteria for the respective functions. An answer of YES or a task that indicated that the criteria for impaired function were met yielded a score of 1, indicating a dysfunction in the scored domain; an answer of NO or the absence of a task that indicated that the criteria were met, yielded a score of 0. The total score was the sum of the score of each domain and could range from 0 to 12 (Leme *et al.,* 2012).

STATISTICAL ANALYSIS

Statistical analysis was performed using Bioestat 5.0 (Mamirauá, Belém, PA, Brazil) and SPSS 9.0 (SPSS, Chicago, IL, USA) with a 5% significance level, and normality was assessed using the Kolmogorov-Smirnov test. Clinical characteristics of sample according to gender were evaluated using Chi-square or Fisher's Exact Test, where appropriate. Differences between the GOHAI total and domain scores by clinical groups were evaluated by Kruskal-Wallis test. This statistical test was also used to compare NOT-S total, interview and examination scores among clinical groups. Spearman's correlation coefficients were used to assess the correlations between the GOHAI total and domain scores with NOT-S total, interview and examination scores for each clinical group.

RESULTS

Table 1 presents the characteristics of the participants with regard to age and gender, considering the use of dental prostheses (independent of the type), defined as clinical groups.

Table 1. Clinical characteristics according to age and gender (n= 76).

Clinical characteristics	Age	Gender*		Total
		Male	Female	
	Mean (SD)	n (%)	n (%)	n (%)
Use of prosthesis in both dental arches	73.7 (10.7)	26 (43)	34 (57)	60 (100)
Use of one prosthesis	69.0 (7.8)	6 (67)	3 (33)	9 (100)
No use of prosthesis	78.1 (8.2)	5 (71)	2 (29)	7 (100)

*p>0.05 (obtained from Chi-square or Fisher's Exact Test).

Table 2 shows the distribution of responses to the GOHAI items by clinical groups. Using the responses "all the time" or "sometimes" as indicators, the percentage of individuals with prostheses in both dental arches who reported the respective responses were higher for the items "uncomfortable to swallow", "discomfort when eating", "unhappy with appearance" and "trouble biting/chewing food", ranging from 97% to 47%. For the other two groups, the percent of negative responses to each item ranged from 0.0% to 100.0%, with five of 12 items being reported by 33.3% or more of the subjects.

Table 2. Distribuition of subjects (%) responding “all the time” and “sometimes” to each GOHAI item (for each clinical group) (n=76).

GOHAI SCORES	**Use of prosthesis in both dental arches (n=60)**	**Use of one prosthesis (n=9)**	**No use of prosthesis Need of prosthesis (n=7)**
	n (%)	**n (%)**	**n (%)**
Physical function			
(1) Limit kinds or amounts of food	8 (13)	0	6 (86)
(2) Trouble biting/chewing food	28 (47)	3 (33)	5 (71)
(3) Uncomfortable to swallow	58 (97)	7 (78)	7 (100)
(4) Prevented from speaking	10 (17)	0	2 (29)
Psychosocial function			
(6) Limit contact with others	2 (7)	0	0
(7) Unhappy with appearance	39 (65)	8 (89)	2 (29)
(9) Worried or concerned	14 (23)	0	1 (14)
(10) Nervous or self-conscious	10 (17)	0	1 (14)
(11) Uncomfortable eating in front of people	2 (3)	0	3 (43)
Pain and discomfort			
(5) Discomfort when eating	56 (93)	9 (100)	5 (71)
(8) Use of medication to relieve pain	3 (5)	0	0
(12) Teeth, gums sensitive to hot/cold	6 (10)	3 (33)	4 (57)

GOHAI, geriatric oral health assessment index.

The frequency of positive responses for NOT-S domains, according the clinical groups, is shown in Table 3. The most frequent interview and examination domains demonstrated by those using prostheses in both dental arches were II (breathing), IV (chewing and swallowing) and 1 (face at rest), with a frequency ranging from 33 to 53%. More than one third of those using at least one prosthesis had difficulty with 3 (facial expression), 1 (asymmetry of the face at rest), II (difficulty with breathing) and VI (dryness of the mouth). For those who did not use a prostheses, domain II (breathing) was the most frequent, followed by IV (chewing and swallowing).

Table 3. Distribution of the sample (%) with positive answer for NOT-S domains according to clinical groups (n=76).

NOT-S items	**Use of prosthesis in both dental arches (n=60)**	**Use of one prosthesis (n=9)**	**No use of prosthesis Need of prosthesis (n=7)**
	n (%)	**n (%)**	**n (%)**
Interview			
(I) Sensory function	4 (7)	0	0
(II) Breathing	32 (53)	4 (44)	4 (57)
(III) Habits	9 (15)	0	0
(IV) Chewing and swallowing	20 (33)	1 (11)	3 (43)
(V) Drooling	4 (7)	1 (11)	1 (14)
(VI) Dry mouth	19 (32)	3 (33)	2 (29)
Examination			
(1) Face at rest	20 (33)	4 (44)	0
(2) Nose breathing	4 (7)	0	0
(3) Facial expression	7 (12)	5 (56)	0
(4) Masticatory muscle and jaw function	1 (2)	0	1 (14)
(5) Oral motor function	1 (2)	0	0
(6) Speech	5 (8)	2 (22)	2 (29)

NOT-S, Nordic orofacial test screening.

Table 4. GOHAI and NOT-S scores according to use of dental prosthesis.

	Number of items	Use of prosthesis in both dental arches (n=60)		Use of one prosthesis (n=9)		No use of prosthesis (n=7)	
		Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)
GOHAI							
Total [12-36]	12	29.2 (2.8)	30.0 (3.0)	30.1 (1.9)	30.0 (3.0)	27.3 (3.7)	27.0 (2.0)
Physical function [1-12]	4	1.1 (1.3)	0.0 (2.0)	0.4 (0.9)	0.0 (0.0)	1.1 (1.1)	1.0 (1.0)
Psychosocial function [1-15]	5	1.4 (1.4)	1.0 (3.0)	0.7 (1.4)	0.0 (0.0)	1.4 (1.9)	0.0 (3.0)
Pain and discomfort [1-9]	3	**1.7 (1.1)***	2.0 (1.0)	**0.4 (0.9)***	0.0 (0.0)	1.3 (1.7)	0.0 (2.5)
NOT-S							
Total [0-12]	12	2.0 (1.8)	2.0 (2.0)	2.1 (1.5)	2.0 (2.0)	1.9 (1.9)	1.0 (1.5)
Interview [0-6]	6	1.4 (1.2)	1.0 (1.3)	1.0 (1.0)	1.0 (1.0)	1.4 (1.1)	1.0 (1.0)
Examination [0-6]	6	0.6 (0.9)	0.0 (1.0)	1.2 (0.8)	1.0 (1.0)	0.4 (0.8)	0.0 (0.5)

GOHAI, geriatric oral health assessment index; NOT-S, Nordic orofacial test screening; SD, standard deviation; IQR, interquartile range.

Values in square brackets indicate range of possible scores.

*p<0.01 (obtained from Kruskal-Wallis test).

When the differences between the GOHAI total and domain scores were analyzed by clinical groups, statistically significant differences were observed in the score for "Pain and discomfort" between the group that used prostheses in both dental arches (1.7 ±1.1) and the group that used one prosthesis (0.4 ±0.9). However, comparing the NOT-S total, interview and examination scores among the clinical groups, no significant differences were observed (Table 4). According to Table 5, the GOHAI "psychosocial function" domain score was positively correlated with the NOT-S total, interview and examination scores for those using prostheses in both dental arches. There was also a significant positive correlation between the GOHAI total and the NOT-S total scores for those using at least one prosthesis.

Table 5. Correlations between GOHAI and NOT-S scores for each clinical group.

