Original Article

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Radiographic Evaluation of Current Status of Permanent Lower First and Second Molars in Geriatric Patients in Turkish Population

Türk Toplumundaki Geriyatrik Hastalarda Daimi Alt Birinci ve İkinci Büyük Azı Dişlerin Mevcut Durumlarının Radyografik Olarak Değerlendirilmesi

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ABSTRACT

Objective: Our study aimed to examine the effects of age and gender for both tooth groups by determining the current status of the permanent mandibular first and second molars, presence/absence status of them and disease/health status of them in geriatric patients.

Methods: Panoramic radiographs of 1,500 patients, 815 women and 685 men, aged 65 and over, who were admitted to Bezmialem Vakıf University Faculty of Dentistry between 2019-2021, were examined. A single investigator reviewed each patient's X-ray. The patients were classified according to their age groups and genders. Age classification was made as 65-74 years, 75-84 years and ≥85 years. Conditions of permanent lower first and second molars were recorded as present or absent. If present, it was reported whether healthy, canal treated, filled orroot canal treated + prosthetic restoration. Root residue and the presence of implants were also noted.

Results: Among 1,500 geriatric patients who were admitted to Bezmialem Vakıf University Faculty of Dentistry between 2019-2021, 1,127 (75.1%) were in the 65-74 years of age group, 321 (21.4) in the 75-84 years of age group, and 52 (3.5%) in the ≥85 years of age group. Of the permanent left mandibular first molars, 6.7% were healthy and 72.1% were absent. Of the permanent left mandibular second molars, 10.3% were healthy and 67% were absent. While 6.1% of the permanent right mandibular first molars were healthy, 73.3% were absent. On the other hand, 10% of the permanent right mandibular second molars were healthy, while

ÖZ

Amaç: Bu çalışmanın amacı, Türk toplumundaki geriatrik hastalarda daimi alt birinci ve ikinci büyük azı dişlerin mevcut durumlarının, varlık/ yokluk ve hastalık/sağlık tespitlerinin yapılarak her iki diş grubu için yaş ve cinsiyet etkisinin incelenmesidir.

Yöntemler: 2019-2021 yılları arasında Bezmialem Vakıf Üniversitesi Diş Hekimliği Fakültesi'ne başvuran 65 yaş ve üstü 815 kadın, 685 erkek olmak üzere 1.500 hastanın panoramik radyografileri tek bir araştırmacı tarafından incelendi. Hastalar yaş gruplarına ve cinsiyetlerine göre sınıflandırıldı. Yaş sınıflandırması 65-74, 75-84, 85 yaş ve üzeri olacak şekilde yapıldı. Daimi alt birinci ve ikinci büyük azıların durumları var-yok, var ise sağlıklı, kanal tedavili, dolgulu, kanal tedavili + protetik restorasyonlu olarak kaydedildi. Kök artığı ve implant varlığı ayrıca belirtildi.

Bulgular: Radyografları incelenen 1.500 hastanın 1.127'si (%75,1) 65-74 yaş aralığında, 321'i (21,4) 75-84 yaş aralığında, 52'si (%3,5) ise 85 yaş ve üzerindeydi. Daimi sol alt birinci büyük azı dişlerin %6,7'si sağlıklı idi ve %72,1'i yoktu. Daimi sol alt ikinci büyük azı dişlerin ise %10,3'ü sağlıklı idi ve %67'si yoktu. Daimi sağ alt birinci büyük azı dişlerin %6,1'i sağlıklıyken, %73,3'ü yoktu. Daimi sağ alt ikinci büyük azı dişlerin ise %10'u sağlıklıyken %66,8'i yoktu. Hiç diş eksikliği olmayan geriyatrik hasta sayısı 97 iken, dört diş eksikliği olan hasta sayısı 785 olarak bulundu.

Sonuç: Daimi alt ikinci büyük azı dişlerin hayatta kalma yüzdesi daimi alt birinci büyük azılara göre daha yüksektir. Yaşam süresi uzamasına karşın daimi büyük azıların ağızda kalma sıklıklarında artış görülmemektedir.

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ABSTRACT

66.8% were absent. While the number of geriatric patients with no missing teeth was 97, the number of patients with four missing teeth was found to be 785.

Conclusion: The survival percentage of permanent mandibular second molars is higher than permanent mandibular first molars. Despite the prolongation of life expectancy, there is no increase in the frequency of permanent molars.

