

THE INFLUENCE OF PATIENTS' DEMOGRAPHICS ON DENTAL TREATMENT APPROACH

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ABSTRACT

Objective: to determine the influence of demographic factors on the therapist while making decision between fixed or mobile dental treatment approach in prosthodontic and orthodontic patients.

Materials and Methods: The research was conducted using database from the computer system at the UDCC St.Panteleimon Skopje. Obtained and analyzed data for the purpose of this study covered the period between 2012 and 2014. Data was divided into two sections or groups – patients undergoing prosthodontic and patients went through orthodontic treatment. Each data section was analyzed by a team composed by the corresponding department from which data was obtained. Each team had a task to collect, statistically analyze data from the computer system and to find positive correlations between the treatment approaches and the predisposing demographic factors of the patients.

Results: In the prosthodontic department, fixed dental constructions were made in the upper jaw (65, 9%), in the lower jaw (34, 1%) in patients aging from 18-39 (77, 8%). In those aging from 40-60 (40, 3%) and above 60 (27, 1%). Mobile constructions were made in the upper and in the lower jaw (50%) in patients ageing from 18-39 (22, 2%), in those aging from 40-60 (59, 7%) and in those above 60 (72, 9%). In orthodontic department fixed appliances were made in patients ageing below 10 (2%), and in those above 10 (61, 7%). Mobile appliances were made in patients ageing below 10 (98%) and in older than 10 (58, 3%).

Conclusion: The older patients require dental treatments with removable dentures and fixed orthodontic appliances, while the younger population of patients require dental dental treatment with fixed dentures and mobile orthodontic appliances.

Keywords: prosthodontic restoration, fixed partial dentures, fixed orthodontic appliance, mobile dentures, and mobile orthodontic appliances

Introduction

There is no definite key to unlock and to determine the type of dental treatment that corresponds to particular dental diagnosis or that is appropriate for a particular people demographic [1]. Despite of this, we still believe that there are certain demographic factors that influence dental therapist's decision regarding the course for the dental treatment.

The main guideline in treating a new patient is to choose the best therapeutic option depending on the established diagnosis and prognosis of treatment outcome [2]. However, there are other influencing factors which may lead the therapist towards a particular treatment option that could be more suitable for the patient [3]. The modern dentistry provides us various treatment options and treatment approaches when treating different patients sharing the same initial diagnosis. Many treatment modalities in modern dentistry addressing the issues and diagnoses regarding the patients' occlusion can be divided into two categories: mobile and fixed dental treatment approaches [4]. We believe that demographic characteristics of the patients are influencing factors thus making more options when choosing between mobile or fixed dental treatment.

Objective is to determine the influence of the demographic factors on the therapist decision between fixed or mobile dental treatment approach in prosthodontic and orthodontic patients.

Materials and Methods

This study was done as a part of much wider research included in the project Analysis and evaluation of the oral health condition and interventions on patients from PHI UDCC "St. Panteleimon" - Skopje, in the period 2012 - 2014. The aim of this project was extensive statistical analysis of data collected from patients and preformed services. Data for this study was collected from the computer system at the Dental Clinical Center for record keeping. The data gathered from this system included performed interventions during the period 2012-2014. The collected data was initially sequestered into smaller data sections on the basis on the dental department in which the patient was admitted and the type of performed intervention. Each data section was statistically analyzed and processed by a separate team of doctors who were employed at the corresponding department of Dental Clinic. Each team had task to collect, statistically analyze the data from the computer system and to find positive correlation between the predisposing demographic factors of the patients with the selected course of treatment determined by the dental therapist.

First, an analytical database was established from which the conclusions and recommendations of the executed project were being drawn. In the period covered by analysis, data for 303,527 interventions being performed on 53,621 patients from each dental department in the clinical center, were processed.

Large statistical database in which patients and services were analyzed in terms of the demographic status (sex, age, place of residence, and the ground for insurance coverage) was formed. The frequency of patients and services was also analysed separately for each dental department.

