

# The dentition of the elderly and the food implications

## A dentição do idoso e as implicações alimentares

## La dentición de los ancianos y las implicaciones alimentarias

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### Abstract

Aging causes changes in all aspects of life, being characterized by a change in social, mental and bodily functions. In the Stomatoglossognathic System, it is possible to observe significant changes, starting with the preparatory phase of swallowing and the chewing function, resulting from the loss of teeth; which is responsible for crushing food, formation of food bolus and loss of muscle tone that are responsible for masticatory movements. This research observed how dental changes in the elderly can affect their diet. A cross-sectional observational study was carried out, with a sample of 33 elderly people attending the Evangelical Assembly of God Church in Alagoas, in the municipality of Coqueiro Seco. A collection instrument was applied, which had questions based on the MBGR and the EAT-10 scale. The results showed that there is a large number of elderly people who use dental prosthesis, reflecting on the performance of masticatory function, choice of food consistency and socio-emotional aspects. Dental prostheses, when well adapted, can generate a significant gain for the patient, allowing a diet that does not interfere with their social posture, nor with their emotional issues.

**Keywords:** Chewing; Dentition; Elderly; Dental prosthesis

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#### Authors' contributions:

MSM: Study design, data collection and preparation.

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## Resumo

O envelhecimento acarreta mudanças em todos os aspectos da vida, sendo caracterizado por uma modificação nas funções sociais, mentais e corporais. No Sistema Estomatoglossognático, é possível observar alterações significativas, começando pela fase preparatória da deglutição e da função de mastigação, decorrente da perda dos dentes, a qual é responsável pela trituração do alimento, formação do bolo alimentar e perda do tônus dos músculos que são responsáveis pelos movimentos mastigatórios. Esta pesquisa observou como as alterações dentárias em idosos podem repercutir na sua alimentação. Foi realizado um estudo observacional transversal, com amostra de 33 idosos frequentadores da Igreja Evangélica Assembleia de Deus em Alagoas, no município de Coqueiro Seco. Foi feita aplicação de um instrumento de coleta, o qual possuía perguntas baseadas no MBGR e na escala EAT-10. Os resultados mostraram que há um grande número de idosos que fazem uso de prótese dentária, refletindo na execução da função mastigatória, escolha da consistência alimentar e aspectos socioemocionais. As próteses dentárias, quando bem adaptadas, podem gerar um ganho significativo ao paciente, permitindo uma alimentação que não interfere na sua postura social, nem em suas questões emocionais.

**Palavras-chave:** Mastigação; Dentição; Idosos; Prótese dentária.

## Resumen

El envejecimiento provoca cambios en todos los aspectos de la vida, caracterizándose por un cambio en las funciones sociales, mentales y corporales. En el Sistema Estomatoglossognático, es posible observar cambios significativos, a partir de la fase preparatoria de la deglución y de la función masticatoria, resultantes de la pérdida de dientes; que se encarga de triturar los alimentos, formación de bolos alimenticios y pérdida de tono muscular que son responsables de los movimientos masticatorios. Esta investigación observó cómo las alteraciones dentales en los adultos mayores pueden afectar su alimentación. Se realizó un estudio observacional transversal, con una muestra de 33 ancianos asistentes a la Iglesia Evangélica Asamblea de Dios de Alagoas, en el municipio de Coqueiro Seco. Se aplicó un instrumento de recolección, el cual contó con preguntas basadas en el MBGR y la escala EAT-10. Los resultados mostraron que existe un gran número de ancianos que utilizan prótesis dental, reflexionando sobre el desempeño de la función masticatoria, elección de la consistencia de los alimentos y aspectos socioemocionales. Las prótesis dentales, bien adaptadas, pueden generar una ganancia importante para el paciente, permitiendo una alimentación que no interfiere con su postura social, ni con sus problemas emocionales.

**Palabras clave:** Masticar; Dentición; Mayores; Prótesis dental

## Introduction

One of the functions developed by the Stomatognathic System is chewing, which is observed by the incision, trituration and pulverization of the aliment, through the teeth. The most recommended chewing is one which contains equilibrium of the muscles functions, teeth and bones of this system, being realized in a bilateral alternating way<sup>1</sup>.

