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Awareness of patients' orthodontic problems and referral practices among general dental practitioners and non-orthodontic specialists

Svest o ortodontskim problemima pacijenata i praksi njihovog upućivanja među stomatolozima opšte prakse i specijalistima koji nisu ortodonti

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Abstract

Background/Aim. Dentists and particularly general dental practitioners (GDPs) should be able to identify problems such as malocclusions and refer patients with such problems to orthodontics. The aim of the study was to evaluate the awareness of orthodontic problems and referral practices among GDPs and non-orthodontic specialists practicing in the Kingdom of Saudi Arabia. **Methods.** A cross-sectional prospective study included GDP and specialists/consultants of both genders, aged between 22–60 years, practicing general dentistry and specialists other than orthodontics who had worked in their field for two or more years. Non-practicing dentists and nonregistered dentists were excluded. Data was analyzed on SPSS version 21.00. **Results.** Among the respondents, 55.5% were men, and 44% were GDPs. Out of the total number of respondents, 107 (53.5%) GDPs and 66 (33%) non-orthodontic specialists practiced orthodontic referral in their practices. By using the χ^2 test, statistical analysis of different variables depending on the participants' gender and specialty was performed. It revealed that variables with significant *p*-value were: orthodontist referral, the recommendation of orthodontic treatment only after the eruption of all permanent teeth, awareness of tooth extraction for alignment of irregular teeth, and awareness regarding worsening of temporomandibular joint problems by orthodontic treatment. **Conclusion.** The referral practices of dentists practicing in the Kingdom of Saudi Arabia concerning orthodontic patients were satisfactory, although awareness regarding orthodontic problems requires continuous learning and considerate positive progression toward basic orthodontics.

Key words:
dentists; knowledge; orthodontics; referral and consultation; surveys and questionnaires.

Apstrakt

Uvod/Cilj. Stomatolozi, uopšteno, i posebno stomatolozi opšte prakse (SOP) trebalo bi da budu edukovani da mogu da prepoznaju probleme kao što je malokluzija i upute pacijente sa takvim problemima specijalisti ortodoncije. Cilj rada bio je da se proceni svest o ortodontskim problemima i praksi u vezi upućivanja među SOP i neortodontskim specijalistima koji rade u Kraljevini Saudijskoj Arabiji. **Metode.** Prospektivnom studijom preseka bili su obuhvaćeni SOP i specijalisti/konsultanti starosti 22–60 godina koji su se bavili opštom stomatologijom, kao i specijalisti svih grana sem ortodoncije, zaposleni dve ili više godina. Svi podaci su analizirani korišćenjem SPSS programa verzije 21.00. **Rezultati.** Među ispitanicima bilo je 55,5% muškaraca, a SOP 44%. Ukupno, 107 (53,5%) SOP i 66 (33%) neortodontskih specijalista je u svojim ordinacijama praktikovalo upućivanje ortodontima. Pomoću χ^2 testa izvršena je statistička analiza različitih varijabli u zavisnosti od pola i specijalnosti ispitanika. Pokazano je da sledeće varijable imaju statistički značajnu *p*-vrednost: upućivanje ortodontu, preporuke za ortodontsko lečenje tek nakon nicanja svih stalnih zuba, svest o vađenju zuba radi poravnanja nepravilnih zuba i svest o pogoršanju problema temporomandibularnog zgloba usled ortodontskog lečenja. **Zaključak.** Upućivanje ortodontskih pacijenata od strane stomatologa koji rade u Kraljevini Saudijskoj Arabiji je zadovoljavajuće, mada svest o ortodontskom lečenju zahteva neprekidno učenje i pažljiv napredak ka bazičnoj ortodonciji.

Ključne reči:
stomatolozi; znanje; ortodoncija; upućivanje i konsultacija; ankete i upitnici.

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Introduction

Orthodontics deals with facial and dental aesthetics [1], and the correct association between dental and skeletal tissues provides the most pleasing aesthetics and functions to the patient [2].

Awareness of a dentist about the existence of orthodontic problems in their patients is of paramount importance. A dentist should be able to identify dental and skeletal incorrect relations such as malocclusion. Numerous factors influence orthodontic practices, which include the personal and practice characteristics of dentists. A study published in 2019 reported that there was a significant difference between the orthodontic care providers and non-orthodontic care providers – general dental practitioners (GDPs) – in terms of knowledge, attitude, and orthodontic needs among two groups of practitioners [3]. Their results pointed out and highlighted that continuous dental education programs and the use of information resources play a valuable role in GDP and non-orthodontic specialists' education.

GDPs and even pedodontists are the primary sources of identification and referral of patients to orthodontists. Various studies reported that many GDPs provide basic orthodontic treatment and referral to an orthodontist in the majority of patients [4–6]. Another study conducted in India and published in 2016, determining the practices of pedodontists for orthodontic referral, revealed that the knowledge and practices of pediatricians are not sufficient [7]. They should be aware of the common understanding of orthodontic problems and develop a habit of referral to an orthodontist. A study conducted to evaluate the basic knowledge and practices of GDPs and non-orthodontist practitioners revealed reduced knowledge and practices [8, 9]. Unfortunately, fewer studies determining patient referral to orthodontists among Saudi dental practitioners were available [10, 11].