This study included two dental departments and two types of patients, the department of prosthodontics and orthodontics and their patients. In both department, the patients and their therapists were able to choose between two different types of treatment approaches (fixed or mobile constructions and appliances accordingly). For this study, the predominantly analyzed demographic factor was the age of the patients, being then correlated to the treatment approaches, fixed or mobile appliances or constructions chosen by the doctor treating the patient.

Two groups of patients were made for the purposes of this research in order to compare the tendency towards fixed or mobile dental treatment approaches in both prosthodontic and orthodontic clinical cases. The first group of respondents was composed by the patients treated at the Department of Dental Prosthodontics (**Figure 1, A, B**) and the second group of respondents by

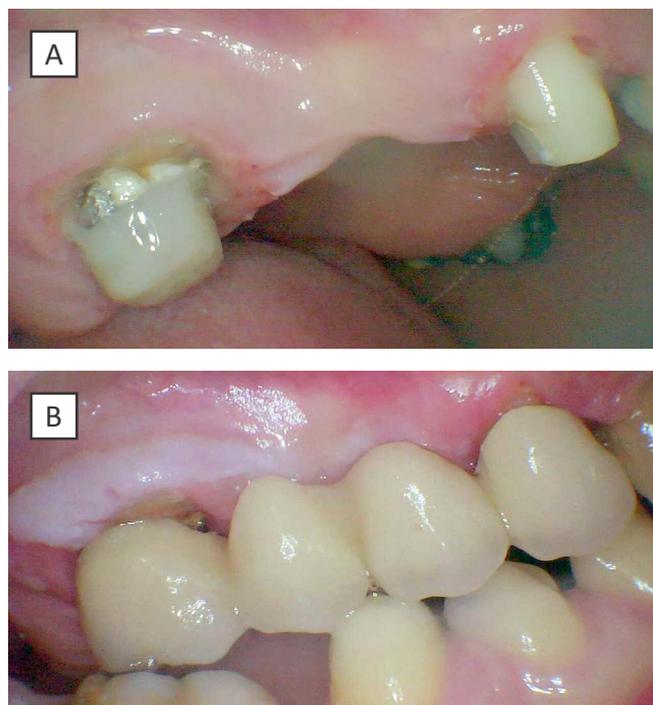


Figure 1. Prosthodontic patients (First group of patients),
A. Before fixed prosthodontic treatment,
B after fixed prosthodontic treatment

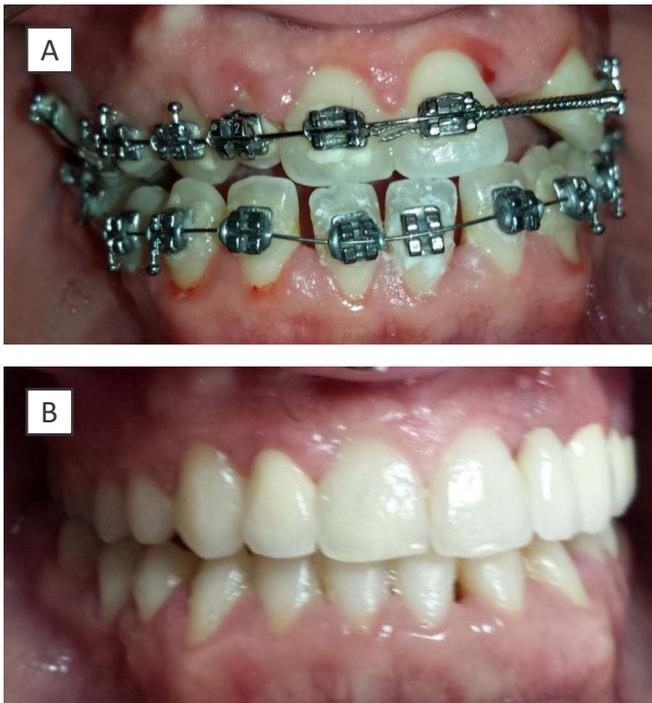


Figure 1. Prosthodontic patients (First group of patients),
A. Before fixed prosthodontic treatment,
B after fixed prosthodontic treatment

those treated at the Department of Orthodontics (**Figure 2, A, B**). The frequency of the chosen dental treatment approach by the therapist, the use of fixed or mobile

constructions or appliances to accomplish adequate treatment results, was analyzed for each group of patients in relation to the patients' age and the jaw on which the prosthetic construction was placed.