		NOT-S	
	Total	**Interview**	**Examination**
Group: Use of prosthesis in both dental arches (n=60)			
GOHAI total	-0.17	-0.19	-0.06
Physical function	0.06	0.11	0.09
Psychosocial function	**0.42*****	**0.33****	**0.41****
Pain and discomfort	0.13	-0.19	0.00
Group: Use of one prosthesis (n=9)			
GOHAI total	**0.71***	0.56	0.38
Physical function	0.00	0.11	-0.11
Psychosocial function	0.00	0.10	0.12
Pain and discomfort	0.00	0.11	-0.11
Group: No use of prosthesis (n=7)			
GOHAI total	0.22	0.10	0.14
Physical function	-0.46	-0.37	-0.18
Psychosocial function	-0.50	-0.51	-0.52
Pain and discomfort	0.26	0.30	0.63

GOHAI, geriatric oral health assessment index; NOT-S, nordic orofacial test screening. *p>0.05; **p<0.01; ***p<0.001 (obtained from Spearman's correlation test).

DISCUSSION

This study evaluated self-perceptions of oral health, presence of dental prostheses and orofacial dysfunctions that might affect the oral health of institutionalized elderly individuals. According to Ocampo (2005), the assessment of the health conditions of elderly individuals must go beyond the traditional clinical history, and aspects such as psychological, familial, social, economic and functional dimensions must also be considered. Then, the objective assessment becomes relevant, through specific methodologies, as well as through subjective evaluations using instruments capable of measuring the impact of these changes on the quality of life of the elderly patient. It is worth mentioning that the evaluation of the health state of elderly individuals implies subjectivity because it depends on the interaction of functional abilities, psychological conditions, social support and psychological well-being.

The sample comprised 37 males and 36 females who used or did not use dental prostheses. A high mean age was verified (73.8±10.1), with the major age observed of 93 years old in a voluntary with cognitive status and physical conditions preserved, suggesting an increase in life expectancy of the elderly population. Among the purposes of the use of prostheses are maintaining the mandible and maintaining proper occlusion, which have been considered important for correct swallowing in elderly subjects (Tamura *et al.,* 2002); the absence of a prosthesis may alter the function of the oral structures. Nevertheless, the results of this study showed that most individuals using or not using a dental prosthesis experienced trouble with biting/chewing food and felt uncomfortable when swallowing, which confirmed discomfort with eating. These results imply that the prosthesis could be of poor quality, indicating the need for better oral care for the people who were evaluated. Moreover, few individuals with prostheses in both arches and most individuals who do not use prostheses limited the types or amount of food that they consumed. Those facts are important because it has been reported that oral conditions can influence dietary intake and nutrition (Dormenval *et al.,* 1999; Soini *et al.,* 2005), and a lack of consumption of natural foods has been associated with being underweight. In this context, health promotion strategies should involve retraining and restoring oral function to avoid harmful dietary

restrictions (Marcenes *et al.,* 2005), mainly for frail and dependent elderly people (Ikebe *et al.,* 2006). Furthermore, feelings of unhappiness with their appearance were reported by the most of the prosthesis wearers. All of these factors indicate that the evaluated individuals perceived their oral health as poor, implying that their quality of life could be affected, as noted by da Costa *et al*. (2010).

The sample was also evaluated using the Nordic Orofacial Test–Screening to investigate the presence of orofacial dysfunction (Table 3). The results showed that individuals without prostheses had problems regarding breathing, chewing and swallowing; as noted above before, the latter was caused by difficulty in reducing food into smaller particles to form the bolus (Furuta & Yamashita, 2013). Moreover, individuals with prostheses in both dental arches had higher scores related to breathing, chewing and swallowing and face at rest; in other words, the results suggest that individuals without prostheses and those rehabilitated with prostheses in both dental arches may present difficulties regarding orofacial function. These problems may have been related to poor adaptation or poor condition of the dentures, which damages not only masticatory function but also the face at rest. This finding corroborates the study performed by Saarela *et al*. (2013), which reported that elderly assisted living residents may present common oral health problems, such as pain, dry mouth and difficulty in chewing and swallowing that could be associated with poor oral hygiene. It is noteworthy that difficulties related to chewing and swallowing were observed in all groups. The differences in sample distribution for similar items between the GOHAI and the NOT-S interview can be justified by the nature of the questionnaires.

Additionally, this study found mean values for the GOHAI equal to or less than 30, which is considered low, thereby demonstrating negative perceptions of oral health (Silva *et al.,* 2005). The subjective aspects evaluated in this research could be affected by the distance of their family, the time living in the institution and abandonment feelings. Conversely, low total scores for the NOT-S indicated slight oral dysfunction in all groups (Table 4). Nevertheless, Bakke et al. (2007) indicated that scoring a point in one domain in the screening necessitated a more detailed evaluation of that domain and might indicate

referral to a specialist, showing that the results of NOT-S scores can be considered important in the context of the population studied.

The lower values of the total GOHAI score for the group using prostheses in both dental arches may be associated with the discomfort caused by the presence of unsatisfactory prostheses, as noted by the participants, and the need for replacement, as observed in clinical examination. This finding partially corroborates other studies (Tsakos *et al.,* 2009; de Andrade *et al.,* 2012), which reported that the need for dental prosthesis was significantly associated with moderate and high levels of negative impact on quality of life and that elderly individuals with dentures were more likely to have lower GOHAI scores than those without. In contrast, impairment in different domains of the GOHAI was observed for the groups with the absence of at least one prostheses, which resulted in different complaints and caused a negative perception of oral health, although without accompanying orofacial dysfunction. Various reports in the literature (Tsakos *et al.,* 2009; de Andrade *et al.,* 2012) also related that the need for dental prostheses must take into account the quality of the prostheses (e.g., adaptation and retention) and may be a more reliable measure of functional oral impact than the use of dental prostheses alone and that the self-perceived dental needs are culturally and behaviorally dependent.

Individuals without prostheses demonstrated impairment related to chewing and swallowing that could have limited the type or the amount of food ingested. However, the values obtained for the domain "uncomfortable to swallow" were high for all clinical groups. This finding could be justified by those of previous studies, which reported that elderly people, with a reduced number of functional teeth, have difficulty in chewing and swallowing (Okamoto *et al.,* 2012). This discomfort may also occur because of the use of ill-fitting dentures with which is not possible to obtain sufficient occlusal contact; this could reduce masticatory performance (Furuta & Yamashita, 2013) and cause a loss of accuracy in controlling the force needed to crush food (Mishellany-Dutour *et al.,* 2008), leading to impairment of swallowing activity. Similarly, partially edentulous individuals present difficulties with forming the bolus because they cannot reduce the food with the same particle size distribution as can individuals who possess all of their own teeth

(Lassauzay *et al.,* 2000). According to Mishellany *et al*. (2006), the bolus size increases directly with the number of missing teeth, which can interfere with optimal swallowing.

Furthermore, individuals with one prostheses showed higher values regarding facial expression and asymmetry of the face at rest evaluated by NOT-S. The impairment of facial expression in this group of individuals might be due to the lack of one denture or to the poor condition of the opposing dental arch, which hinders the ability to completely restore oral function and to maintain the facial harmony. As noted above, Furuta & Yamashita (2013) affirmed that the function of dentures is to maintain the correct position of the mandible and to maintain proper occlusion, and it is difficult to achieve these goals with only one prosthesis, as observed in this study. Furthermore, dryness of the mouth was also observed in this group, a condition that is commonly found in elderly individuals. Dry mouth indicates the presence of xerostomia, which is defined as the subjective sensation of oral dryness and as salivary gland hypofunction related to the objective observation of reduced salivary flow. The causes of these alterations are age (Liu *et al.,* 2012), the use of certain medications, various diseases, iatrogenic and idiopathic (Turner *et al.,* 2007), and they are indicative of overall health problems that can affect oral health and represent a negative impact on the quality of life (Navazesh, 2002). Individuals may present problems such as carious and oral mucosal lesions, difficulty in dental treatment and fungal infections. Xerostomia can be associated with burning mouth syndrome as well as with impairments in speech and chewing and swallowing, which can lead to difficulties with the use of prostheses; further, the individual may experience changes in taste, loss of appetite and other symptoms (Dormenval *et al.,* 1999; Turner *et al.,* 2007).