Aging causes changes in all aspects of the lives of the elderly, being characterized by a modification in social, mental, and bodily functions<sup>2</sup>.

In the Stomatoglossognathic System, it is possible to observe significant changes, starting with the preparatory phase of swallowing and the chew-

ing function, resulting from the loss of teeth, which is responsible for crushing food, formation of food bolus and loss of muscle tone that are responsible for masticatory movements. Furthermore, because of this loss in the strength function, chewing becomes slower and more precarious, since the tooth structure is not totally complete. It is well known that deglutition is closely linked to chewing; as the elderly have this function impaired, this will also generate an alteration in deglutition<sup>3</sup>.

The feeding process is an action that involves nutritional gains through the ingestion of food, although it is something more than that. Feed yourself is a way to obtain both pleasure and to reunite people, being a very important moment for many

cultures<sup>4</sup>. In addition to that, good nutrition is associated with the context in which the individual is inserted, which directly influences the food content that is offered to the person<sup>5</sup>.

Dentition is of vital importance for chewing, since teeth are responsible for food breakdown and bolus formation. In the aging process, tooth loss occurs and, consequently, there is a loss in phonation and in the feeding of elderly people, with a lack of gain of nutritional components due to the masticatory deficiency that has repercussions on swallowing, requiring the use of dental prosthesis, which often bothers the elderly<sup>6</sup>.

The objective of the dental prosthesis is helping the elderly through the feeding process, favoring the ingestion of food that they could not eat before and to attain a balance in the Stomatognathic System. However, it is important to have a good adaptation of the artificial teeth, because uncomfortable prosthesis tends to cause pain when chewing, bringing loss to the user and repercussions in many aspects of life, such as feeding and communication<sup>7</sup>.

Moreover, it is common knowledge that in the aging process occurs an efficiency decrease in the functions found on the Stomatognathic System, being that part of life a progressive process in which occurs some modifications on the individual's body, with lasting effects on the chewing and feeding process<sup>3</sup>. With that modification in mind, some authors describe that the elderly tend to search for an easy to chew diet<sup>8</sup>. Regarding the diet, there is also a need for quality in what is offered and in which way the food is shattered and reaches the digestive tract<sup>9</sup>.

This research investigated the relationship between the teeth and swallowing disorders, with repercussions on the feeding process, in an attempt to favor the development of strategies and actions to optimize the elderly feeding and minimize probable dietary impacts.

Therefore, this research observed how dental changes in the elderly can affect their diet.

## Material and methods

A cross-sectional observational study was carried out, with endorsement in opinion number 5.169.975 and CAAE: 35305120.9.0000.5011. The sample of the research was composed by 33 elderly people, from the age of 60 years and up, of

both genders, attending the Assembleia de Deus in Alagoas, in the municipality of Coqueiro Seco, and who reside in the city. Were excluded, legally incapable individuals, due to diagnosed neurological and/or psychiatric issues. As inclusion criteria, established individuals aged sixty years or older. Of the 33 participants, 22 used dental prostheses.

At first, an individual approach was carried out by the researchers to explain the objectives, justification, hypothesis, risks and benefits about the research to the elderly who wished to take part in the study. Those who agreed to participate in the study were asked to sign the TCLE (Informed Consent Form) in both copies, in accord with the resolution 466/12 of the National Health Council (CNS), in which were described all the details on how the study would proceed and making clear that they could give up or continue with the research at any moment without suffering any kind of repercussion. After this, the researchers would start collecting the data.

The meetings were realized in two ways, according to respondents' preferences, on days of reunions in church or in their own residences, according to their solicitations and scheduling. It is important to note that the elderly who chose to participate in their own home were assisted with the biosecurity care of the researchers, regarding all the measures and precautions due to the COVID-19.