Results

As shown in **Table 1**, the research from the Prosthodontic Department has shown that the fixed prosthodontic constructions were made in the group of patients ageing from 18-39 (77,8%), in those ageing from 40-60 (40,3%) and in those above 60 years (27,1%) (**Table 1**).

Mobile constructions were made in patients ageing from 18-39 (22,2%), in those ageing 40-60 (59,7%) and in those above 60 (72,9%) (**Table 1**).

As shown in **Table 2**, fixed prosthetic constructions were made in 65.9% of cases in the upper jaw and 34.1% in the lower jaw (**Table 2**).

Mobile prosthetic constructions were made in 50% of cases in the upper and in the lower jaw (**Table 2**).

The research in Orthodontic Department brought the results as shown in **Table 3** clearly presenting that fixed orthodontic appliances were made on patients ageing below 10 years (2%), and in those above 10 (61,7%) (**Table 3**).

Mobile appliances were made in patients ageing below 10 (98%) and in those older than 10 (38,3%) (**Table 3**).

Age	Fixed prosthodontic constructions		Mobile prosthodontic constructions		Total		χ^2	df
	n	%	n	%	n	%		
18 - 39	721	77,8	206	22,2	927	100,0	1028,3	2
40 - 60	1715	40,3	2536	59,7	4251	100,0		
+60	2255	27,1	6058	72,9	8313	100,0		

Table 1. Correlation between patients' age and treatment approach in prosthodontic patients

Jaw	Fixed prosthodontic constructions		Mobile prosthodontic constructions	
	n	%	n	%
Upper	2325	65,9	4402	50,0
Lower	1203	34,1	4401	50,0
Total	3528	100,0	8803	100,0

Table 2. Fabrication of fixed and mobile prosthodontic constructions in different jaws

Age	Mobile appliances		Fixed appliances		Total		χ^2	df	p
	n	%	n	%	n	%			
Above 10	841	38,3	1354	61,7	2195	100,0	797,7	1	,000
Under 10	732	98,0	15	2,0	747	100,0			

Table 3. Correlation between patients' age and treatment approach in orthodontic patients

Discussion

Majority of the patients seeking treatment at the Dental Clinical Center "Panteleimon" – Skopje were treated at the Department of Dental Prosthodontics and the Department of Orthodontics therefore we can consider those clinics as the most representative regarding their work, therapy and dental interventions being done.

According to statistical analysis conducted within the project of PHI University Dental Clinical Center "Panteleimon" – Skopje, examination of patients and the interventions done in the period from 2012 to 2014, it can be seen that out of 53,621 patients admitted in 2013, 4209 patients or 7,9% were admitted to the Clinic for fixed prosthodontics and 4684 or 8,7% for mobile dental prosthetics. The steady increase in the number of admitted patients and increase in number of interventions performed during each subsequent month for each subsequent year, is evident in the analyzed period. It is apparent that 1,718 patients were admitted in 2012 monthly where 7328 interventions were performed. In 2013, on monthly basis 2,141 patients were admitted and 9507 interventions were performed, while in 2014 on 2,571 patients 10291 interventions were performed.

Analyzes of the total flow of patients treated at the Dental Clinical Center "Sv. Panteleimon" - Skopje unambiguously point out the fact that the Orthodontics Department of the Clinic being covered by this research for the overall period has the largest number of interventions i.e. 61114 interventions or 20.1% of the total number of interventions carried out in this public health facility. On annually basis, the Clinic for Orthodontics is on the first place by performed services in 2012 with 22.8%, in 2014 with 19.7%, and on the second place in 2013 with 19% of all interventions performed in Dental Clinical Center. According to the total number of patients treated, the Clinic of Orthodontics is on the third place compared to other departments with 8482 admitted patients or 15.8% of the total number of patients in Dental Clinical Center "ST. Panteleimon" Skopje

In the study published by R. Graham et al., the primary focus was investigating the need for a removable partial denture and their results showed that the primary determinant for the dental treatment approach was a compromise between the opinion of the therapist and that of the patient. The patients were more influenced by their aesthetic appearance, the impalpable presence of the denture as well as location of the teeth gaps. The therapist was more concerned by the function of the remaining teeth and patient's demand. This is opposite to the findings in our study in which we see the age of the patient as the primary determinant for the dental treatment approach [5].

