

COMPARATIVE ANALYSIS ON THE IMPACT OF AGE ON OCCURRENCE OF ORAL PATHOLOGIES – PREGERIATRIC AGE VERSUS GERIATRIC AGE

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Abstract. Despite the fact that saliva production decreases significantly as a result of the physiological aging process, aging that occurs as a result of increasing age and the individual's inclusion in the geriatric age is accompanied by the appearance of systemic pathologies for which the geriatric patient is forced to be treated with medications that, as a side effect of systemic use, also have a reduction in saliva production. The aim of this study involves analyzing the data collected from the clinical examination of geriatric patients versus data collected from pre-geriatric patients, to find out if and how age affects the appearance of these oral pathologies. The aim of this study is to analyze how age of patient affects the appearance of soft tissue and hard tissue lesions in oral cavity, analyzing the results of these pathologies, results that are expressed in the number of remaining natural teeth in the oral cavity, in number of endodontically treated teeth, in presence or not of total partial dentures or fixed dentures. A total of 61 patients: 26 of geriatric age and 35 of pre-geriatric age, were evaluated during oral examination for the presence of oral soft tissue and hard tissue pathologies, also expressed by the number of remaining natural teeth in the oral cavity, in number of endodontically treated teeth, in presence or not of total partial dentures or fixed dentures. Oral cavities were examined in order to evaluate previous dental treatments. Photography of oral pathologies were performed also. Regardless of pre-geriatric and geriatric age, endodontic treatment occurs in almost 70% of cases and their absence in 30% of cases included in the study. Endodontic treatments with the aim of preserving the natural tooth has the highest value in pre-geriatric patients, expressed in the value of about 50% of the number of patients included with 1 or more endodontic treatments in the same oral cavity. For geriatric age, 2% of patients are classified in category with the largest number of teeth in the oral cavity, 26-32 teeth, for non-geriatric age, patients with 0-15 teeth in oral cavity are about 10%. The combination of these figures indicates an increasing trend in population that will pass to total edentulism in geriatric age. The presence of removable prostheses for pre-geriatric age in the amount of 7%, as opposed to geriatric age where this value is 18%. It is clear that the pre-geriatric age tends towards fixed prosthetics, while the geriatric age tends towards removable prosthetics. The tendency for prosthetics for both the pre-geriatric and geriatric ages appears in the ratio 1:1. The combination of figures on the minimum amount of natural teeth in the oral cavity in the pre-geriatric age and on the maximum amount of natural teeth in the oral cavity in the geriatric age shows an increasing trend in the population that will go into total edentulism in the geriatric age; a tendency that appears from the pregeriatric age. Patients of the pre-geriatric age present with more teeth treated endodontically compared to patients of the geriatric age.

Keywords: dental prosthetics, geriatric, natural teeth, oral hygiene, pre-geriatric, oral health

1. INTRODUCTION

The evolution and aggravation of periodontal pathologies with age leads to the exposure of parts of the tooth root in the oral cavity, exposing these parts to the destructive cariogenic attacks of oral bacteria in the patient's saliva [1,2]. In addition to systemic pathologies that co-associate each other, there are also treatments for pathologies that co-associate the previously manifested systemic pathology [2-5].

The geriatric age is more susceptible to chronic systemic diseases, the cure of which requires the regular intake of certain medications [3,6-8]. These medications, which are listed in almost 500 different types, cause a significant decrease in the production of salivary flow [1,7,9].

Statistical data show that the number of natural teeth remaining in the oral cavity has increased in the geriatric population, and these teeth are even treated, indicating an increase in dental care or preventive dental care [3,10-12]. This data has importance compared to the approach of the geriatric population to dental therapeutic treatment, but compared to periodontal treatments, it is worth noting that the level of bone loss in the remaining natural teeth in the oral cavity of the geriatric patient should be considered [7,13]. The postulate that the prevalence of periodontal diseases is a function of the patient's age has not been proven for periodontal lesions, since periodontal diseases can appear at different ages in the patient, but the prognosis of a chronic periodontal disease appearing in adulthood is worse than this same chronic periodontal disease appeared in the geriatric age [1,14].