All of the clinical groups also showed high values for the “pain and discomfort” domain of the GOHAI (Table 2), demonstrating that they experienced discomfort when eating, impairing masticatory function. These findings are confirmed by the values obtained in the “pain and discomfort” domain of the GOHAI, in which a statistically significant difference was observed between the group of individuals with prostheses in both arches and the group with only one prosthesis (Table 4). This finding may be explained as follows: individuals may experience difficulty with eating due to problems with dentures with which is not possible to achieve sufficient occlusal contact, thus impairing masticatory

performance (Furuta & Yamashita, 2013). Furthermore, a significant positive correlation was observed between the "psychosocial function" domain of the GOHAI, which mainly includes aspects related to dissatisfaction with appearance, and the total NOT-S scores for individuals with prostheses in both arches (Table 5). Additionally, there was a significant positive correlation between the total GOHAI and total NOT-S scores for individuals who used at least one prosthesis. According to the literature, lower scores on the GOHAI indicate a high degree of negative impact on quality of life that may be due to the individual's decline in oral health (Tsakos *et al.,* 2009; de Andrade *et al.,* 2012), while lower scores on the NOT-S indicate an absence of orofacial dysfunction (Leme *et al.,* 2012). In this study, individuals presented with slight oral dysfunction, and they perceived their oral health as poor. This may have been because they were dissatisfied with their prostheses and experienced impaired chewing; this suggests the need to replace those prostheses.

On the other hand, Furuta & Yamashita (2013) affirmed that individuals with physical disabilities appear to be at an increased risk of poor oral health due to an inability to chew because of few remaining teeth or ill-fitting dentures. Previous studies reported that tooth loss in and the use of dental prostheses by elderly individuals are considered characteristics of the aging process; similarly, the need for dental prosthesis takes into account the quality of the prosthesis (e.g., adaptation and retention) and may be a more reliable measure of functional oral impact than the use of dental prosthesis alone (de Andrade *et al.,* 2012). Therefore, it is important to emphasize that restoration of the patient's oral function by dental treatment may stimulate the patient in his/her daily life (Naito *et al.,* 2010). Thus, dental professionals can help in the restoration and maintenance of oral health and function and can contribute to improving the patient's well-being and general health by improving nutrition, alleviating pain and discomfort, and increasing personal esteem and social acceptability.

In conclusion, our findings showed that elderly individuals may present difficulties associated with physical and psychological aspects of oral health, especially those who use prostheses in both dental arches; these may cause pain and discomfort, thereby having a negative impact on the individuals' quality of life.

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COMPETING INTEREST

The authors have no conflict of interest.

ETHICAL APPROVAL

The research was approved by the Ethical Committee of Piracicaba Dental School. University of Campinas. Protocol number 134/2011.

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REFERENCES

1. Bakke M, Bergendal B, Mcallister A, Sjögreen L, Asten P. Development and evaluation of a comprehensive screening for orofacial dysfunction. Swed Dent J 2007; 31:75-84.
2. Benyamini Y, Leventhal H, Leventhal EA. Self-rated oral health as an independent predictor of self-rated general health, self-esteem and life satisfaction. Soc Sci Med. 2004; 59:1109–16.
3. da Costa EH, Saintrain MV, Vieira AP. [Self-perception of oral health condition of the institutionalized and non institutionalized elders]. Cien Saude Colet. 2010;15(6):2925-30.

4. de Andrade FB, Lebrão ML, Santos JLF, Teixeira DSC, Duarte YAO. Relationship Between Oral Health–Related Quality of Life, Oral Health, Socioeconomic, and General Health Factors in Elderly Brazilians. J Am Geriatr Soc. 2012; 60(9):1755-60.
5. Dormenval V, Mojon P, Budtz-Jørgensen E. Associations between self-assessed masticatory ability, nutritional status, prosthetic status and salivary flow rate in hospitalized elders. Oral Dis 1999; 5:32-8.
6. Furuta M, Yamashita Y. Oral health and swallowing problems. Curr Phys Med Rehabil Rep 2013; 1:216–22.
7. Ikebe K, Matsuda K, Morii K, Nokubi T, Ettinger RL. The relationship between oral function and body mass index among independently living older Japanese people. Int J Prosthodont. 2006;19(6):539-46.
8. Joaquim AM, Wyatt CC, Aleksejūnienė J, Greghi SL, Pegoraro LF, Kiyak HA. A comparison of the dental health of Brazilian and Canadian independently living elderly. Gerodontology 2010; 27:258–65.
9. Kane RA, Kling KC, Bershadsky B, Kane RL, Giles K, Degenholtz HB, Liu J, Cutler LJ. Quality of life measures for nursing home residents. J Gerontol A Biol Sci Med Sci. 2003; 58(3):240–8.
10. Lassauzay C, Peyron MA, Albuisson E, Dransfield E, Woda A. Variability of the masticatory process during chewing of elastic model foods. Eur J Oral Sci. 2000; 108(6):484-92.
11. Liu B, Dion MR, Jurasic MM, Gibson G, Jones JA. Xerostomia and salivary hypofunction in vulnerable elders: prevalence and etiology. Oral Surg Oral Med Oral Pathol Oral Radiol 2012 Jul;114(1):52-60.
12. Leme MS, Barbosa TS, Gavião MBD. Assessment of orofacial functions in Brazilian children using the Nordic Orofacial Test-Screening (NOT-S). Rev Odonto Cienc 2012; 27(2):108-14.
13. Marcenes W, Steele JG, Sheiham A, Walls AW. The relationship between dental status, food selection, nutrient intake, nutritional status, and body mass index in older people. Cad Saude Publica. 2003;19(3):809-16.

14. Mariño R, Schofield M, Wright C, Calache H, Minichiello V. Self-reported and clinically determined oral health status predictors for quality of life in dentate older migrant adults. Community Dent. Oral Epidemiol 2008; 36:85–94.
15. Miller AJ. Oral and pharyngeal reflexes in the mammalian nervous system: theirdiverse range in complexity and the pivotal role of the tongue. Crit Rev Oral Biol Med 2003; 13:409-25.
16. Mishellany A, Woda A, Labas R, Peyron MA. The challenge of mastication: preparing a bolus suitable for deglutition. Dysphagia. 2006; 21:87–94.
17. Mishellany-Dutour A, Renaud J, Peyron MA, Rimek F, Woda A. Is the goal of mastication reached in young dentates, aged dentates and aged denture wearers? Br J Nutr 2008; 99(1):121-8.
18. Moriya S, Tei K, Yamazaki Y, Hata H, Shinkai S, Yoshida H, Muramatsu M, Kitagawa Y, Inoue N, Yamada H, Miura H. Relationships between perceived chewing ability and muscle strength of the body among the elderly. J Oral Rehabil. 2011; 38(9):674-9.
19. Navazesh M. Dry mouth: aging and oral health. Compend Contin Educ Dent. 2002; 23(10):41-8.
20. Okamoto N, Tomioka K, Saeki K, Iwamoto J, Morikawa M, Harano A, Kurumatani N. Relationship between swallowing problems and tooth loss in community-dwelling independent elderly adults: the Fujiwara-kyo study. J Am Geriatr Soc. 2012;60(5):849-53.
21. Saarela RK, Soini H, Muurinen S, Suominen MH, Pitkälä KH. Oral hygiene and associated factors among frail older assisted living residents. Spec Care Dentist. 2013; 33(2):56-61.
22. Sánchez-García S, Heredia-Ponce E, Juarez-Cedillo T. Psychometric properties of the General Oral Health Assessment Index (GOHAI) and dental status of an elderly Mexican population. J Public Health Dent 2010; 70:300–7.
23. Schierz O, John MT, Reissmann DR, Mehrstedt M, Szentpétery A. Comparison of perceived oral health in individuals with temporomandibular disorders and dental

anxiety using oral health-related quality of life profiles. Qual Life Res 2008; 17: 857–66.

