

THE ORTHODONTIC TREATMENT NEEDS IN PATIENTS REFERRED TO ORTHODONTIST

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ABSTRACT

The objective: The aim of this study was to examine and establish compliance in determining the need for orthodontic treatment by general dental practitioners or non-orthodontic specialties and orthodontists.

Material and methods: The study included 100 patients referred to an orthodontist by general practitioners or non-orthodontic specialties. The research included a period of three months during which referrals of patients who applied to the Clinic for Orthodontics at the Faculty of Dentistry with clinics of the University of Sarajevo were reviewed and analyzed. After examination by an orthodontist specialist, compliance was aligned with regard to determining the need for orthodontic treatment by general dental practitioners or non-orthodontic specialties and orthodontists. Results: An analysis of the need for orthodontic treatment showed that an orthodontic treatment was required in 83 (83%) patients, while orthodontic treatment was not needed in 17 (17%) patients.

Conclusion: The research showed that there is no statistically significant difference in determining the need for orthodontic treatment by general dental practitioners or non-orthodontic specialties and orthodontists. It is necessary to provide guidelines that would facilitate recognition of individual malocclusions, complexity of case, and timely referral of patients to orthodontist, and therefore to obtain correct referral letters.

Key words: orthodontic treatment need, general dental practitioners, non-orthodontic specialties, malocclusion

Introduction

Lately, orthodontics have noticed an increasing number of patients starting the therapy. For an overview of orthodontics, patients usually come to their own initiative (parents or society initiative) or they are referred by their chosen primary dentist [1]. Approximately 70% of patients are referred to orthodontist by a doctor of dental medicine, who is more critical than patient in relation to assessing the need for treatment [2]. In a large number of cases, the final outcome of the therapy depends on dentist's existing knowledge and time when the patient is referred to orthodontic therapy. As there is inconsistency on the best time to begin orthodontic treatment, patients in orthodontic examination are commonly referred too late, i.e. when the tooth replacement has already been completed, at the time of permanent dentition. In individual cases, due to untimely visit to the orthodontist's, it is impossible to avoid the extraction of permanent teeth, and treatment duration is extended [1]. The referral letters for orthodontic clinics usually arrive from a children's dentist and general practice dentist. Although the general practice dentists are generally aware of the available treatment options and the best time for application of the intervention, it is crucially important for the children's dentists and general practice dentists to be well informed on the exact diagnosis and problems of early malocclusion [3]. General dentists and non-orthodontic specialists may play essential role in education and motivation of their patients in relation to principals and practicing of orthodontic therapy, which may be very beneficial for patient's lifestyle. Therefore it is very important to recognize and identify their level of knowledge and stance regarding orthodontic therapy [4].

In most countries, the requests for orthodontic therapy are increasing. Therefore, the rational planning of population-based orthodontic measures is essential for assessing the necessary funds in order to provide this service. This emphasizes the importance of epidemiological researches in order to understand and cognize the degree of prevalence of different types of malocclusions and needs for orthodontic treatment [5].

Clarifying the orthodontic treatment need was one of the main reasons for establishing a number of occlusal indices. The use of such indices allows the individuals with a high rate of need for therapy to be recognized as a priority when funds for orthodontic practice are limited or when the availability of therapy is unequally distributed. Similarly, the individuals with low rate of need for therapy are protected from potential risks of unnecessary treatment [6].

Oral health care services financed from public funds are rarely sufficient to answer to unlimited number of requests for orthodontic services. Therefore, patient selection is indispensable to ensure that the therapy is provided to those mostly in need, those who would mostly benefit from the therapy in all probability [7].

Orthodontic anomalies are associated with psychosocial problems, poor periodontal condition and weakened masticatory functions, and as such, they should be treated as a health problem. The variability of social, economic and cultural factors may influence the perception of individuals regarding the need for orthodontic therapy [8].

It is very difficult to define and classify the malocclusions, mostly due to the variations of perception of this problem among individuals, and obviously among patients and practitioners. Orthodontic patients expect orthodontic therapy to improve their dental and facial aesthetics, and consequently their popularity and social success. While patients expect the results that define social and cultural standard of beauty in reference groups, or in society in general, orthodontists prefer to use parameters and indices to diagnose the problem and plan later treatment [9].