The study done by Dubravka-Knezovic-Zlaticaric showed no significant difference between patient's satisfactions or in the assessments of quality of fixed partial dentures between the different age groups. But our in study we found differences between the treatment selection in three age groups: 18-39, 40-60 and above 60 [6].

Glantz PO et al, found no significant difference between long term survival of the fixed partial denture depending on the age group of the patient being different to our findings pointing out that the removable dentures as a treatment were the choice in older and the fixed partial dentures in younger patients [7].

Compared to study done by Mohsen K. et al we came to the conclusion that age groups below 18-39 prefer to undergo a fixed prosthodontic treatment, age groups 40-60 years are more prefer mobile prosthodontic treatment and age groups above 60 have greater tendency for mobile prosthodontic treatment. In the study of Mohsen K, et al, patient satisfaction from removable dentures did not differ significantly between patients aged ≥ 50 years and those aged < 50 years ($P > 0.01$) [8].

Hiltunen K et al, discovered that in patients above 70 years of age, fixed prosthodontic treatment modalities such as removable and fixed partial dentures are very rare and repairs are more common. In our study we discovered that removable prosthodontic treatment modalities are more common in patients above 60 and fixed prosthodontic treatment is more common in patients ranging from 18 to 39 [9].

According to analysis of data we collected from the Clinics for Dental Prosthodontics and with regards to the results from performed interventions, the following could be discussed:

- Increased necessity for fixed-prosthetic constructions appears in patients in postadolescent and adult age;
- Fixed prosthetic constructions are more common in the population between 18-39 years with 77.8% and 40-60 years with 40,3%, respectively, compared to the mobile constructions with 22.2% and 59.7% for the corresponding age group;
- The necessity for making fixed and mobile prosthetic constructions in the middle age (40-60) group is almost equal, because this age group consisted of patients that underwent both fixed (40.3%) and mobile (59.7%) prosthodontic treatment with almost equal distribution;
- There is an increased frequency of mobile prosthetic constructions in population over 60 years (72.9%) compared to fixed constructions present in the same population in smaller number (27.1%). Namely, the higher the age of the patients is, the necessity for mobile prosthetic constructions is

higher, which is explained by the growing number of extracted teeth in these patients;

- The fabrication of fixed prosthetic constructions is more common in the upper jaw compared to the lower jaw. The necessity for better aesthetics and phonetics in patients from different gender and age is the primary indication for more frequent fabrication of prosthetic constructions in the upper jaw.

The success rate of the correction of the anterior crossbite in mixed dentition in a study done by Wiedel AP et al. proved to be equal regardless to the dental treatment approach with mobile and fixed appliances. Research showed that the patients with fixed appliances had shorter treatment duration than the patients having removable orthodontic appliances. These results are similar to the results of our study showing that the fixed orthodontic treatment is more favorable for patients with mixed dentition [10].

Fixed orthodontic appliances were shown to be more superior to removable orthodontic appliance in the study done by Endarra L.K. Tang et al. in all age groups being different from our findings which are in favor of removable appliances in patients below 10 years of age and in favor of fixed appliances in patients above 10 years of age [11].

Moaiyad Moussa Pacha et al investigated different effects of removable and fixed orthodontic treatment on patients with class II malocclusion and had inconclusive results for the superiority of each of these treatment approaches. Opposite to their findings, our study focuses on patients with a variety of malocclusions showing that patients below age of 10 could have more benefit from a removable and patients above 10 from a fixed orthodontic treatment [12].

In two consecutive studies Bilgiç F. et al showed that in a treatment of mandibular retrognathia regardless of the age groups both removable and fixed orthodontic treatments are an effective approach. This finding is contrary to our findings that favor the removable orthodontic approach in patients younger and the fixed orthodontic approach in patients older than 10 [13, 14].