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In other words, the time of action of the bacterial plaque factor in the adult patient is much greater than in the geriatric patient, we are talking about a greater interval of years [15-17]. The severity of periodontal pathology will be presented at the highest level of bone loss in these patients [3,6,16]. Continuing in this logic, it seems that even the loss of attachment should still be at a higher level, aggravated, than the level of bone loss in teeth affected by periodontal pathologies [17]. Geriatric age is also closely related to the aging process, a process which affects both the microscopic and macroscopic levels of periodontal structures, starting with collagen and gingival epithelium until at attachment of collagen and periodontal ligament fibers to resorption lacunae in both cementum and bone of periodontally affected teeth [2,18-20].

The purpose of this study is to analyze how age affects the appearance of soft tissue and hard tissue lesions in the oral cavity, analyzing the results of these pathologies, results that are expressed in number of remaining natural teeth in the oral cavity, in number of endodontically treated teeth, in presence or not of total partial dentures or fixed dentures, as well as in presence of current oral pathologies in the cavity of the patients included in this study.

Age and the way the aging process affects the body's systems and consequently also the oral cavity, but also vice versa age and the way it affects the oral cavity and then the appearance or not of the pathologies of the different systems in the organism analyzed in this study, are two elements that are tried to be compared to each other, being analyzed in the framework of the numerical values of the possibly "quantitative" assessment of the oral status of geriatric patients versus pre-geriatric patients [3,21-24].

2. METHODOLOGY

The study collected data related to oral hygiene from a cross-sectional perspective. The study of this topic is based on the processing of data collected from patients previously agreed to be included in the study. The patients included in the study were patients presented to a Dental Clinic, with the purpose of emergency dental treatments or routine dental control, in the period May 2023 – December 2023 (8 months). The study was carried out on a total of 61 patients, of which 35 were pre-geriatric patients, and the rest 26 were geriatric patients.

Patient selection criteria:

- 1- Patients with age within specific pre-geriatric and geriatric age ranges were selected.
- 2- Patients randomly presented to a dental clinic for various dental treatments.
- 3- Patients who were willing and able to cooperate for accurate data collection,
- 4- Patients who agreed to be included in the evaluation after verbal consent.

The study is oriented around the collection of clinical data on dental pathologies in patients of pre-geriatric age and in patients of geriatric age, in order to compare the values encountered.

This study was approved by the Institutional Ethics Committee of Albanian University (02.06.2019), Tirana, Albania, according to national regulations.

3. RESULTS AND DISCUSSION

The study results are presented in tables 1-6 in accordance with the processing rules established previously specifically for this study. Table 1 shows the aggregated data of the distribution of patients depending on age and gender.

Table 1. Data on the demographic elements of the patients included in the study. The patient classification was carried out under the category of pre-geriatric patients and geriatric patients, also classified depending on gender.

Patients	Pre-geriatric age	Geriatric age	Total	Statistical data
Male	16 - 26%	14 - 23%	30 - 50%	Mean: 56.5 Variance: 54 SEM: 1.34
Female	29 - 48%	12 - 20%	31 - 50%	Mean: 55.16 Variance: 64.00 SEM: 1.43
Total	35 - 57%	26 - 43%	61 - 100%	SD: 5.8 SEM - 0.98 Standard Deviation: 2.5 SEM - 0.497
Statistical data				
Mean, \bar{x} : 50.57				
Variance, s^2 : 34.13				
Mean, \bar{x} : 62.88				
Variance, s^2 : 6.42				

Based on the data in Table 1 on the age and gender of the patients, it can be said that the average age of the pre-geriatric patients was 51 years and the average age of the geriatric patients was 62 years. Separated or classified by gender, the average age of men was 57 years and the average age of women was 55 years, regardless of the division into pre-geriatric age or geriatric age. Despite the fact that the patients included in the study were selected based on the criteria mentioned as the inclusion criteria in the materials and methods part of the study, it can be said that the report is almost 11 patients classified by gender and with average age but by gender almost the same 56 for men and 55 for women. The patient classification according to pre-geriatric and geriatric age remains in unequal percentages at 57% pre-geriatric age and 43% geriatric age [3,7,9,13].

Table 2. Distribution of patients based on the number of natural teeth in the oral cavity, according to sub-classifications 0-15 teeth, 16-25 teeth and 26-32 teeth and pre-geriatric or geriatric age.