The aim of this study was to examine and establish compliance in determining the need for orthodontic treatment by general dental practitioners or non-orthodontic specialties and orthodontists.

Material and Methods

The study included 100 patients who were referred to orthodontist by general practice dentist or by some other dental specialist. Patients aged 5 to 17 years; 53 persons were female and 47 persons

were of male gender. The research included three months period (April, May, June, 2017) during which referrals of patients who applied to the Clinic for Orthodontics at the Faculty of Dentistry with Clinics of the University of Sarajevo were reviewed and analyzed.

For all subjects involved in research, the following data were collected:

1. Gender of patient
2. Age of patient
3. Who referred the patient to orthodontist
4. Correctness of referral letter: without diagnosis, with correct diagnosis, with incorrect diagnosis
5. Diagnosis by orthodontic specialist at Clinic for Orthodontics of Faculty of Dentistry with Clinics in Sarajevo
6. Assessment of orthodontic treatment need: treatment needed, no treatment needed
7. In which period orthodontic treatment is needed; treatment needed in later period (patient referred too early), treatment needed at time of visit (patient referred timely) and treatment was needed even earlier (patient referred late).

After the examination by the specialist orthodontist, the harmonization was compared regarding determination of need for orthodontic treatment/diagnosis by the general practice dentist or other specialty dentist and orthodontist, i.e. how many patients were correctly and timely referred to orthodontist, and how many of them did not need orthodontic treatment at all or were simply referred too early.

The criterion used by dentists to recognize the need for orthodontic therapy and on which basis they referred the patients to orthodontist is not known.

Orthodontic specialists at Clinic for Orthodontics of the Faculty of Dentistry with Clinics in Sarajevo determined the need for orthodontic treatment based on occlusal index using Angle's classification.

The occlusion analysis was performed in three anatomical planes (sagittal, vertical and transversal) and this is in intercanine (frontal) and transcanine (lateral) region.

Depending on the degree of deviation in any plane, orthodontists made decision regarding the need for orthodontic treatment.

Statistical analysis

The results were analyzed using SPSS computer program for statistical analyses (*SPSS-Statistical Package for Social Sciences*) version 13.0 (Chicago, IL, USA).

A *Shapiro-Wilk* test was used to estimate normality of the distribution of continuous variables.

The significance of difference for continuous independent variables that followed normal distribution is tested by means of *Student t-test*, and results are shown as mean value (\bar{X}) and standard deviation (SD).

Qualitative data are shown as absolute numbers and percentages (%) of values and are analyzed by *Chi square* test (χ^2). Values $p < 0.05$ are considered as statistically significant.

Results

The research included 100 (100%) patients referred to orthodontist, of them 47 (47.0%) were male and 53 (53.0%) were female patients. The average age of patients involved in the research was 11.14 ± 2.95 years. The minimum age was 5 years and maximum age was 17 years. The male patients were of average age 10.79 ± 2.91 years, with minimum age of 5 years and maximum age of 17 years. The female patients were of average age 11.45 ± 2.97 years, with minimum age of 6 years and a maximum age of 17 years.

The observed difference in average age of patients in relation to gender was not statistically significant ($p = 0.262$; $p > 0.05$).

The largest number of patients referred to orthodontist, 53 (53.0%), had referral letters from general practice dentists, 45 (45.0%) were referred by specialists in children's and preventive dentistry, 1 (1.0%) of patients was referred by specialist in oral surgery, and, also, 1 (1.0%) patient was referred by specialist in oral medicine and periodontics.

Of the total number of referral letters, 100 (100.0%), 96 (96.0%) were without diagnosis, while 4 (4.0%) referral letters were with diagnosis. The

representation of referral letters without diagnosis was statistically significant greater in relation to the representation of referral letters with diagnosis ($\chi^2=84.64$; $p<0.0005$).

Of the total number of referral letters sent to orthodontist with diagnosis, 3 (75.0%) had correct diagnosis, while 1 (25.0%) was with incorrect diagnosis.