After signing the Informed Consent Form (TCLE), a conversation was held with each participant and the data collection instrument on dental aspects, chewing, and food implications (APPENDIX A) was applied, which was based on the items of the MBGR<sup>10</sup>, protocol created to enable the evaluation of aspects related to orofacial motricity, aiming to assess the entire stomatognathic system, and the Eating Assessment Tool (EAT-10)<sup>11</sup> evaluation scale, which seeks to perform a self-assessment of food-related aspects and screen for signs and symptoms of dysphagia.

The adaptation, construction and application of the collecting instrument, helped in the achievement of these elderly feeding aspects. It became clear that, when using the instrument, each participant had the free will to answer or not the questions.

The data obtained were arranged in an Excel spreadsheet, which was then followed with a quantitative analysis, using the software *Jamovi Version 2.2.5.0* to observe the relevance of the results, considering that  $p \leq 0.05$ .

Of the elderly participants in the study, only 22 used some type of dental prosthesis, either a full prosthesis due to the lack of all dental elements, or a partial prosthesis in which only some teeth were missing. The partial prostheses were used to address the absence of several or just a few teeth, ranging from central incisors to molars. Furthermore, those who used the full prosthesis had a removable type.

## Results

The sample consisted of 33 participants, with no exclusions. In order to better understand the characteristic findings of dental and dietary aspects, a table (Table 1) was structured to show the results quantitatively.

**Table 1.** Dental and Feeding Characteristics

DENTAL AND FEEDING CHARACTERISTICS	N (%)
TOOTH LOSS	
YES	32 (96,96)
NO	1 (3,04)
USE OF DENTAL PROSTHESIS	
YES	22 (66,67)
NO	11 (33,33)
FEEDING REPERCUSSIONS	
YES	25 (75,75)
NO	8 (24,25)
BRUSHING	
≤ 2	13 (39,39)
≥ 3	20 (60,60)
CHEWING	
ADEQUATE	3 (9,09)
INADEQUATE	30 (90,91)
PREFERENCE FOR CONSISTENCY	
YES	18 (54,55)
NO	15 (45,45)

Legend: N- absolute number of participants; % percentile value; p significant for values lower than 0.05.  
Source: from the authors.

Regarding dental prostheses, it is noteworthy that 9 elderly individuals (N= 27.28%) reported using a total prosthesis because they have no teeth in their oral cavity, while 12 (N=36.37%) use partial dental prostheses. Additionally, 1 (N=3.03%) elderly participant reported using both types of prostheses.

By characterizing the use of dental prostheses, it was possible to describe the specificities of masticatory function, as only 3 participants (N=9.09%) have adequate mastication, while 30 participants (N=90.91%) have inadequate mastication, with

lateral cutting of food, unilateral chewing predominance, lingual use to aid in food crushing, pain during chewing, and noise in the temporomandibular joint (TMJ) being notable.

Table 2 described the relationship between teeth and those who use dental prostheses, with the majority using artificial teeth to replace missing ones and, consequently, improving dietary and aesthetic issues. However, the sample size was insufficient to answer this association, and a larger number of participants is necessary for it to be representative.

**Table 2.** Relationship between teeth and use of dental prosthesis.

USE OF PROSTHESIS	DENTITION		total	p value
	ABSENCE OF ELEMENTS (N)	PRESENCE OF ELEMENTS (N)		
NO	1	10	11	0.151
YES	0	22	22	

Legend: N- absolute number of participants; p significant for values lower than 0.05.  
Source: from the authors.

Table 3 shows a greater presence of dietary repercussions in participants using dental prostheses, with a notable sensation of food getting stuck in the throat, choking, vocal alteration, the use of liquids associated with food, and odynophagia. Of these participants who reported symptoms related to dietary repercussions, 6 elderly individuals (N=31.57%) reported difficulty swallowing and/or the sensation of food getting stuck in the throat. In

relation to choking, only 6 participants (N=31.57%) mentioned the presence of this symptom while eating. When asked about vocal perception after ingesting food, 3 (N=15.78%) reported that their voice changes from its usual sound after eating. Regarding the use of liquids in conjunction with food, 4 participants (N=21.05%) cited needing liquids to aid in food ingestion.