Natural teeth	0-15 teeth	16-25 teeth	26-32 teeth	Total
Pre-geriatric age	6 - 10%	19 - 31%	10 - 16%	35 - 57%
Geriatric age	17 - 28%	8 - 13%	1 - 2%	26 - 43%
Total	23 - 38%	27 - 44%	11 - 18%	61 - 100%

Table 2 shows the data collected from the patients included in the study based on the number of natural teeth in the oral cavity, classified according to the categories of pre-geriatric age and geriatric age. Figure 1 shows the data of Table 2 on the distribution of patients included in the study depending on the number of natural teeth in the oral cavity, also classified according to the patient's age.

NUMBER OF NATURAL TEETH VERSUS AGE

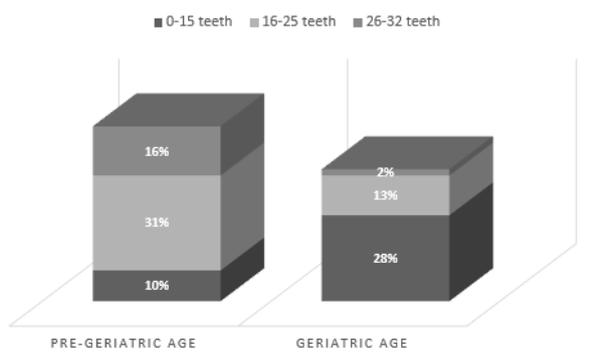


Figure 1. Graphic presentation of data of Table 2 about the distribution of patients based on the number of natural teeth in oral cavity and the specific age of the patient under the classification pre-geriatric age and geriatric age.

Based on the data in Table 2 and the graphic presentation of the same data in Figure 1, the trend of tooth loss in the oral cavity as a result of age is clearly visible. For the pre-geriatric age with 0-15 teeth in the oral cavity are about 10% of the patients included in the study, compared to the geriatric age where this value goes to 28%. For the classification with 16-25 natural teeth in the oral cavity, for the pre-geriatric age the value goes to 31% and for the geriatric age this value goes to the value of 13%. For the classification with 26-32 natural teeth remaining in the oral cavity for the pre-geriatric age, about 16% of the patients included in the study and 2% of the patients for the geriatric age with 26-32 natural teeth in the oral cavity are presented. If for the geriatric age only 2% of the population has the maximum number of teeth remaining in the oral cavity, for the pre-geriatric age with 0-15 teeth in the oral cavity the value goes to 10% [7,25]. The combination of these figures indicates an increasing tendency in the population that will pass to total edentulism in the geriatric age, a tendency that appears even in the pre-geriatric age; and the trend for dental treatment and prophylaxis to preserve natural teeth is in significant decline [26-28].

The classification of 0-15, 16-25 teeth and 26-32 teeth was selected based on clear criteria requiring that the minimum in the oral cavity be 3 teeth per quadrant, 6 teeth per quadrant and 8 teeth in one of the dental quadrants. First, in this perspective, it seems clear that the pre-geriatric age tends towards the presence of at least 6 teeth in the quadrant, expressed in the value of 31% of the pre-geriatric age patients included in the study; and the geriatric age tends towards a minimum of 3 teeth in the quadrant, expressed in the value of 28% of the geriatric patients included in the study. If the data in Table 2 is seen from the perspective of how age affects the presence or absence of natural teeth in the oral cavity, it can be said that with a minimum of 3 teeth per quadrant, the patients included in the study were in 38% of their number, with a minimum of 6 teeth per quadrant were in 44% of their number and 18% of patients were in the group with 26-32 teeth in the oral cavity. Tooth preservation versus edentulism is expressed in the ratio 1:2. The tendency of patients is against tooth extraction and not preserving natural teeth [1,5,8,29-32].

Table 3 shows data about how gender can affect the presence of natural teeth in the oral cavity. Figure 2 shows the data of Table 3 on the influence of gender on the number of natural teeth remaining in the oral cavity.

Table 3. Number of teeth depending on gender and age.