Keywords: Geriatric dentistry, endodontics, panoramic radiography

ÖZ

Anahtar Sözcükler: Geriatrik diş hekimliği, endodonti, radyografik görüntüleme

Introduction

Geriatrics is the branch of medicine that deals with health problems in old age (1). Patients aged 65 and over are defined as geriatric patients by the World Health Organization (2). Hearing, vision, tooth loss and physical disabilities are the most common chronic disorders in people aged 65 and over (3). Oral health care for older adults, called geriatric dentistry, includes the diagnosis, treatment and prevention of caries and periodontal disease, as well as diseases of the oral mucosa, head and neck pain (4). In geriatric patients, the average number of teeth remaining in the mouth decreases significantly with age compared to younger patients (5). On the other hand, dental caries has been a health problem that has been struggled since the existence of humanity (6,7). Caries is an important oral health problem among the elderly due to age-related salivary changes and gingival recession (8,9). The elderly can often lose their teeth due to caries, pulp disease and periodontal disease (10).

According to the data of the Turkish Statistical Institute (TUIK) for 2020, the population aged 65 and over, which was considered as the elderly population, was 6 million 495 thousand 239 people in 2015, and increased by 22.5% in the last five years to 7 million 953 thousand 555 people in 2020. While the proportion of the elderly population in the total population was 8.2% in 2015, it increased to 9.5% in 2020. In 2020, 44.2% of the elderly population was male and 55.8% was female. According to population projections, it is predicted that the proportion of the elderly population will be 11.0% in 2025, 12.9% in 2030, 16.3% in 2040, 22.6% in 2060 and 25.6% in 2080 (11).

With the increase in the elderly population, the fight against oral and dental diseases, which are very common in old age, gains importance. Since the lower first molars are the first permanent teeth to erupt, the incidence of caries and possible early loss before the age of 15 is high. The importance of this tooth lies in its main role in maintaining normal chewing function and dentofacial compliance (12). Malocclusions and association of mandibular second permanent molars with adjacent teeth is important for treatment planning and prognosis (13). Previous studies have shown that mandibular first molars are more prone to caries than mandibular second permanent molars (14). Demographic studies are frequently performed for mandibular first molars, and detailed data are lacking for second molars.

Panoramic radiographs allow us to obtain an image of the mandible, maxilla and surrounding tissues. Panoramic imaging is the most useful method when a wide view of the maxilla and mandible is required for diagnosis. It enables the evaluation of the general condition of the teeth, the imaging of the jaw fractures and the follow-up of bone diseases (15).

The aim of this retrospective study was to examine the effect of age and gender on permanent mandibular first and second molars in geriatric patients in Turkish society by determining the current status, presence/absence status, disease/health status of both tooth groups by panoramic radiography. With these examinations, the survival of existing endodontically treated teeth will also be reported and a reference point will be established for descriptive analyzes for geriatric patients in the future.

Methods

This study was approved by the Ethics Committee of Bezmialem Vakıf University with the decision number 22/435 dated 29.12.2020. Panoramic radiographs taken for routine reasons of 1,500 patients, 815 women and 685 men, aged 65 and over, who were admitted to the Faculty of Dentistry of Bezmialem Vakıf University between 2019-2021, were examined. Each patient's X-ray was analyzed by a single investigator. Panoramic radiographs were taken with the Planmeca Promax (Planmeca, Helsinki, Finland) (66 kVp, 15 mA) device. Patients were classified according to age groups and gender. Patients were categorized into 4 groups according to their age: 65-74 years, 75-84 years and ≥85 years. Permanent mandibular first and second molars were evaluated as present or absent. If available, it was recorded as healthy, with root canal treatment, filling, and root canal treatment + prosthetic restoration. Root residue and the presence of implants were also noted.

Statistical Anaysis

Statistical analysis was performed using the SPSS 20.0 program. In addition to descriptive statistics, the chi-square test was used to compare groups. The results were evaluated at the level of significance ($p<0.05$).

Results

Panoramic radiographs of 1,500 patients aged 65 and over, 815 women (54.3%) and 685 men (45.7%), were evaluated. Of the

patients 1,127 (75.1%) were in the 65-74 years of age group, 321 (21.4%) 75-84 years of age group, and 52 (3.5%) ≥85 years of age group. Right and left first and second molars of 1,500 patients were classified according to their current status on panoramic radiograph (Table 1).

Conditions for statistical significance were further classified as present and absent. The sum of missing, root residue, and implant presence was classified as absent, while all other present conditions were classified as present. According to this classification, the relationship of right and left first and second molars with age and gender is presented in Table 2.