24. Silva SRC, Fernandes RAC. Autopercepção das condições de saúde bucal por idosos. Rev Saúde Pública 2001; 35:359-455.
25. Silva DD, Sousa MLR, Wada RS. [Self-perception and oral health conditions in an elderly population]. Cad Saude Pública 2005; 21(4):1251-9.
26. Soini H, Routasalo P, Lagstrom H. Nutritional status in cognitively intact older people receiving home care services-a pilot study. J Nutr Health Aging. 2005;9(4):249-53.
27. Swoboda J, Kiyak HA, Persson RE, Persson GR, Yamaguchi DK, MacEntee MI, Wyatt CC. Spec Care Dentist 2006; 26(4): 137-44.
28. Tamura F, Mizukami M, Ayano R, Mukai Y. Analysis of feeding function and jaw stability in bedridden elderly. Dysphagia. 2002; 17:235–41.
29. Tsakos G, Sheiham A, Iliffe S, Kharicha K, Harari D, Swift CG, Gillman G, Stuck AE. The impact of educational level on oral health-related quality of life in older people in London. Eur J Oral Sci 2009;117:286–92.
30. Turner MD, Ship JA. Dry mouth and its effects on the oral health of elderly people. J Am Dent Assoc 2007; 138:15-20.
31. World Health Organization Epidemiological survey of basic oral health. 4th ed. São Paulo, Ed Santos, 1999.
32. WHOQOL. Study protocol for the World Health Organization project to develop a Quality of Life assessment instrument. Qual Life Res 1993; 2:153-159.

CONCLUSÃO

Pode-se concluir que os indivíduos idosos avaliaram sua condição bucal como desfavorável e também consideraram a saúde geral como inapropriada. Da mesma forma, apresentaram dificuldades com os aspectos físicos e psicológicos relacionados às condições bucais, especialmente aqueles portadores de próteses em ambas as arcadas dentárias, gerando dor e desconforto, além de um impacto negativo na sua qualidade de vida. Sendo assim, as alterações nas condições bucais podem causar impacto negativo na saúde geral, alterações nos níveis de estresse e depressão, podendo interferir na qualidade de vida.

REFERÊNCIAS

1. Baker SR, Mat A, Robinson PG. What psychosocial factors influence adolescent's oral health? J Dent Res 2010; 89:1230-5.
2. Bakke M, Bergendal B, Mcallister A, Sjögreen L, Asten P. Development and evaluation of a comprehensive screening for orofacial dysfunction. Swed Dent J 2007; 31:75-84.
3. Carneiro RMV, Silva DD, Sousa MLR, Wada RS. Oral health of institutionalized elderly in the Eastern Zone of São Paulo, Brazil, 1999. Cad. Saúde Pública, Rio de Janeiro 2005; 21:1709-16.
4. Ehlert U, Erni K, Hebisch G, Nater UM. Effects of yohimbine challenge on salivary alpha-amylase secretion. Psychosom Med 2005; 67: A-92.
5. IBGE – Instituto Brasileiro de Geografia e Estatística. Censo demográfico. Rio de Janeiro: IBGE, 2010.
6. Luecken LJ, Lemery KS. Early caregiving and physiological stress responses. Clin Psychol Rev 2004; 24:171-91.
7. Luft CD, Sanches SO, Mazo GZ, Andrade A. Versão brasileira da Escala de Estresse Percebido: tradução e validação para idosos. Rev Saúde Pública 2007; 41:606-15.
8. Lund JP. Mastication and its control by the brain stem. Crit Rev Oral Biol Med 1991; 2:33-64.
9. Miller AJ. Oral and pharyngeal reflexes in the mammalian nervous system: theirdiverse range in complexity and the pivotal role of the tongue. Crit Rev Oral BiolMed 2003; 13:409-25.
10. Nater UM, La Marca R, Florin L, Moses A, Langhans W, Koller MM, Ehlert U. Stress-induced changes in human salivary alpha-amylase activity – associations with adrenergic activity. Psychoneuroendocrinology 2006; 31:49-58.
11. Nater UM, Rohleder N, Gaab J, Berger S, Jud A, Kirschbaum C, Ehlert U. Human salivary alphaamylase reactivity in a psychosocial stress paradigm. Int J Psychophysiol 2005; 55:333-42.

12. Neri AL. Qualidade de vida e idade madura. Campinas (SP): Papirus; 1993.
13. Pelegrino VM, Dantas RAS, Ciol MA, Clark AM, Rossi LA, Simões MV. Health-related quality of life in Brazilian outindividuals with Chagas and non-Chagas cardiomyopathy. Heart Lung 2011; 40(3):25-31.
14. Pinnelli A, Sabatello E. Determinants of the health and survival of the elderly: suggestions from two different experiences-Italy and Israel. Conference on Health and Mortality Trends Among Elderly Populations: Determinants and Implications – United Nations/IUSSP/WHO; 1993; 21-5.
15. Plati MCF, Covre P, Lukasova K, Macedo EC. Depressive symptoms and cognitive performance of the elderly: relationship between institutionalization and activity programs. Rev Bras Psiquiatr 2006; 28:118-21.
16. Rodrigues MC, Leal CARAA, Garcia PCO. A extensão buscando contribuir na melhoria da qualidade de vida dos idosos. Revista da UFG. 2003; 5.
17. Silva DD, Sousa MLR, Wada RS. Autopercepção e condições de saúde bucal em uma população de idosos. Cad Saúde Pública 2005; 21:1251-9.
18. Stella F, Gobbi S, Corazza DI, Costa JLR. Depressão no Idoso: Diagnóstico, Tratamento e Benefícios da Atividade Física. Motriz 2002; 8:91-8.
19. Takai N, Yamaguchi M, Aragaki T, Eto K, Uchihashi K, Nishikawa Y. Effect of psychological stress on the salivary cortisol and amylase levels in healthy young adults. Arch Oral Biol 2004; 49:963-8.
20. Turner RJ, Sugiya H. Salivary glands and saliva. Understanding salivary fluid and protein secretion. Oral Dis 2002; 8:3-11.
21. van Stegeren A, Rohleder N, Everaerd W, Wolf OT. Salivary alpha amylase as marker for adrenergic activity during stress: effect of betablockade. Psychoneuroendocrinology 2006; 31:137-41.
22. WHOQOL. Study protocol for the World Health Organization project to develop a Quality of Life assessment instrument. Qual Life Res 1993; 2:153-159.

APÊNDICE 1 – TABELA 5 REFERENTE AO CAPÍTULO 1

Table 5 - Results of multiple linear regression analysis predicting GOHAI total and domain scores.

Dependent variable: GOHAI total		
Independent variables	*B*	*P*
Gender (male = 0; female = 1)	0.354	0.725
Age (in years)	0.369	0.714
SF-36 score	0.854	0.396
PSS score	-1.788	0.078
GDS-15 score	-0.497	0.621
ACR (µg/dl)	0.354	0.724
AAAR (U/ml)	0.974	0.334
Adjusted $R^2 = 0.061$		
Dependent variable: GOHAI subscale ‘‘physical function”		
Independent variables	*B*	*P*
Gender (male = 0; female = 1)	-0.087	0.931
Age (in years)	0.609	0.545
SF-36 score	0.143	0.887
PSS score	-2.234	0.029*
GDS-15 score	-1.766	0.082
ACR (µg/dl)	0.535	0.594
AAAR (U/ml)	1.227	0.224
Adjusted $R^2 = 0.126$		

Continua

Continuação da tabela 5

Table 5 - Results of multiple linear regression analysis predicting GOHAI total and domain scores.

Dependent variable: GOHAI subscale ‘‘psychosocial function”		
Independent variables	*B*	*P*
Gender (male = 0; female = 1)	1.499	0.139
Age (in years)	-0.736	0.464
SF-36 score	1.277	0.206
PSS score	-0.401	0.690
GDS-15 score	0.520	0.605
ACR (µg/dl)	-0.718	0.475
AAAR (U/ml)	0.404	0.687
Adjusted R^2 = 0.023		
Dependent variable: GOHAI subscale ‘‘pain and discomfort”		
Independent variables	*B*	*P*
Gender (male = 0; female = 1)	-1.073	0.287
Age (in years)	1.180	0.242
SF-36 score	0.398	0.692
PSS score	-0.870	0.388
GDS-15 score	0.843	0.402
ACR (µg/dl)	1.240	0.219
AAAR (U/ml)	0.166	0.868
Adjusted R^2 = -0.018		

GOHAI, geriatric oral health assessment index; SF-36, 36-item short form health survey; PSS, perceived stress scale, GDS-15, geriatric depression scale-15; ACR, awakening cortisol response; AAAR, awakening alpha-amylase response.

