

## STATISTICAL ANALYSIS OF DENTAL TREATMENT APPROACH

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Article Received on 20/04/2017

Article Revised on 10/05/2017

Article Accepted on 31/05/2017

## ABSTRACT

**Purpose:** is to investigate and statistically analyze the demographic predisposing factors of the patients that make them favorable for fixed or mobile dental treatment approach. **Materials and Methods:** The investigation was conducted using the patient's database of the computer system at the UDCC St. Panteleimon Skopje. The data extracted and analyzed for this study ranged from the period of 2012-2014. The data was divided into sections depending on which department of the clinic the treatment of the patient was performed. Each data section was analyzed by a separate team employed by the corresponding department that the data was extracted from. Each team had a task to collect, statistically analyze the data from the computer system and find positive correlations between the treatment approaches and the predisposing demographic factors found in the patients that made them suitable for this treatment approach. **Results:** In the prosthodontic department, fixed dental constructions were fabricated in the upper jaw (65,9%), in the lower jaw (34,1%), in patients from age 18-39(77,8%), 40-60(40,3%) and above 60(27,1%). Mobile constructions were fabricated in the upper and the lower jaw(50%), in patients from age 18-39(22,2%), 40-60(59,7%) and above 60(72,9%). In the orthodontic department fixed appliances were fabricated in patients from age below 10(2%), and above 10(61,7%). Mobile appliances were fabricated in patients from age below 10(98%) and older than 10(58,3%). **Conclusion:** The ratio of the treatment approach depending on the predisposing factor is important for future health investments plans and helps us better understand the health needs of the country's population.

**KEYWORDS:** Dental treatment approach, fixed prosthodontics, mobile prosthodontics, fixed prostodontic constructions, mobile prosthodontic constructions, orthodontics, mobile orthodontic appliances, fixed orthodontic appliances.

## INTRODUCTION

Although there is no definite key to unlock and determine the type of dental treatment that corresponds to particular dental diagnosis or that is appropriate for a particular demographic of people, we believed that there are certain demographic factors that contribute to the decision of the dental therapist on the course for the dental treatment.<sup>[1,2,3,4]</sup>

The most of the patients that seek treatment at the Dental Clinical Center "Panteleimon" – Skopje were treated at the department of dental prosthodontics and the department of orthodontics therefore we can safely claim that these clinics are the most representative to the work, therapy and dental interventions that are being done at this dental clinical center.

According to statistical analysis conducted within the project work of PHI University Dental Clinical Center

"Panteleimon" - Skopje and examination of patients and the interventions in the period from 2012 to 2014 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% to the clinic for mobile dental prosthetics. The steady rise in the number of admitted patients and increase the number of interventions performed during each subsequent month for each subsequent year is evident in the analyzed period. It is apparent that on admitted 1,718 patients per month in 2012 were performed 7328 interventions, on 2,141 patients admitted per month in 2013 were performed 9507 interventions, while on 2,571 patients in 2014 were performed 10291 intervention.

Analyzes of the total flow of patients treated in the Dental Clinical Center "Sv. Panteleimon" - Skopje unambiguously point to the fact that the clinic in orthodontics department which is covered by this investigation 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 Viewed individually by year, 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 third place compared to the other departments with 8482 admitted patients or 15.8% of the total number of patients in the Dental Clinical Center "ST. Panteleimon "Skopje

## MATERIALS AND METHODS

This study was done as a much broader investigation in the scope of 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 in which extensive statistical analysis of data collected from patients and preformed services is done. The data for this study was collected from the computer system used at the dental clinical center used for record keeping. The data gathered from this system ranged from interventions performed during the period of 2012-2014. Initially the collected data was sequestered into smaller data sections based on the dental department in which the patient was admitted and the intervention was performed. Each data section was statistically analyzed and processed by a separate team of doctors that were employed at the same corresponding department of the dental clinic. Each team was tasked to collect, statistically analyze the data from the computer system and 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 under analysis, data for 303,527 interventions that were performed on 53,621 patients from each individual clinic 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 preformed. The frequency of patients and services was also analysed on level of clinics.

For this study the predominant demographic factor analyzed was the age of the patients and the treatment

approach, fixed or mobile appliances or construction chosen by the doctor to treat this patient depending on these demographic factors.

Two groups of patients were constructed, patients treated at the department of dental prosthodontics and patients treated at the department of orthodontics (Fig 1. Fig 2). The frequency of the chosen dental treatment approach by the therapist, fixed or mobile constructions or appliances, for each group of patients was analyzed in relation to the age group of the patients and the jaw on which the prosthetic construction was placed.

## RESULTS

In the prosthodontic department, fixed dental constructions were fabricated in the upper jaw (65,9%), in the lower jaw (34,1%), in patients from age 18-39(77,8%), 40-60(40,3%) and above 60(27,1%). The need for fixed prosthetic works is higher in postadolescent age and adulthood. In this age group fixed prosthetic constructions are prescribed in 77.8% of patients, while mobile prosthetic constructions only in 22.2% (Table 1, Table 2).

Mobile constructions were fabricated in the upper and the lower jaw(50%), in patients from age 18-39(22,2%), 40-60(59,7%) and above 60(72,9%). The need for mobile prosthetic constructions is higher in middle and old age group. It may be noted that with the increase of age the need for mobile prosthetic constructions grows. The mobile prosthetic constructions are represented in 59.7% of patients aged from 40 to 60 years, and they are represented in 72.9% in patients aged over 60 years (Table 1, Table 2).