Patients		Male	Female	Total
0-15 teeth	Pre-Geriatric age	3%	10%	13%
	Geriatric age	13%	11%	24%
16-25 teeth	Pre-Geriatric age	18%	15%	33%
	Geriatric age	5%	7%	11%
26-32 teeth	Pre-Geriatric age	5%	7%	11%
	Geriatric age	5%	2%	7%
Total		50%	50%	100%

Gender of patients and number of natural teeth

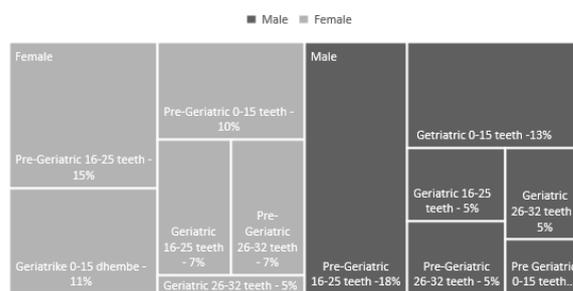


Figure 2. The graphic presentation of the data in Table 3 showing how gender affects the number of natural teeth in the oral cavity of patients, depending on the categorization of patients according to pre-geriatric age or geriatric age.

Based on the data in Table 3, the largest number of patients, both for men and women, is in the category 16-25 teeth in the pre-geriatric age in the ratio of 1:1, respectively in the values of 18% for men and 15% for women. From this table, if the values are evaluated, an almost identical ratio of the number of patients for both the male and female genders can be distinguished. This table shows that gender does not influence or dictate the number of natural teeth in the oral cavity. Again, the values that attract attention is the pre-geriatric age for the number of teeth 0-15 teeth in the oral cavity where it is observed that the female gender dominates compared to the male gender in a ratio of 3:1. For the geriatric age in the category of 26-32 natural teeth in the oral cavity, it is noted that the ratio of female: male genders is 1:2. Perhaps in this logic it can be said that the female gender is more prone to edentulism in the pre-geriatric age, which is still supported even in the geriatric age but in a more limited ratio with the male gender [12,28,33].

Table 4 also shows the statistical calculation of whether gender really affects the number of natural teeth in the oral cavity.

Table 4. Categorization of patients according to the number of natural teeth in the oral cavity and gender, also showing the calculation of dependency or not.

Pre-geriatric age	0-15 teeth	16-32 teeth	p- value
Male	2	14	0.1039 Statistically not significant
Female	6	13	
Geriatric age	0-15 teeth	16-32 teeth	p- value
Male	8	6	1.0000 Statistically not significant
Female	7	5	

Based on the data collected regardless of pre-geriatric and geriatric age, endodontic treatment is present in almost 70% of cases and their absence in 30% of the cases included in the study. Endodontic treatment aimed at preserving the natural tooth has the highest value in patients of pre-geriatric age, expressed in the value of about 50% of the number of patients involved with 1 or more endodontic treatments in the same oral cavity. For the geriatric age, the absence and presence of endodontic treatments in the same cavity is presented in a 1:1 ratio. The pre-geriatric age is more sensitive to endodontic treatments, which is expressed in a ratio of 1:7 in cases without any endodontic treatment versus cases with 1 or more endodontically treated teeth. Pre-geriatric patients present with more endodontically treated teeth compared to geriatric patients. Based on the data in Table 3 on the number of natural teeth in the oral cavity, it is understood that the pre-geriatric age has the largest number of patients with natural teeth in the oral cavity, these teeth have also been treated endodontically [5,18,34-36].

Table 5 shows the data collected from the patients included in the study classified on the basis of the presence or not of removable prostheses or fixed prosthetic works.

Table 5. This table shows the data on the presence of removable or fixed prostheses in patients of pre-geriatric age and in patients of geriatric age.

Dental prosthesis	Fixed prostheses		Movable prostheses		Total patients with prostheses
	0	1-more	0	1-more	
Age / No. of prostheses	0	1-more	0	1-more	
Pre-geriatric age	15 – 25%	20 – 33%	31 – 51%	4 – 7%	24 – 39%
Geriatric age	17 – 28%	9 – 15%	15 – 25%	11 – 18%	20 – 33%
Total	32 – 53%	29 – 48%	46 – 75%	15 – 25%	44 – 72%