Presence/absence status for right and left mandibular first molars did not have a relationship with gender. In the right and left second premolars, teeth were present in the 65-74 age group, which was statistically significant ($p<0.05$). Both right and left mandibular first molars were present at a statistically significant higher rate in women ($p<0.05$). There was no significant gender difference for the right and left mandibular second molars ($p>0.05$).

The absence of right and left first and second molars in 1,500 radiographs examined was also classified in itself. While the number of geriatric patients with no missing teeth was 97 (6.4%), the number of patients with four missing teeth was found to be 785 (52%) (Table 3).

Discussion

Human lifespan has extended with the development of health services and technology over the years. With the increase in the population aged 65 and over, the incidence of age-related diseases has also increased. Elderly individuals are more prone to oral and dental diseases due to age-related diseases and functional changes (16). For this reason, correct diagnosis and treatment in patients aged 65 and over will increase the quality of life of patients.

Table 1. Present radiographic status of right and left first and second molars

Status/tooth	36	37	46	47
Healthy	100 (6.7%)	154 (10.3%)	92 (6.1%)	150 (10%)
RCT	29 (1.9%)	25 (1.7%)	31 (2.1%)	19 (1.3%)
Filling	40 (2.7%)	54 (3.6%)	46 (3.1%)	62 (4.1%)
RCT + crown	26 (1.7%)	23 (1.5%)	30 (2%)	28 (1.9%)
Crown	57 (3.8%)	99 (6.6%)	52 (3.5%)	114 (7.6%)
Missing	1,082 (72.1%)	1,005 (67%)	1,100 (73.3%)	1,002 (66.8%)
Caries	63 (4.2%)	81 (5.4%)	57 (3.8%)	73 (4.9%)
Root	17 (1.1%)	16 (1.1%)	24 (1.6%)	12 (0.8%)
Implant	86 (5.7%)	43 (2.9%)	68 (4.5%)	40 (2.7%)
Total	1,500	1,500	1,500	1,500

RCT: Root canal treatment

Table 2. The relationship of presence/absence of right and left first molars with age and gender

		36			37		
		No	Yes		No	Yes	
		n (%)	p	p	n (%)	n (%)	p
Age	65-74	883 (78.3%)	244 (21.7%)	0.31	774 (68.7%)	353 (31.3%)	**0.004**
	75-84	257 (80.1%)	64 (19.9%)		250 (77.9%)	71 (22.1%)	
	>85	45 (86.5%)	7 (13.5%)		40 (76.9%)	12 (23.1%)	
Gender	Female	666 (81.7%)	149 (18.3%)	**0.005**	582 (71.4%)	233 (28.6%)	0.65
	Male	519 (75.8%)	166 (24.2%)		482 (70.4%)	203 (29.6%)	
		46			**47**		
		No	**Yes**		**No**	**Yes**	
		n (%)	n (%)	p	n (%)	n (%)	p
Age	65-74	883 (78.3%)	244 (21.7%)	0.098	761 (67.5%)	366 (32.5%)	**0.001**
	75-84	263 (81.9%)	58 (18.1%)		251 (78.2%)	70 (21.8%)	
	>85	46 (88.5%)	6 (11.5%)		42 (80.8%)	10 (19.2%)	
Gender	Female	668 (82.0%)	147 (18.0%)	***0.009***	587 (72.0%)	228 (28.0%)	0.1
	Male	524 (76.5%)	161 (23.5%)		467 (68.2%)	218 (31.8%)	

Chi-square test, $p<0.05$

Table 3. Distribution of missing teeth by age and gender

		Missing none	1 tooth missing	2 teeth missing	3 teeth missing	4 teeth missing
Age	65-74	84 (7.5%)	112 (9.9%)	170 (15.1%)	195 (17.3%)	566 (50.2%)
	75-84	11 (3.4%)	29 (9%)	38 (11.8%)	56 (17.4%)	187 (58.3%)
	>85	2 (3.8%)	0 (0%)	9 (17.3%)	9 (17.3%)	32 (61.5%)
Gender	Female	46 (5.6%)	68 (8.3%)	113 (13.9%)	143 (17.5%)	445 (54.6%)
	Male	51 (7.4%)	73 (10.7%)	104 (15.2%)	117 (17.1%)	340 (49.6%)

In this study, 54.3% of the 1,500 patients aged 65 and over who were admitted to the Faculty of Dentistry of Bezmialem Vakıf University between 2019-2021 were female and 45.7% were male. This rate is also consistent with the study of Karadayı et al. (17) and 2020 TUIK data (11).