The findings from our research obtained at the Clinic for Orthodontics were interesting, considering that the interventions were performed on patients whose age and future should be taken into consideration:

- The use of mobile orthodontic appliances is the mostly applied method for the treatment of orthodontic malocclusions for those younger than 10 years in 98% of patients;
- At older than 10 years, the use of fixed orthodontic appliances is dominant, but only in 61.7% of treated patients.

Conclusion

The influence of demographic factors on the therapist decision between fixed or mobile dental treatment approach in prosthodontic and orthodontic patients is significant and should not be underestimated.

The conclusion of this study is shown in the statistical relationship between the dental treatment approach and patients' demographics. Namely, we conclude that the older patients require dental treatments with mobile prosthodontic constructions and fixed orthodontic appliances, while the younger population of patients require dental treatment with fixed prosthodontic constructions and mobile orthodontic appliances.

We would like to point out that the patient's demographics might not be the predetermining factor in all clinical cases, but they certainly are an important factor influencing the final decision regarding dental treatment approach. When deciding the patient's treatment plan, the dental medicine takes into consideration the cost - benefit of this treatment approach for the patients' wellbeing and this is very much relative and dependant on the age of the patient. Thus, the age of the patient as a demographic factor determines the final course of treatment in many clinical cases as it can be seen from the results of our study.

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References

1. A.B. Carr, D.T. Brown McCracken's removable partial prosthodontics (12th ed.), CV Mosby, St Louis (2011)
2. R.D. Phoenix, D.R. Cagna, C.F. Defreest Stewart's clinical removable partial prosthodontics (4th ed.), Quintessence Publishing Co, Inc (2008)
3. Dorland's Illustrated Medical Dictionary. 30th ed. London: Saunders; 2003
4. Smith BG. Dental crowns and bridges: Design and preparation. 2nd ed. Chicago: Year Book Medical Publishers; 1990. p. 79-81
5. Graham R. et al. Determining 'need' for a Removable Partial Denture: a qualitative study of factors that influence dentist provision and patient use. *British Dent Journal* 2006;200:155-158
6. Dubravka-Knezovic-Zlataric et al. Patients' Satisfaction with Partial Denture Therapy. *Acta Stom Croatica* 2000; 34: 373-378
7. Glantz Po et al. Patient age and long term survival of fixed prosthodontics. *Gerodontology* 1993; 10(1): 33-9
8. Mohsen K. Aljabri BDS^a Tamer O. Ibrahim MD^b Rayan M. Sharka, Removable partial dentures: Patient satisfaction and complaints in Makkah City, KSA, *Journal of Taibah University Medical Sciences* Dec 2017; 12(6): 561-564
9. Hiltunen K et al. Is prosthodontic treatment age-dependent in patients 60 years and older in Public Dental Services?. *J Oral Rehabil.* 2015; 42(6): 454-9
10. Wiedel AP et al. Fixed versus removable orthodontic appliances to correct anterior crossbite in the mixed dentition--a randomized controlled trial. *Eur J Orthod.* 2015 Apr;37(2):123-7. doi: 10.1093/ejo/cju005. Epub 2014 Aug 11.
11. Endarra L.K. Tang et al. Assessing treatment effectiveness of removable and fixed orthodontic appliances with the occlusal index. *American journal of orthodontics and dentofacial orthopedics* 1990; 98(6):550-556
12. Moaiyad Moussa Pacha et al. A comparison of the efficacy of fixed versus removable functional appliances in children with Class II malocclusion: A systematic review. *European Journal of Orthodontics* 2016; 38(6): 621-630
13. Bilgiç F. Başaran G. and Hamamci O. Comparison of Forsus FRD EZ and Andresen activator in the treatment of class II, division 1 malocclusions *Clinical Oral Investigations.* 2015; 19:445-451
14. Bilgiç F. Hamamci O. and Başaran G Comparison of the effects of fixed and removable functional appliances on the skeletal and dentoalveolar structures. *Australian Orthodontic Journal.* 2011; 27:110-116