**Table 3.** Relationship between feeding repercussions and use of dental prosthesis

USE OF PROSTHESIS	FEEDING REPERCUSSIONS		total	p value
	FEEDING DIFFICULTIES (N)	ABSENCE OF DIFFICULTIES (N)		
NO	3	8	11	0.774
YES	5	17	22	

Legend: N - absolute number of participants; p-value significant for values less than 0.05.  
Source: from the authors.

Another interesting aspect analyzed was how chewing and its alterations can reflect on the socioemotional aspects of the elderly. Among the 14 participants who mentioned some type of feeding difficulty, 10 (N=30.30%) reported that their chewing influences both the social and emotional spheres, as they prefer to avoid environments with unfamiliar people, some reported feeling embarrassed or afraid of choking, and others reported irritability due to chewing difficulties.

Regarding dietary preferences, some elderly individuals did not understand the description of consistencies due to their level of education, and it was necessary to provide examples of representative foods. The pasty consistency was the most cited, chosen by 9 elderly individuals (N=50%) as their preferred consistency.

**Table 4.** Preference for food consistency and use of dental prosthesis

USE OF PROSTHESIS	PREFERENCE FOR FOOD CONSISTENCY		total	p value
	NO (N)	YES (N)		
NO	5	6	11	0.767
YES	10	12	22	

Legend: N - absolute number of participants; p-value significant for values less than 0.05.  
Source: from the authors.

## Discussion

From the results obtained, it was possible to observe that dental absence is a common issue in the studied population due to the natural changes caused by aging that have an impact on the elderly's diet. Due to the COVID-19 pandemic, there was a limitation regarding the number of participants in the current research.

The modifications observed in the dental arch of the elderly are also caused by factors ranging from the decrease of nutrients that are important for their preservation to factors related to oral health. The same author, in his research, described that 86.7% of the elderly had dental absence, although some of them had poorly adapted prostheses and lower chewing performance. This data corroborates the findings of this study regarding the prevalence of elderly individuals who have dental absence and use prostheses, although not all elderly participants in the study presented this condition. This factor may be related to the social context, as the cost of making a prosthesis can often add to the existing expenses for the elderly person who needs more medication and accessories to assist in their independence. Furthermore, there seems to be a lack of awareness about the importance of good dental conservation and the role of teeth in effective chewing, emphasizing the need for better oral health care.

In a study about the impact of complete dentures on the elderly, it was observed that the brushing habit in this population is done two times or less per day and, when it does occur, the appropriate product or brush for oral hygiene is not used. Contrary to what was found in the current study, where more than half of the elderly reported performing oral hygiene three times or more per day, however, using only water, it is evident that there is not adequate oral hygiene. This reinforces the disregard for oral hygiene, although there is frequency, there is no quality in brushing.

With aging, older adults end up seeking compensations to make up for the lack of dental elements, when they are missing, or modifying their chewing patterns due to difficulties that dental prostheses may bring when they are poorly adapted<sup>14</sup>. Other studies describe that individuals with natural teeth have better quality of life compared to those who use some type of dental prosthesis. In this research, it was possible to verify that most of the

older adults presented inadequate chewing patterns, reinforcing the compensations for chewing due to missing teeth or poorly adapted prostheses<sup>15</sup>. It is understood that difficulty in chewing can affect food and consistency choices, reinforcing human adaptability in an attempt to maintain their diet.

Regarding the report of some elderly participants in the study regarding the perception of vocal changes, literature evidences the correlation between vocal modifications in elderly individuals and the risk of dysphagia during feeding<sup>16</sup>. Another study extends this correlation to the presence of underlying diseases<sup>17</sup>. However, the sample of the current research did not mention any dysphagic symptoms during the collection of relevant information for the study, although the identification of voice changes after feeding was reported by some participants.

Considering the social aspects reported by some of the participants, the literature shows that there were no complaints regarding the socialization of those who use artificial dentition<sup>7,13</sup>. However, in the present study, reports were found that specify social and emotional impacts determined by the use of dentures in the elderly. It was described that they had a preference for eating with their family, avoiding external environments and being in the presence of people they do not interact with on a daily basis.