The referral letters with correct diagnosis were sent by: general practice dentist - 1 (33.3%), specialist in oral surgery - 1 (33.3%) and specialist in oral medicine and periodontics - 1 (33.3%). Only 1 (100%) referral letter was registered with incorrect diagnosis, which was sent by general practice dentist.

Figure 1. shows the analysis of representation of different diagnoses established by specialist orthodontist.

Analysis of need for orthodontic treatment by specialist orthodontist showed that orthodontic treatment was needed in 83 (83%) patients, while orthodontic treatment was not needed in 17 (17%) patients

Figure 3. shows the representation of need for orthodontic treatment based on the information who sent the referral letters.

Of the total number of patients, orthodontist assessed that 13 (15.7%) patients were referred too early to orthodontist, and that they would need orthodontic treatment in later period, 62 (74.7%) patients were referred timely, while 8 (9.6%) patients were referred to orthodontist late, i.e. they needed orthodontic treatment much earlier (**Figure 4.**)

Figure 5. shows the representation of patients as per adequate time for orthodontic treatment.

According to the orthodontists' assessment, the largest number of patients referred by general practice dentist, 35 of them or 66.0%, referred timely and needed orthodontic treatment at the time of visit to the orthodontist. Of the total number of patients referred to the orthodontist by specialist in children's and preventive dentistry, 25 of them or 55.6% referred timely to the orthodontist. Specialist in oral surgery referred 1 (100%) patient and specialist in oral medicine and periodontics referred 1 patient to orthodontist who referred timely (**Figure 6.**)

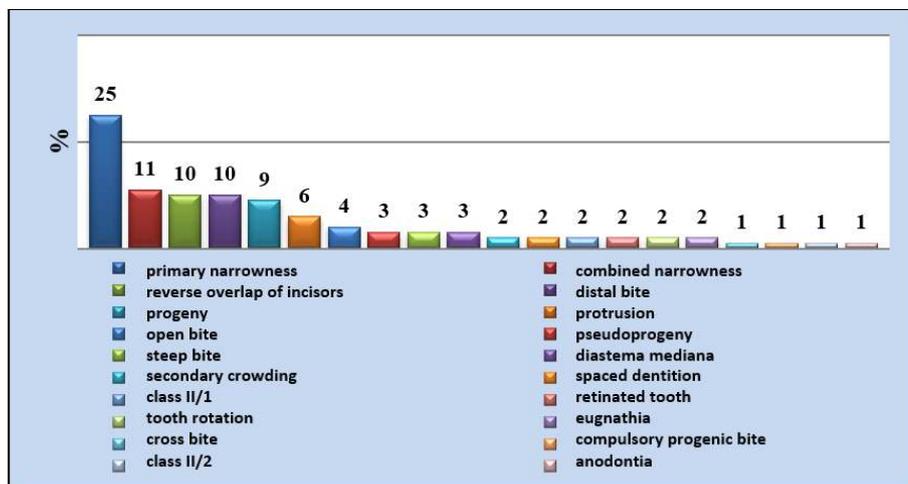


Figure 1. Representation of diagnoses established by specialist orthodontist

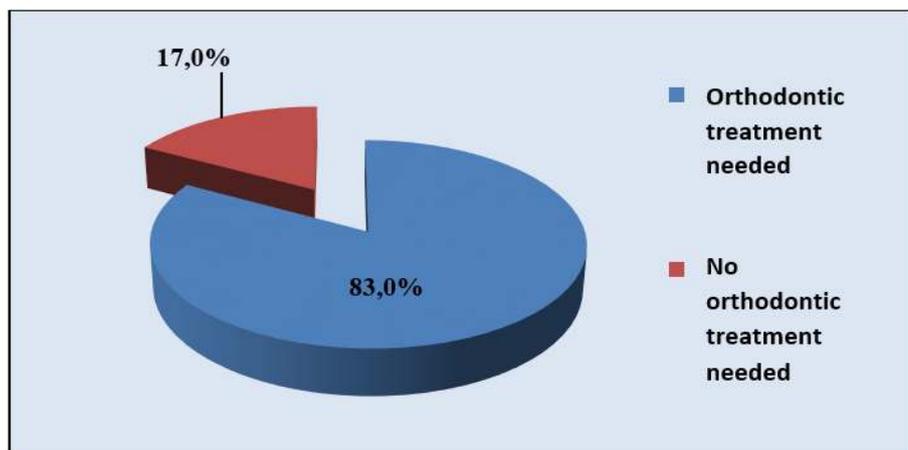


Figure 2. Representation of patients based on need for orthodontic treatment assessed by orthodontist