APÊNDICE 2 - TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Nº do registro no CEP: 053/2009

UNIVERSIDADE ESTADUAL DE CAMPINAS
FACULDADE DE ODONTOLOGIA DE PIRACICABA

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Introdução

Você está convidado a participar da pesquisa acima citada, a ser desenvolvida pelas pesquisadoras Polyanne Junqueira Silva Andresen Strini e Profa. Dr. Maria Beatriz Duarte Gavião. O documento abaixo é o Termo de Consentimento Livre e Esclarecido que contém todas as informações necessárias sobre a pesquisa que será realizada. As informações contidas neste Termo, bem como a apresentação e a obtenção do consentimento, serão realizadas por nós, pesquisadoras responsáveis pela pesquisa. Sua colaboração neste estudo será de muita importância, mas se desistir a qualquer momento, isso não lhe causará nenhum prejuízo.

Eu, abaixo assinado, concordo de livre e espontânea vontade, em participar como voluntário do estudo "Associação entre saúde bucal, qualidade de vida, níveis salivares de cortisol e alfa-amilase em idosos institucionalizados". Declaro que obtive todas as informações necessárias fornecidas pelas pesquisadoras responsáveis, bem como todos os eventuais esclarecimentos quanto às dúvidas por mim apresentadas.

Estou ciente que:

I) Justificativa
Este trabalho mostra-se necessário para entender as alterações do sistema mastigatório decorrentes do processo de envelhecimento que podem levar a exposição a situações estressantes e alterações psicológicas afetando o bem-estar e a qualidade de vida destes indivíduos.

II) Objetivo
Avaliar as condições de saúde bucal, aspectos psicológicos relacionados à qualidade de vida e níveis salivares de cortisol e alfa-amilase em idosos institucionalizados.

III) Metodologia
1. Para a realização da pesquisa, todos os voluntários serão submetidos à entrevista para informar dados pessoais, história médica e odontológica além do preenchimento de questionários em sala reservada.

2. Será realizado um exame clínico intra e extra-oral (dentro e fora da boca) para avaliação das condições bucais, incluindo a presença e ausência de dentes e/ou próteses dentárias utilizando-se espelho clínico. Já as condições periodontais serão verificadas por meio do Índice Periodontal Comunitário (IPC), um instrumento que permite verificar a presença de sangramento gengival, cálculos e bolsas periodontais, sendo realizado utilizando-se uma sonda periodontal.
3. Para a avaliação subjetiva das condições bucais em idosos será realizado o preenchimento do questionário Geriatric Oral Health Assessment Index (GOHAI), que avalia aspectos psicológicos e funcionais relacionados a elas. A versão curta da Escala de Depressão Geriátrica (GDS-15) será utilizada para a avaliação da presença de depressão, por meio de perguntas que permitem respostas simples (sim/não).
4. A dor crônica será avaliada utilizando-se o questionário de dor McGill, que fornece informações por meio de descrições verbais fornecidas pelos próprios voluntários. Já a autopercepção com relação a situações estressantes será avaliada por meio da Escala de Estresse Percebido (PSS), permitindo a verificação da percepção dos indivíduos sobre sua própria vida, considerando-a incontrolável, imprevisível e/ou sobrecarregada.
5. O questionário Medical Outcome Studies Short-Form Health Survey (SF-36), será aplicado de modo a fornecer informações relacionadas à saúde geral dos voluntários. Este é composto por domínios que envolvem aspectos físicos e mentais, incluindo questões que permitem a comparação da saúde geral atual com um período anterior há um ano, além de questões que avaliam o estado de saúde nas últimas quatro semanas.
6. Para a coleta de saliva, um rolete de algodão estéril será colocado sob a língua do voluntário por 2 a 3 minutos, sendo esta realizada em casa pelo próprio voluntário após orientações prévias.
7. Os laboratórios da área de odontopediatria estão adequadamente equipados para a realização dos experimentos para análise de saliva.
8. Durante o período da pesquisa, os voluntários devem relatar aos pesquisadores, eventuais alterações sistêmicas ou administração de medicamentos.
9. Cada voluntário terá o seu horário agendado previamente, de modo a não comprometer suas atividades diárias. Para cada sessão, estimam-se o tempo aproximado de 60 minutos, suficientes para realização de cada etapa deste trabalho. Na primeira sessão será agendada a próxima sessão, considerando a disponibilidade do voluntário. Estima-se a necessidade de duas sessões para a realização do estudo.

IV) Possibilidade de inclusão em grupo controle
Neste projeto não está prevista a inclusão de grupo controle ou placebo.

V) Métodos alternativos para obtenção da informação ou tratamento da condição
Não existem métodos alternativos para a obtenção da informação desejada e não será realizada nenhuma forma de tratamento.

VI) Descrição crítica dos desconfortos e riscos previsíveis
A coleta da saliva é um teste, que busca avaliar a presença dos hormônios cortisol e alfa-amilase, sendo um procedimento não invasivo, portanto não causa riscos previsíveis aos voluntários, visto que todas as variáveis são controladas. Da mesma forma, o

preenchimento dos questionários GOHAI, GDS-15, McGill, PSS e SF-36 não provocam nenhum incômodo ou desconforto ao indivíduo. Os exames clínicos intra e extra-orais serão realizados seguindo procedimentos já realizados nesta instituição. Estes, quando realizados por profissional habilitado, com técnica adequada, como propõe a metodologia deste projeto, não causa quaisquer desconfortos e efeitos colaterais negativos e terão duração aproximada de 50 a 60 minutos.

VII) Descrição dos benefícios e vantagens diretas ao voluntário
Por meio deste estudo, será possível obter informações relacionadas às condições bucais bem como entender como as alterações morfológicas e funcionais das estruturas que compõem o sistema mastigatório podem influenciar na qualidade de vida, causando impactos no bem-estar emocional e social dos indivíduos. Da mesma forma, os procedimentos realizados nesta pesquisa podem auxiliar no diagnóstico, contribuindo na seleção de uma terapêutica apropriada.

VIII) Forma de acompanhamento e assistência ao sujeito
O acompanhamento e a assistência serão dados pelas pesquisadoras responsáveis, para sanar qualquer necessidade relacionada à pesquisa.

IX) Forma de contato com os pesquisadores e com o CEP
O contato com um dos pesquisadores responsáveis ou CEP (Comitê de Ética em Pesquisa) poderá ser feito através de telefone ou endereço presente no fim deste termo de consentimento.

X) Garantia de esclarecimentos
Quaisquer dúvidas poderão ser esclarecidas antes, durante e após o desenvolvimento da pesquisa, entrando em contato com os pesquisadores ou com o CEP.

XI) Garantia de recusa à participação ou de saída do estudo
Tenho a liberdade de desistir ou de interromper a colaboração neste estudo, no momento em que desejar, sem qualquer penalidade de qualquer natureza, mediante o contato com um dos pesquisadores responsáveis ou CEP.

XII) Garantia de sigilo
Fica garantido o sigilo de dados confidenciais ou que, de algum modo, possam provocar constrangimentos ou prejuízos a minha pessoa, preservando sempre minha integridade e identidade.

XIII) Garantia de ressarcimento
Os voluntários desta pesquisa não terão despesas relacionadas à pesquisa, não havendo previsão de ressarcimento desses gastos.

XIV) Garantia de indenização e/ou reparação de danos

Não há riscos previsíveis para a realização desta pesquisa. Entretanto, se por ventura houver qualquer dano causado durante a realização dos exames, os pesquisadores tomarão medidas para repará-los.

XV) Garantia de entrega de cópia

Tenho garantido o recebimento de uma cópia deste Termo de Consentimento Livre e Esclarecido.