According to 2020 TUIK data, when the elderly population was analyzed by age group, in 2015, 61.3% of the elderly population was in the 65-74 years of age group, 30.7% was in the 75-84 years of age group, and 8.0% was in the ≥85 years of age group. In 2020, 63.8% were in the 65-74 years of age group, 27.9% were in the 75-84 years of age group, and 8.4% were in the ≥85 years of age group (11). In our study, 75.1% of the patients were between the ages of 65-74, 21.4% were between the ages of 75-84, and 3.5% were aged 85 and over. The rates do not coincide with the TUIK data. The reason for this may be that patients are not admitted to dentistry faculties due to total edentulism, the percentage of which increases with age. On the other hand, the inability of patients from all age groups to reach Bezmialem Vakıf University Faculty of Dentistry, which was the only hospital where the study was conducted, might be effective. More studies are needed to be carried out simultaneously from several different institutions and centres. In addition, the decrease in the number of patients who were admitted to clinics due to the effect of the Covid-19 pandemic between the years 2019-2021, which was the time period of the study, might cause the difference in rates.

In our study, it was observed that tooth 36 was missing in 72.1% of the patients, tooth 37 was missing in 67%, tooth 46 was missing in 73.3%, and tooth 47 was missing in 66.8%. According to the data we obtained, the rate of permanent mandibular right and left second molars in the mouth was higher than mandibular right and left first molars. This result might be related to the earlier eruption of permanent mandibular first molars compared to permanent mandibular second molars and their more prone to possible extraction before the age of 15 (12). In a previous study, it was determined that 91.7% of permanent mandibular first molars decayed before the age of 26, and this rate was 85.9% in permanent mandibular second molars (14). The data obtained in this study also explains the fact that permanent mandibular first molars are less common in the mouth than permanent mandibular second molars.

Incebeyaz et al. examined the clinical conditions of permanent first molars according to age and gender, evaluated 2,604 patients and determined that 62 implants were made in place of permanent left lower molars and 80 implants were made in place of permanent right lower molars (18). In our study, it was determined that 86 implants were made in place of the permanent left lower molar and 68 implants were made in place of the permanent lower right molars. Although the number of patients we examined was less, the reason for the higher number of implants might be that the implant became a more accessible treatment method over time and that our study was conducted in a more recent time period.

While the permanent left lower first molar was absent in 81.7% of women, it was absent in 75.8% of men. The difference was statistically significant. Similarly, the permanent lower right first molar was absent in women with a statistically significant higher percentage (82%). This difference might be due to the lack of permanent mandibular first molars with a higher percentage in general and the higher number of women than men included in the study. There were no gender differences in terms of permanent mandibular second molars.

The permanent left mandibular second molar was present in 31.3% of 65-74 years of age group. This rate was statistically significantly higher than other age groups. The permanent lower right second molar was present in 32.5% of the 65-74 years of age group. This difference was statistically significant compared to other age groups. This difference might be due to the higher percentage of permanent mandibular second molars present and the higher number of participants aged 65-74 years compared to other age groups.

With the prolongation of the duration of the teeth in the mouth and the increase in the success rate of endodontic treatment, it can be expected that the survival of endodontically treated teeth in geriatric patients will increase. With its current results, this study can form a basis for future studies, and indirectly for reference data of follow-up studies of endodontic treatment in geriatric patients.

Study Limitations

The study was conducted in a limited time frame, with only one center. It was limited in presenting data for the patient population admitted to Bezmialem Vakıf University Hospital. Not knowing the current systemic disorders, habits and medical conditions of the patients included in the study on the basis of reviewing the historical data was also a limitation. Multi-centre and multinational management over a wider period of time may be a research topic for further studies.

Conclusion

Permanent mandibular second molars have a higher survival rate than permanent mandibular first molars. Despite the prolongation of life expectancy, there is no increase in the frequency of permanent molars in the mouth. The percentage of geriatric patients admitted to the faculty of dentistry is below the percentage of geriatric patients in the general population.

Ethics

Ethics Committee Approval: This study was approved by the Ethics Committee of Bezmialem Vakıf University with the decision number 22/435 dated 29.12.2020.

Peer-review: Externally peer reviewed.

Authorship Contributions

Concept: G.N., Design: G.N., Data Collection or Processing: G.N., S.N.T., Analysis or Interpretation: G.N., S.N.T., Literature Search: G.N., S.N.T., Writing: G.N., S.N.T.

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