Based on the data in Table 5, the tendency of the pre-geriatric age towards fixed prosthesis is clearly visible, which is not supported much by the same data for the geriatric age, where this tendency decreases from the value of 33% to the value of 15%. The presence of removable prostheses for the pre-geriatric age at the rate of 7% is noteworthy, as opposed to the geriatric age where this value is 18%. From this table, it is clear that the pre-geriatric age tends towards fixed prosthesis, while the geriatric age tends towards mobile prosthesis [17,36-38]. The tendency for prosthetics for both the pre-geriatric age and the geriatric age appears in the ratio 1:1. The data of Table 5 is compared with the data

of Table 2 and it is noted that while the pre-geriatric age appears in almost 47% with 16-32 natural teeth in the oral cavity, 33% of them have replaced them with fixed prosthesis. Seen from this point of view, for the geriatric age it can be said that in the value of 15%, the geriatric age appears with 16-32 natural teeth in the oral cavity and with the tendency in the same value of 15% for fixed prosthetic replacement [39-41].

Table 6 shows the data on the presence of fixed and removable dentures, given in Table 5, but already presented based on the number of teeth with fixed dentures and the type of removable denture.

Table 6. This table presents the collected data based on the number of teeth with fixed dentures and total dentures divided according to the classification placed only in the maxilla, only in the mandible or total in both jaws.

Dental prosthesis Patients	Fixed prostheses			Movable prostheses	
	1-5 crowns	6-12 crowns	13-32 crowns	Max.	Man.
Pre-geriatric age	10 – 16%	5 – %	5 – 8%	1 – 2%	3 – 6%
Geriatric age	1 – 2%	2 – 3%	6 – 9%	2 – 4%	4 – 7%
Total	11 – 18%	7 – 11%	11 – 18%	3 – 6%	7 – 11%

From the data presented in Table 6, it is clearly shown that the presence of natural teeth 16-32 teeth in the oral cavity at the value of 16% for pre-geriatric age corresponds to 16% of patients with fixed prosthesis with 1-5 crowns in the oral cavity. Patients with 0-15 natural teeth in the oral cavity with a value of 10% are compared to a value of 8% of fixed prosthesis with 13-32 crowns.

For the pre-geriatric age, these data are approximate values. The same values are also presented for the geriatric age, matching the trend of both pre-geriatric and geriatric ages against fixed prosthesis [19,2,37].

Table 7 shows the aggregated data on the presence of systemic pathologies and oral pathologies at the time of examination of the patients.

From the data presented in Table 6, it is clearly shown that the presence of natural teeth 16-32 teeth in the oral cavity at the value of 16% for pre-geriatric age corresponds to 16% of patients with fixed prosthesis with 1-5 crowns in the oral cavity. Patients with 0-15 natural teeth in the oral cavity with a value of 10% are compared to a value of 8% of fixed prosthesis with 13-32 crowns. For the pre-geriatric age, these data are approximate values. The same values are also presented for the geriatric age, matching the trend of both pre-geriatric and geriatric ages against fixed prosthesis [19,2,37].

Table 7. This table shows the frequencies of systemic pathologies and oral pathologies, respectively, both in the pre-geriatric age and in the geriatric age.

Age	Systemic pathology		Total	Oral pathology		Total
	0	1-more		0	1-more	
Pre-geriatric	10 – 16%	25 – 41%	35	27 – 44%	8 – 13%	35
Geriatric	5 – 8%	21 – 34%	26	18 – 29%	8 – 13%	26
Total	15	46 – 75%	61	45	16 – 26%	61

4. CONCLUSION

The combination of figures on the minimum amount of natural teeth in the oral cavity in the pre-geriatric age and on the maximum amount of natural teeth in the oral cavity in the geriatric age indicates an increasing trend in the population that will go into total edentulism in the geriatric age, this trend which appears from the pre-geriatric age; and tendency for dental treatment and prophylaxis to preserve natural teeth that is in significant reduction, a tendency that appears in geriatric age.

Tooth preservation versus edentulism is expressed in the ratio 1:2. The tendency of patients is against tooth extraction and not preserving natural teeth. Gender does not influence or dictate the number of natural teeth in the oral cavity. Patients of pre-geriatric age present with the largest number of endodontically treated teeth that, comparing with geriatric age, the effect of extraction is felt as a result of destructive carious pathologies or endodontic maltreatment. The trend of both pre-geriatric and geriatric ages is the same against fixed prosthesis. The presence of oral pathologies versus systemic pathologies both in the pre-geriatric age and in the geriatric age are presented in almost the same ratios.

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