Nome:_____Data de nascimento: _____/_____/_____
Endereço:_____Telefone: _____
Identidade (RG):_____ CPF: _____

Assinatura: _____ Data: _____/_____/_____

"Em caso de dúvida quanto aos seus direitos, como voluntário de pesquisa, entre em contato com o CEP-FOP"

Pesquisadoras responsáveis:

Profa. Maria Beatriz Duarte Gavião (e-mail: mbgaviao@fop.unicamp.br)

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_____
Assinatura

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ANEXO 1- AVALIAÇÃO DAS CONDIÇÕES BUCAIS

CONDIÇÃO DENTAL E NECESSIDADE DE TRATAMENTO

Nº Identificação

	55	54	53	52	51	61	62	63	64	65					
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
Coroa (66)																	(81)
Raiz (82)																	(97)
Trat. (98)																	(113)

	85	84	83	82	81	71	72	73	74	75					
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
Coroa (114)																	(129)
Raiz (130)																	(145)
Trat. (146)																	(161)

Dentes Decíduos	Dentes Permanentes		
Coroa	*Coroa*	*Raiz*	CONDIÇÃO
A	0	0	Sadio
B	1	1	Cariado
C	2	2	Restaurado com cárie
D	3	3	Restaurado sem cárie
E	4	-	Perdido por cárie
-	5	-	Perdido outras razões
F	6	-	Selante
G	7	7	Apoio de ponte, coroa ou faceta/implante
-	8	8	Dente não erupcionado (coroa)/raiz não exposta
T	T	-	Trauma (fratura)
-	9	9	Sem registro

TRATAMENTO
0 = Nenhum
P = Cuidado preventivo/ cariostático
F = Selante
1 = Restauração 1 face
2 = Restauração 2 ou mais faces
3 = Coroa por qualquer motivo
4 = Faceta laminada
5 = Tratamento pulpar e restauração
6 = Extração
7 = Outros cuidados
8 = Outros cuidados
9 = Sem registro

USO DE PRÓTESE

Sup Inf (162) (163)

0 = Sem prótese
1 = Prótese fixa
2 = Mais de uma prótese fixa
3 = Prótese parcial removível
4 = Prótese fixa e removível
5 = Prótese total
9 = Sem registro

NECESSIDADE DE PRÓTESE

Sup Inf (164) (165)

0 = Sem necessidade de prótese
1 = Prótese fixa unitária
2 = Prótese fixa ou removível unitária e/ou múltipla
3 = Combinação de prótese fixa e/ou removível unitária e/ou múltipla
4 = Prótese total
9 = Sem registro

ÍNDICE PERIODONTAL COMUNITÁRIO (CPI)

0 = Hígido
1 = Sangramento
2 = Cálculo
3* = Bolsa de 4-5 mm (faixa preta da sonda parcialmente visível)
4* = Bolsa de 6 mm ou mais (faixa preta da sonda não visível)
x = Sextante excluído
9 = Sem registro

* Não registrar em idades abaixo de 15 anos

	17/16	11	26/27	
(54)				(56)
(57)				(59)
	47/46	31	36/37	

PERDA DE INSERÇÃO *

0 = 0-3 mm
1 = 4-5 mm (junção cemento-esmalte (JCE) dentro da faixa preta)
2 = 6-8 mm (JCE entre o limite superior da faixa preta e a marca de 8,5 mm)
3 = 9-11 mm (JCE entre as marcas 8,5 e 11,5 mm)
4 = 12 mm ou mais (JCE acima da marca 11,5)
x = Sextante excluído
9 = Sem registro

* Não registrar em idades abaixo de 15 anos

	17/16	11	26/27	
(60)				(62)
(63)				(65)
	47/46	31	36/37	

ANEXO 2 – QUESTIONÁRIO DE QUALIDADE DE VIDA (SF-36)

Nome:_____
Idade: _____ Sexo: _____
Função exercida no trabalho: _____
Há quanto tempo exerce essa função: _____
Instruções: Esta pesquisa questiona você sobre sua saúde. Estas informações nos manterão informados de como você se sente e quão bem você é capaz de fazer atividades de vida diária. Responda cada questão marcando a resposta como indicado. Caso você esteja inseguro em como responder, por favor, tente responder o melhor que puder.

1- Em geral você diria que sua saúde é:

Excelente	Muito Boa	Boa	Ruim	Muito Ruim
1	2	3	4	5

2- Comparada há um ano atrás, como você se classificaria sua idade em geral, agora?

Muito Melhor	Um Pouco Melhor	Quase a mesma	Um Pouco Pior	Muito Pior
1	2	3	4	5

3- Os seguintes itens são sobre atividades que você poderia fazer atualmente durante um dia comum. Devido à sua saúde, você teria dificuldade para fazer estas atividades? Neste caso, quando?

Atividades	Sim, dificulta muito	Sim, dificulta um pouco	Não, não dificulta de modo algum
a) Atividades Rigorosas, que exigem muito esforço, tais como correr, levantar objetos pesados, participar em esportes árduos.	1	2	3
b) Atividades moderadas, tais como mover uma mesa, passar aspirador de pó, jogar bola, varrer a casa.	1	2	3
c) Levantar ou carregar mantimentos	1	2	3
d) Subir vários lances de escada	1	2	3
e) Subir um lance de escada	1	2	3

f) Curvar-se, ajoelhar-se ou dobrar-se	1	2	3
g) Andar mais de 1 quilômetro	1	2	3
h) Andar vários quarteirões	1	2	3
i) Andar um quarteirão	1	2	3
j) Tomar banho ou vestir-se	1	2	3

4- Durante as últimas 4 semanas, você teve algum dos seguintes problemas com seu trabalho ou com alguma atividade regular, como conseqüência de sua saúde física?

	Sim	Não
a) Você diminui a quantidade de tempo que se dedicava ao seu trabalho ou a outras atividades?	1	2
b) Realizou menos tarefas do que você gostaria?	1	2
c) Esteve limitado no seu tipo de trabalho ou a outras atividades.	1	2
d) Teve dificuldade de fazer seu trabalho ou outras atividades (p. ex. necessitou de um esforço extra).	1	2

5- Durante as últimas 4 semanas, você teve algum dos seguintes problemas com seu trabalho ou outra atividade regular diária, como conseqüência de algum problema emocional (como se sentir deprimido ou ansioso)?

	Sim	Não
a) Você diminui a quantidade de tempo que se dedicava ao seu trabalho ou a outras atividades?	1	2
b) Realizou menos tarefas do que você gostaria?	1	2
c) Não realizou ou fez qualquer das atividades com tanto cuidado como geralmente faz.	1	2

6- Durante as últimas 4 semanas, de que maneira sua saúde física ou problemas emocionais interferiram nas suas atividades sociais normais, em relação à família, amigos ou em grupo?

De forma nenhuma	Ligeiramente	Moderadamente	Bastante	Extremamente
1	2	3	4	5

7- Quanta dor no corpo você teve durante as últimas 4 semanas?

Nenhuma	Muito leve	Leve	Moderada	Grave	Muito grave
1	2	3	4	5	5

8- Durante as últimas 4 semanas, quanto a dor interferiu com seu trabalho normal (incluindo o trabalho dentro de casa)?

De maneira alguma	Ligeiramente	Moderadamente	Bastante	Extremamente
1	2	3	4	5

9- Estas questões são sobre como você se sente e como tudo tem acontecido com você durante as últimas 4 semanas. Para cada questão, por favor dê uma resposta que mais se aproxime de maneira como você se sente, em relação às últimas 4 semanas.