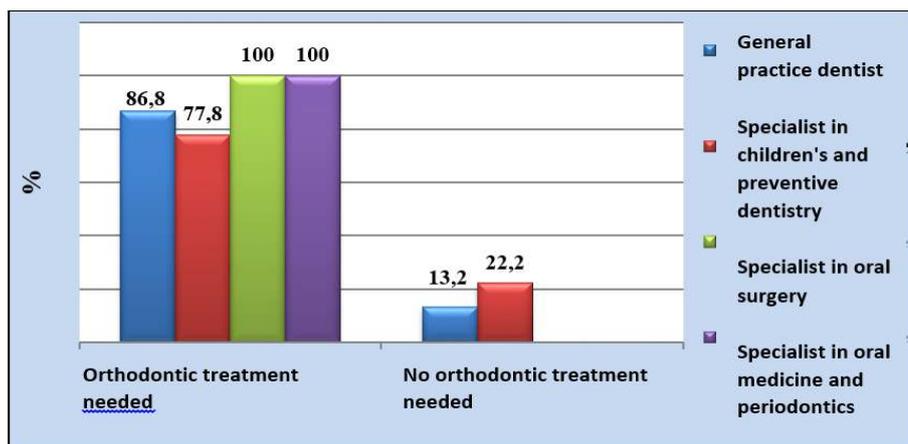


Figure 3. Representation of need for orthodontic treatment based on who issues referral letters

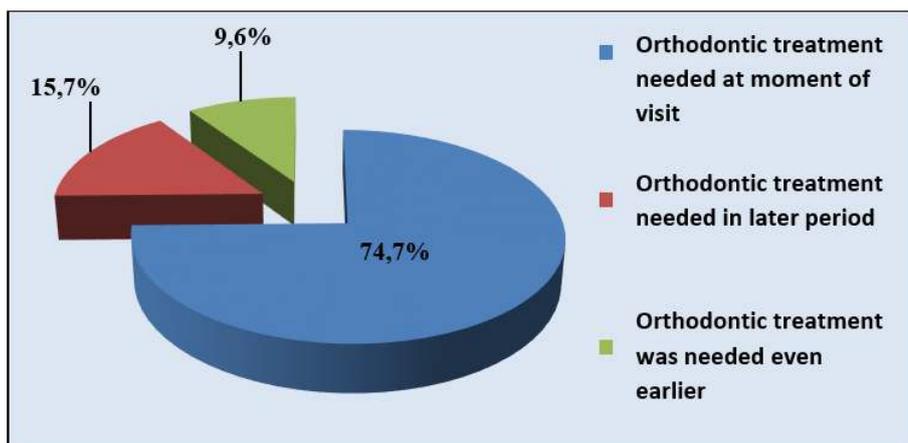


Figure 4. Representation of patients based on need for orthodontic treatment assessed by orthodontist in relation to the optimal treatment time