The correlation between food consistency preference and denture use revealed that elderly individuals showed a preference for a paste-like consistency, as it does not require the execution of masticatory phases, making it an easier item in the feeding process. This statement was also cited by other authors. Another justification found in the literature for the preference for pasty foods corresponds to the reduction of painful symptoms during chewing, confirming what was found in this research. Thus, the permanent search for adaptation of the organism to minimize pain and maintain essential functions is reinforced.

## Conclusion

The results found in this study describe that dental alterations in the elderly, from their absence to the use of poorly adapted prostheses, can interfere with masticatory function regarding the starting point of the cut, unilateral masticatory predominance, impacting on food preferences

for pasty consistency and the social habits of the elderly, who prefer to avoid eating among individuals who are not part of their daily life, negatively contributing to the elderly's social isolation.

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## APPENDIX A - DATA COLLECTION INSTRUMENT ON DENTAL, MASTICATORY, AND FOOD IMPLICATIONS

(Adapted from Source: Genaro KF, Berretin-Felix, Rehder MIBC, Marchesan IQ. Orofacial Myofunctional Evaluation - MBGR Protocol. Rev. CEFAC. 2009, 11(2): 237-255; Gonçalves MIR, Remaili CB, Behlau M. Cultural equivalence of the Brazilian version of the Eating Assessment Tool-EAT-10. CoDAS. 2013. 25(6): pp 601-604)

Number: \_\_\_\_\_

Date of birth: \_\_\_\_\_

Date of evaluation: \_\_\_\_\_

### Use of dental prosthesis(s):

Yes( ) No( )

### Missing teeth:

Yes( ) No( )

### Dental condition:

Good( ) Regular( ) Poor( )

### Tooth brushing habit:

After meals( ) Twice a day only( ) Other( ) Prefer not to answer( )

### ***Chewing***

Adequate( ) Habitual chewing  
Incision:(0) anterior (1) lateral (1) other

Trituration:  
(0) posterior teeth (0) efficient  
(1) anterior teeth (1) inefficient (1) with tongue

### Ask the research participant

- Preferred chewing side:  
( ) right and left (1) right (1) left  
(0) do not know Prefer not to answer( )

-Pain when chewing: (0) absent Prefer not to answer( )

-Noise in the TMJ: (0) absent (1) right (1) left  
(1) right (1) left

Observations: \_\_\_\_\_

### Ask the patient participant

-Difficulty swallowing: (0) no (1) yes (describe):  
( ) Prefer not to answer

Observations: \_\_\_\_\_

### Food consistency preference:

( ) I do not have ( ) Solid ( ) Soft ( ) Liquid ( ) Prefer not to answer  
If you have a preference, why do you prefer to eat foods of this consistency?

### How is the mealtime experience?

( ) At the table with family ( ) At a different time ( ) Prefer not to answer







**Is there any food that you would like to eat but do not eat?**

What? \_\_\_\_\_ ( ) Prefer not to answer

**Is there anything that bothers you when you are eating?**

What? \_\_\_\_\_

**Is eating pleasurable?**

Why? \_\_\_\_\_

**Do you think mealtime is a time to gather friends and family?**

( ) Yes ( ) No ( ) Prefer not to answer

**Do you feel like the food is stuck in your throat when you swallow?**

( ) Yes ( ) No ( ) Prefer not to answer

**Have you ever avoided eating certain foods in front of others because of fear or embarrassment of choking?**

( ) Yes ( ) No ( ) Prefer not to answer

**Do you feel like your voice sounds different after eating?**

( ) Yes ( ) No ( ) Prefer not to answer

**Do you feel comfortable eating in places with other people?**

( ) Yes ( ) No ( ) Prefer not to answer

**Do you need to drink any liquids, such as water or juice, to be able to swallow?**

( ) Yes ( ) No ( ) Prefer not to answer

**Do you choke when you eat?**

( ) Yes ( ) No ( ) Prefer not to answer

**Does this happen more often when you eat what type of food?**

( ) Solid ( ) Liquid ( ) Soft

**Do you get annoyed when chewing or swallowing food?**

( ) Yes ( ) No ( ) Prefer not to answer

**If so, why?** \_\_\_\_\_