Fixed prosthetic constructions are fabricated twice as much in the upper 65.9% compared to the lower jaw 34.1%. Mobile prosthetic constructions are fabricated equally in both jaws, 50% in the upper and lower jaw (Table 2).

In the orthodontic department fixed appliances were fabricated in patients from age below 10(2%), and above 10(61,7%). Mobile appliances were fabricated in patients from age below 10(98%) and older than 10(58,3%). In patients under 10 years of age the mobile orthodontic appliances are used with higher frequency in 98% of cases, while the fixed orthodontic appliances are used with higher frequency in 61.7% of patients over 10 years of age (Table 3).

**Table 1: Age distribution of patients depending on the treatment approach in department of prosthodontics.**

Age	Fixed prosthodontic constructions		Mobile prosthodontic constructions		Total		$\chi^2$	df	p
	n	%	n	%	n	%			
18-39	721	77,8	206	22,2	927	100,0	1028,3	2	,000
40-60	1715	40,3	2536	59,7	4251	100,0			
Над 60	2255	27,1	6058	72,9	8313	100,0			

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

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

**Table 3: Age distribution of patients depending on the treatment approach in department of prosthodontics.**

Age	Mobile appliances		Fixed appliances		Total		$\chi^2$	df	p
	n	%	n	%	n	%			
Above 10	841	38,3	1354	61,7	2195	100,0	797,7	1	,000
Under10	732	98,0	15	2,0	747	100,0			

### Illustrations and Figures

**Figure 1: First group of patients.****Figure 2: Second group of patients.**

### DISCUSSION

In a study published by R. Graham *et al.*, the primal focus was investigating the need for a removable partial denture and their results showed that the primary determinant for the dental treatment approach was determined as a compromise between the opinion of the therapist and the patient. The patients were more influenced by their aesthetic appearance, the unpalpable presence of the denture as well as location of the teeth gaps. The therapist were more concerned with the function of the remaining teeth and patient's demand. This is opposite from the findings in our study in which we see the age of the patient as the primary determinant for the dental treatment approach.<sup>[6]</sup>

The study done by Dubravka-Knezovic-Zlataric showed no significant difference between patient's satisfaction or in the assessments of quality of fixed partial dentures between different age groups.<sup>[7]</sup>

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.<sup>[7]</sup>

According to the analysis of the data we collected from the clinics for dental prosthodontics and in regard to the results for the 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 20-34 years with 77.1% and 35-44 years with 66.3%, respectively, compared to the mobile constructions with 22.9% and 33.73% for the same age group,
- ✓ There is an equal necessity for fabrication of fixed and mobile prosthetic constructions in the middle age (40-60). Fixed (with 51.91%) and mobile (with

48.09%) prosthetic constructions are equally distributed in the population between 45-64 years,

- ✓ There is an increased frequency of mobile prosthetic constructions in population in old age over 60 years (72.9%) compared with fixed constructions that are present in the same population in fewer 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.* was determined to be equal regardless of the dental treatment approach with mobile and fixed appliances.<sup>[8]</sup>

The findings from our investigations obtained on the clinic for orthodontics were interesting, considering that the work is performed on patients whose age and future should be taken into account:

- ✓ The use of mobile orthodontic appliances is the most often applied method for the treatment of orthodontic malocclusions before the age of 10 years in 98% of patients;
- ✓ After 10 years the use of fixed orthodontic appliances is dominant, but only in 61.7% of the treated patients.

## CONCLUSION

The results and conclusions of the evaluation and the state of oral health interventions in patients of PHI USKC "St. Panteleimon" Skopje from 2011-2014 year are practically applicable to the development and improvement both in primary and in secondary dental care in the population of the Republic Macedonia.

The hypotheses and the objectives of this study will help to determine the extent of dental and prosthetic health patients in Macedonia and will enable to determine the necessity of introducing regular periodic, preventive, control and targeted examinations of patients. For this purpose, the results and findings of this study will help to activate and public attention on the importance of oral health as an important part of the overall health and mobilize all parts of society to contribute to the promotion and improvement of the general health of the mouth and teeth.

Unambiguous conclusion of this study is that the Macedonian population there is a growing need for orthodontic treatment and correction of dentofacial irregularities. This necessity can be seen through the data

which indicates that the clinic for orthodontics has the highest number of completed interventions of the total workload of the national Dental Clinical Center.

Furthermore this study shows the growing statistical trend in dental treatment approach that the older patients require dental treatments with mobile prosthodontic constructions and fixed orthodontic appliances, while the younger patients require dental treatment with fixed prosthodontic constructions and mobile orthodontic appliances.<sup>[9,10,11]</sup> This is an important notion, that the Macedonian government should have when it is making the national health plan for the future generations.<sup>[12,13,15]</sup>

## DISCLOSURE \ ACKNOWLEDGEMENTS

The institutions that helped with the preparation of this scientific paper are as they follow:

1. Faculty of dentistry, University "St. Cyril and Methodius", Skopje, Republic of Macedonia.
2. Department of prosthodontics, Public Health Clinic "St. Panteleimon, Skopje, Republic of Macedonia.

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