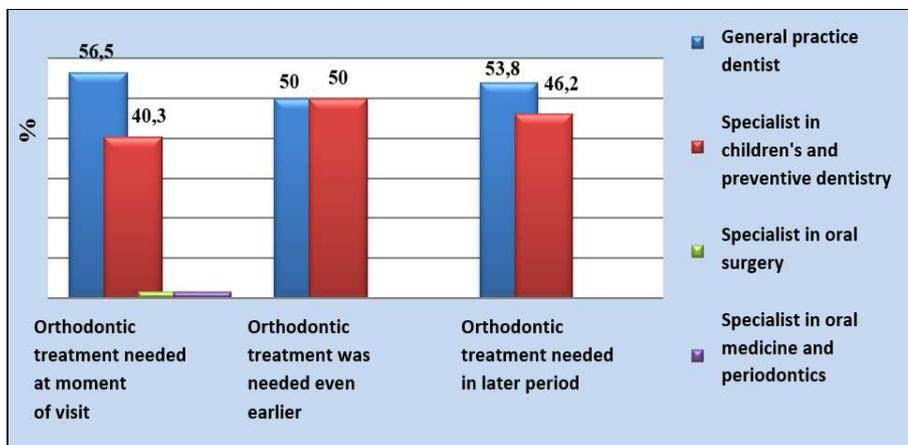


Figure 5. Representation of need for orthodontic treatment based on who issues referral letters in relation to the optimal treatment time

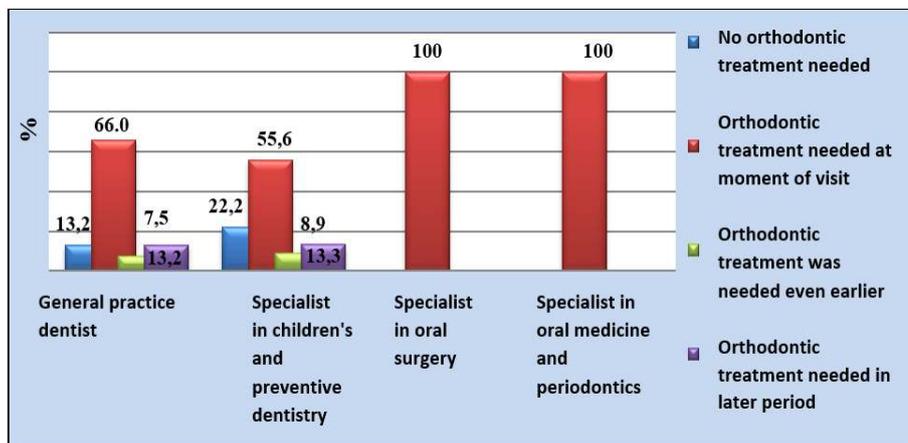


Figure 6. Representation of need for orthodontic treatment based on opinion of orthodontist and based on who issues referral letters

Discussion

Many scientific studies researched and established harmonization regarding the determination of orthodontic treatment need by general practice dentist or dental doctors of other specialties and orthodontists, as well as the level of knowledge of general dentists and non-orthodontic specialties in dentistry and their stance concerning orthodontic therapy.

The criterion used by dentists to recognize the need for orthodontic therapy is not completely clear [10]. The tendency exists that orthodontists are more critical towards dental health protection due to their greater knowledge of occlusion and experience with possible treatment outcome. In comparative research conducted by Kuroda et al. among dentistry students, dentists at specialist training and orthodontists, perceived needs for orthodontic treatment being changed with increased experience and skills in dentistry and orthodontics. Finally, certain variations in the perception of the need for treatment may be found among orthodontists and dentists worldwide and should be taken into account when interpreting the results [11]. Although dentists are so educated that they should well know the bases of diagnostics, etiology and character of individual orthodontic irregularities, some surveys have not yielded results consistent with this. For example, the analyses were performed on patients' diagnoses who referred to one orthodontic outpatient department. From these analyses, it followed that of the total of 400 referral letters that were processed by free choice method, only 65 referral letters were with correct diagnosis. The other diagnoses were partial, incorrect or undefined, and the largest number of referral letters was without any diagnosis [12]. We observe similar data in our research; of the total number of referral letters sent to orthodontist, 96.0% were without diagnosis, while 4.0% of referral letters were with diagnosis.

In the study by Berk et al., it was necessary to establish the rate of agreement among general practice dentists, children's dentists and orthodontists regarding the need for orthodontic therapy. The results showed a high rate of agreement among opinions inside groups of children's dentists, orthodontists and general dentists (Kappa range

0.86-0.95). The rate of agreement compared among groups was lower. The orthodontists, general dentists and children's dentists in this example showed the rate of high agreement regarding the need for orthodontic therapy [13].