	Todo tempo	A maior parte do tempo	Uma boa parte do tempo	Alguma parte do tempo	Uma pequena parte do tempo	Nunca
a) Quanto tempo você tem se sentindo cheio de vigor, de vontade, de força?	1	2	3	4	5	6
b) Quanto tempo você tem se sentido uma pessoa muito nervosa?	1	2	3	4	5	6
c) Quanto tempo você tem se sentido tão deprimido que nada pode anima-lo?	1	2	3	4	5	6
d) Quanto tempo você tem se sentido calmo ou tranqüilo?	1	2	3	4	5	6
e) Quanto tempo você tem se sentido com muita energia?	1	2	3	4	5	6
f) Quanto tempo você	1	2	3	4	5	6

tem se sentido desanimado ou abatido?						
g) Quanto tempo você tem se sentido esgotado?	1	2	3	4	5	6
h) Quanto tempo você tem se sentido uma pessoa feliz?	1	2	3	4	5	6
i) Quanto tempo você tem se sentido cansado?	1	2	3	4	5	6

ANEXO 3 - AVALIAÇÃO DA SAÚDE BUCAL GERIÁTRICA (GOHAI)

Nome:_____ Aluno:_____

Nos últimos três meses, qual a freqüência com que o senhor ou a senhora:
Assinalar apenas um quadradinho em cada pergunta

PERGUNTA	Sempre	Às vezes	Nunca
1. Limitou o tipo e quantidade de alimentos que come por causa de problemas com seus dentes ou próteses?			
2. Teve dificuldade em morder ou mastigar certos alimentos como carne firme ou maçãs?			
3. Foi capaz de engolir confortavelmente?			
4. Percebeu que seus dentes ou próteses o (a) impediram de falar como gostaria?			
5. Foi capaz de comer qualquer coisa sem se sentir desconfortável?			
6. Evitou contato com as pessoas por causa das condições de seus dentes e gengivas ou próteses?			
7. Sentiu-se contente ou feliz com a aparência de seus dentes e gengivas ou próteses?			
8. Precisou usar medicações para aliviar dor ou desconforto relacionados à sua boca?			
9. Aborreceu-se ou teve preocupações a respeito de problemas com seus dentes, gengivas ou próteses?			
10. Sentiu-se nervoso (a) por causa de problemas com seus dentes, gengivas ou próteses?			
11. Sentiu-se desconfortável comendo diante de pessoas por causa de seus dentes, gengivas ou próteses?			
12. Sentiu seus dentes ou gengivas sensíveis ao quente, ao frio ou aos doces?			

ANEXO 4 - ESCALA DE ESTRESSE PERCEBIDO (PSS)

Nome:_____ Aluno:_____

Itens e instruções para aplicação

As questões nesta escala perguntam sobre seus sentimentos e pensamentos durante o último mês. Em cada caso, será pedido para você indicar o quão freqüentemente você tem se sentido de uma determinada maneira. Embora algumas das perguntas sejam similares, há diferenças entre elas e você deve analisar cada uma como uma pergunta separada. A melhor abordagem é responder a cada pergunta razoavelmente rápido. Isto é, não tente contar o número de vezes que você se sentiu de uma maneira particular, mas indique a alternativa que lhe pareça como uma estimativa razoável. Para cada pergunta, escolha as seguintes alternativas:

Neste último mês, com que frequencia...	Nunca	Quase nunca	Às vezes	Quase sempre	Sempre
1. Você tem ficado triste por causa de algo que aconteceu inesperadamente?					
2. Você tem se sentido incapaz de controlar as coisas importantes em sua vida?					
3. Você tem se sentido nervoso e “estressado”?					
4. Você tem tratado com sucesso dos problemas difíceis da vida?					
5. Você tem sentido que está lidando bem as mudanças importantes que estão ocorrendo em sua vida?					
6. Você tem se sentido confiante na sua habilidade de resolver problemas pessoais?					
7. Você tem sentido que as coisas estão acontecendo de acordo com a sua vontade?					
8. Você tem achado que não conseguiria lidar com todas as coisas que você tem que fazer?					
9. Você tem conseguido controlar as irritações em sua vida?					
10. Você tem sentido que as coisas estão sob o seu controle?					
11. Você tem ficado irritado porque as coisas que acontecem estão fora do seu controle?					
12. Você tem se encontrado pensando sobre as coisas que deve fazer?					
13 . Você tem conseguido controlar a maneira como gasta seu tempo?					
14. Você tem sentido que as dificuldades se acumulam a ponto de acreditar que não pode suportá-las?					

ANEXO 5 - ESCALA DE DEPRESSÃO GERIÁTRICA (GDS-15)

Nome:_____
Aluno:_____

Pergunta	SIM	NÃO
1. Você está satisfeito com a sua vida?		
2. Você deixou de lado muitos de suas atividades e interesses?		
3. Você sente que sua vida está vazia?		
4. Você sente-se aborrecido com freqüência?		
5. Está você de bom humor na maioria das vezes?		
6. Você teme que algo de ruim lhe aconteça?		
7. Você se sente feliz na maioria das vezes?		
8. Você se sente freqüentemente desamparado?		
9. Você prefere permanecer em casa do que sair e fazer coisas novas?		
10. Você sente que tem mais problemas de memória que antes?		
11. Você pensa que é maravilhoso estar vivo?		
12. Você se sente inútil?		
13 . Você se sente cheio de energia?		
14. Você sente que sua situação é sem esperança?		
15. Você pensa que a maioria das pessoas estão melhores do que você?		
Pontuação máxima de GDS-15 = 15 pontos		

ANEXO 6 – NORDIC OROFACIAL TEST – SCREENING (NOT-S)

Nordic Orofacial Test - Screening NOT-S

O NOT-S foi desenvolvido por Merete Bakke, Copenhagen; Birgitta Bergendal, Jönköping; Anita McAllister, Linköping; Lotta Sjögreen, Göteborg; and Pamela Åsten, Oslo; com a ajuda da Associação Nórdica de Disfunção e Saúde Oral, NFC.

Esta avaliação está disponibilizada no site **www.mun-h-center.se.**

Deve ser utilizado com o manual ilustrado que pode ser pedido através da loja virtual ou do telefone **+46 31 750 92 00.**

Nordic Orofacial Test NOT-S – exame

O NOT-S é usado quando um paciente tem dificuldade para falar, mastigar ou engolir.

A seção de anamnese é conduzida como uma entrevista estruturada. O examinador faz a pergunta, explica, e faz perguntas adicionais quando necessário, interpreta a resposta e preenche o questionário.

A entrevista do NOT-S contém seis sessões: Função Sensorial, Respiração, Hábitos, Mastigando e Engolindo, Salivação e Secura da Boca (I-VI).

O exame do NOT-S contém seis sessões: Face em Repouso, Respiração Nasal, Expressão Facial, Músculos Mastigatórios e Função Mandibular, Função motora oral e Fala (1-6).

O manual ilustrado deve ser utilizado durante o exame.

País _____

Fonoaudiólogo Dentista Médico Fisioterapeuta Outros

Examinador ☐ ☐ ☐ ☐ ☐ _____

Data do exame ____/____/_____

Data de nascimento ____/____/_____ ♀ ☐ ♂ ☐

Nome:_____

Primeiro Diagnóstico Médico (especificar somente um):

_____

Código de diagnóstico (ICD-10):

_____

Posição durante o exame ☐ Sentado ☐ Deitado

Posição da cabeça quando sentado ☐ Normal (reta e vertical) ☐ Outra

Respostas com ajuda de outra pessoa ☐

CÓDIGO PARA AVALIAÇÃO: O ESCORE TOTAL DO NOT-S PODE VARIAR DE 0 A 12	X = SIM 0 = NÃO ---- = NÃO AVALIADO	SE EM UMA SESSÃO HOUVER UMA OU MAIS RESPOSTAS X, COLOQUE O ESCORE 1 NA CAIXA DA COLUNA À DIREITA

NOT-S	ESCORE TOTAL ☐ ☐

		Pontuação
I	**Função Sensorial** **A**- Escovar seus dentes faz você ter ânsia de vômito? Isso acontece muitas vezes? ☐ Desconforto óbvio como enjôo, vômito, ou refluxo – aumento de sensibilidade. **B**- Você coloca tanta comida na boca que fica difícil de mastigar? Isso acontece todo dia? ☐ Não consegue perceber quando a boca está cheia – diminuição da sensibilidade.	☐
II	**Respiração** **A**- Você respira normalmente ou usa algum suporte para respirar? ☐ CPAP, Oxigênio, respirador, outros. **B**- Você ronca muito quando dorme? Isso acontece toda noite? ☐ Ronco ou apnéia; não se aplica a sintomas de asma ou alergias.	☐
III	**Hábitos** **A**- Você roe as unhas, ou chupa os dedos ou outros objetos todos os dias? ☐ Hábito de sucção de chupeta e dedos não é avaliado abaixo dos 5 anos. **B**- Você chupa ou morde seus lábios, língua ou bochechas todos os dias? ☐ **C**- Você aperta forte seus dentes ou os range durante o dia? ☐	☐
IV	**Mastigação e Deglutição** **A**- Não come com a boca ☐ Tubo nasogástrico, gastrostomia, outros – pular perguntas B-E **B**- Você acha difícil comer alimentos com certa consistência (mais duros)? ☐ Excluir alergias e dietas especiais como vegetarianismo e intolerância ao glúten **C**- Você demora mais do que 30 minutos para comer uma refeição completa? ☐ **D**- Você engole grandes pedaços sem mastigar? ☐ **E**- Você costuma tossir durante as refeições? ☐ Acontece em quase todas as refeições.	☐
V	**Salivação** **A** - Você fica com saliva no canto da boca ou escorre saliva para o queixo todos os dias? ☐ Tem que limpar a boca, não se aplica enquanto dorme.	☐
VI	**Secura da boca** **A**- Você precisa beber algum tipo de líquido para conseguir comer uma torrada? ☐ **B**- Você sente dor na mucosa (pele) da boca ou na língua? ☐ Dor recorrente ou sensação de formigamento pelo menos uma vez na semana; não se aplica a dor de dente ou vesículas (lesões bolhosas) na boca.	☐
Nome:	ENTREVISTA NOT-S	Soma:

1	**Face em repouso** **Observe a figura por um minuto, começando agora.** Observação de um minuto. Avalie A-D Figura 1 **A**- Assimetria ..... ☐ (considerar tanto osso quanto tecidos moles) **B**- Desvio da posição dos lábios ..... ☐ (boca aberta ou outros desvios em mais de 2/3 do tempo) **C**-Desvio da posição da língua ..... ☐ (ponta da língua visivelmente entre os dentes em mais de 2/3 do tempo) **D**- Movimentos involuntários ..... ☐ (repetidos movimentos involuntários da face)	☐
2	**Respiração nasal** Figura 2 **A**- Feche a boca e faça 5 profundas inspirações pelo nariz (cheire) ☐ Não consegue fazer 5 inspirações sucessivas pelo nariz. Se o paciente não consegue fechar os lábios, o paciente ou o examinador pode, manualmente ajudar a manter os lábios fechados. Não avaliar se o paciente estiver resfriado	☐
3	**Expressão facial** Figura 3 **A**- Feche os olhos bem forte ..... ☐ Os músculos faciais não estão ativados, esteticamente, em simetria. Figura 4 **B**- Mostre seus dentes ..... ☐ Os lábios e os músculos faciais não são simetricamente ativados então os dentes são facilmente visíveis. Figura 5 **C**- Tente assobiar/soprar ..... ☐ Não consegue fazer biquinho com os lábios simetricamente.	☐
4	**Músculos mastigatórios e função mandibular** Figura 6 **A**- Morda forte com seus dentes do fundo ..... ☐ Não se pode registrar atividade simétrica quando dois dedos ficam pressionando os músculos mandibulares (m. masseter dos dois lados). Figura 7 **B**- Abra a boca o máximo que conseguir ..... ☐ Não consegue abrir a boca numa distância correspondente à largura do dedo indicador e do dedo do meio da mão esquerda do paciente. Se os dentes anteriores estiverem ausentes, use a largura de três dedos (indicador, dedo do meio e anelar) como medida.	☐
5	**Função motora oral** Figura 8 **A**- Ponha sua língua para fora o quanto puder ..... ☐ Não consegue alcançar a borda do vermelhão dos lábios com a ponta da língua. Figura 9 **B**- Lamba os seus lábios ..... ☐ Não consegue usar a ponta da língua para molhar os lábios e não consegue alcançar os cantos da boca. Figura 10 **C**- Encha sua boca de ar e segure por pelo menos 3 segundos ... ☐ Não consegue encher a boca de ar sem vazamento de ar ou sem fazer barulhos. Figura 11 **D**- Abra a boca bem grande e diga ah-ah-ah! ..... ☐ Não se nota elevação da úvula e o palato mole é observado.	☐

6	**Fala**		
	A- Não fala	☐	
	Pular perguntas B-C.		
	Figura 12 **B**- Conte alto até 10	☐	
	A fala não é clara com um ou mais sons indistinguíveis ou nasalidade anormal.		
	Abaixo de 5 anos de idade exclua sons de R, S da avaliação.		
	Figura 13 **C**- Diga PATAKA, PATAKA, PATAKA	☐	
	Não avalie este item em crianças menores de 5 anos de idade.		☐
Nome:	EXAME NOT-S	Soma:	

ANEXO 7 - COMITÊ DE ÉTICA EM PESQUISA

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 **"Associação entre saúde bucal, qualidade de vida, níveis salivares de cortisol e alfa-amilase em idosos institucionalizados"**, protocolo nº 134/2011, dos pesquisadores Polyanne Junqueira Silva Andresen Strini e Maria Beatriz Duarte Gavião, satisfaz as exigências do Conselho Nacional de Saúde - Ministério da Saúde para as pesquisas em seres humanos e foi aprovado por este comitê em 10/01/2012.

The Ethics Committee in Research of the School of Dentistry of Piracicaba - State University of Campinas, certify that the project **"Associação entre saúde bucal, qualidade de vida, níveis salivares de cortisol e alfa-amilase em idosos institucionalizados"**, register number 134/2011, of Polyanne Junqueira Silva Andresen Strini and Maria Beatriz Duarte Gavião, 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 01/10/2012.

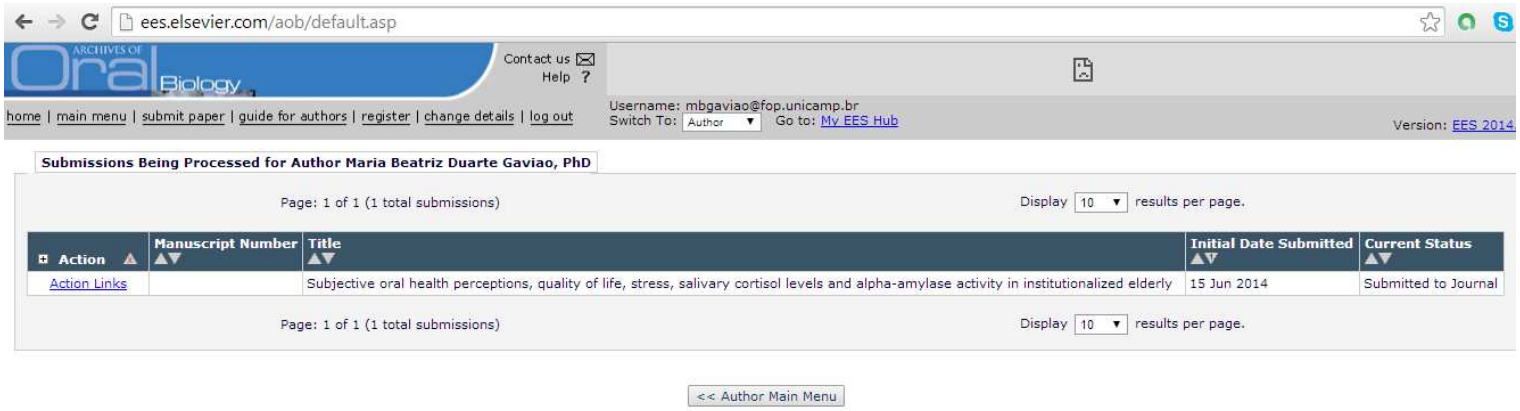
Profa. Dra. Livia Maria Andaló Tenuta
Secretária
CEP/FOP/UNICAMP

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.

www.fop.unicamp.br/cep/sistema/certificado.php?Protocolo=134/2011&id=1522&Passo=2&DataPar=2012-01-10 1/1

ANEXO 8 - COMPROVANTE DE ENVIO À REVISTA



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Action	Manuscript Number	Title	Initial Date Submitted	Current Status
Action Links		Subjective oral health perceptions, quality of life, stress, salivary cortisol levels and alpha-amylase activity in institutionalized elderly	15 Jun 2014	Submitted to Journal

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