The aim of study conducted by Jackson et al. was to examine referral of patients to orthodontist by the general dentists and to examine knowledge of dentists on the Index of Orthodontic Treatment Need (IOTN). The results show that 20% of dentists made correct decisions on referral time for three different malocclusions using tests of photographs. The IOTN is not used routinely by 76% of dentists when referring to the orthodontist. This study offers the evidence that there is a need for postgraduate training or producing instructions for referral in order to help dentists to refer patients for orthodontic treatment to the most appropriate service provider at the most appropriate time. If dentists, among other things, need to act as "doormen" of orthodontic service, it is necessary to provide more support and education for them concerning the use of IOTN [14].

The comparative analysis conducted by Sastri et al. showed significant differences in the results of knowledge and stance towards orthodontics among general dentists and non-orthodontic specialists, and, it was on the side of non-orthodontic specialists. The results of the study were moderately satisfactory and showed the need for increasing clinic-oriented education towards practice and concept of orthodontic therapy. This shows that non-orthodontic specialists, who had 3 more years of education when specializing in dentistry, had more knowledge on orthodontic therapy. Also, results regarding the issue of stance towards orthodontics were on the side of non-orthodontic specialists in comparison with results of general dentists, pointing to a significant statistical difference [4].

Thind et al. concluded in their study that it is necessary to draw attention to general dentists in relation to their recommendation and referral letters that do not contain even basic necessary information. The research suggests that dentists who refer patients to orthodontists should follow instructions and recommendations of British Orthodontic Society [15]. In research by O'Brien et al., it was necessary to determine whether unnecessary referral of new patients to orthodontic consultations was a significant problem. The first part of study included

evaluation of referral letters to orthodontists from general dentists. In the second part, the information was gathered on patients referred by general dentists. The study concluded that significant variations appeared in relation to rates of referral among dentists and many patients were referred unnecessarily. It seems that guidelines for referral to orthodontic therapy are needed and should be directed to all general dentists [16].

Aldrees et al. conducted a study aimed at assessing the orthodontic diagnostic skills, reasons for referral to specialist and the perceptions of orthodontics benefits of pediatric dentists and general dentists in comparison to orthodontists. The selected treatment plans for three cases of early malocclusion showed huge contradictions between results of orthodontists and remaining two groups. Contrary to the orthodontists, pediatric dentists most commonly proposed treatment in relation to dentition periods: primary dentition and early-mixed, and then late-mixed and permanent dentition. Regardless of similarities in diagnosis, among dental practitioners inside three mentioned groups, noticeable differences also existed with regards to proposed treatment approaches, perceived treatment need and timing of intervention [3].

The study by Richmond et al. investigated variations in the dentists' perception of the orthodontic treatment need. The results of this research showed that the group of subjects was divided on the basis of the opinion "what the orthodontic treatment need represents at all", within the very dentistry. It is proposed that the method, achieving a more balanced assessment when defining the need for orthodontic therapy, should be one using occlusal index [10]. O'Brien et al. assessed the effectiveness of recommendations for orthodontic patients' referral to orthodontists. The results showed that the instructions for referral of orthodontic patients did not influence the behavior of general dentists. It is necessary to research more the optimal methods and application of guidelines for referral of patients to orthodontist in general dental service [18].

Contrary to the above-mentioned studies, our research showed that there is no statistically significant difference in determination of need for orthodontic treatment by the general practice dentist or non-orthodontic specialists and orthodontists. The comparative analysis did not show significant

differences in results regarding determination of need for orthodontic treatment by the general practice dentist and non-orthodontic specialists.

However, similar to other authors' researches, we established that the representation of referral letters without diagnosis was statistically significantly higher in relation to the representation of referral letters with diagnosis. Still, it is necessary to take into consideration the limitation of this research regarding the size of the very sample, and it would be necessary to conduct the same on significantly greater number of subjects.

Conclusion

The research showed that there is no statistically significant difference in determining the need for orthodontic treatment by general dental practitioners or non-orthodontic specialties and orthodontists. The representation of referral letters without diagnosis was statistically significantly greater in relation to the representation of referral letters with diagnosis.

It is necessary to provide guidelines that would facilitate recognition of individual malocclusions, complexity of case, and timely referral of patients to orthodontist, and therefore issuance of correct referral letters.

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