Therefore, the aim of this study was to evaluate the knowledge, awareness, attitude, and referral practices of dentists and non-orthodontic specialists in the Kingdom of Saudi Arabia.

Methods

This cross-sectional prospective study was conducted from a predesigned questionnaire, which consisted of 22 questions addressing dentists and non-orthodontic specialists. Samples were recruited through nonprobability convenience sampling.

Inclusion criteria for the sample population were general dentists and specialists/consultants of both genders, aged between 22–60 years, practicing general dentistry or other dental specialties for at least 2 or more years.

Exclusion criteria were non-practicing dentists, nonregistered dentists, as well as fresh dental graduates.

The duration of the study was 6 months, i.e., from April 2019 to September 2019. Raosoft software was used to calculate the sample size, which was 200, with a margin of error of 5%, a population size of 100, a confidence level of 95%, and a response distribution of 50%.

The participants were asked for verbal informed consent to be included in the study. All the responses were recorded on a predesigned form by the researchers. The study was carried out on a previously used [11] structured questionnaire containing 22 questions, which were validated after a pilot study. The questionnaires were formulated to study the knowledge and attitude of GDPs and non-orthodontic specialties toward the practice of orthodontic treatment. The first part of the questionnaire was designed to collect demographic and other practice-related information, such as specialty and years of experience. The second part consisted of 13 questions framed to study the knowledge of general dental surgeons and non-orthodontic specialties. The questions were Yes/No type, questions indicating their knowledge regarding starting age of orthodontic treatment, mixed dentition stage treatment, facial appearance, functional therapy, inclined teeth, extraction of teeth for orthodontic purposes, etc. The last part, which consisted of 9 questions (Yes/No type), was prepared to study the attitude toward orthodontic treatment, like diagnostic orthodontic procedures, opinion of the orthodontist, giving information to the patient about malocclusion when the patient comes for the other dental treatment, orthodontic treatment in patients with periodontal problems, orthognathic surgeries, etc.

Statistical analysis was done with the SPSS version 21.00. Frequencies and percentages were calculated for qualitative variables. Cross tabulation was performed using descriptive analysis. A χ^2 test was done to evaluate the association of different qualitative variables with gender and specialty. The p-value of ≤ 0.05 was considered significant.

Results

The results revealed that among questioned dentists and non-orthodontic specialists, females made up 45.5% and males 55.5%. Among specialties, GDPs constituted the highest percentage (44%), followed by others (Figure 1).

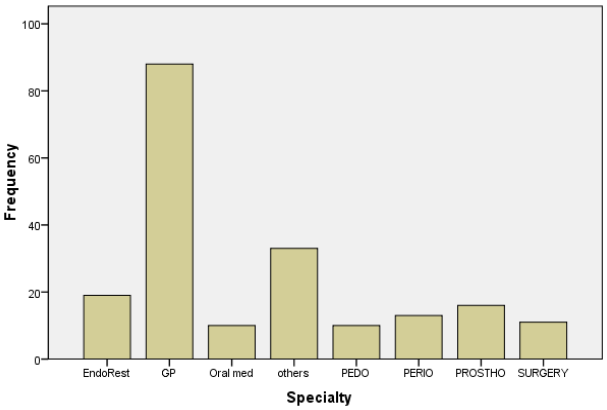


Fig. 1 – Specialty distribution among questioned dentists. GP – general practitioners; PEDO – pedodontists; PERIO – periodontists; PROSTHO – prosthodontists.

Figure 2 shows the percentage of orthodontic referrals among GDPs and non-orthodontic specialists. In their practices, 107 (53.5%) GDPs and 66 (33%) non-orthodontic spe-

cialists practiced orthodontic referral. The comparison revealed a high significance (*p*-value of 0.000).

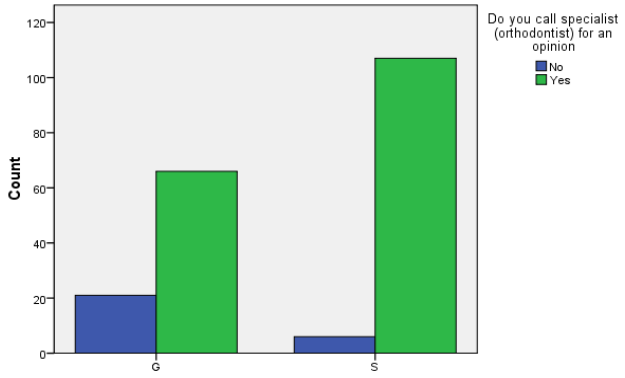


Fig. 2 – Percentage of orthodontic referrals among general dental practitioners (G) and non-orthodontic specialists (S).

Statistical analysis through the χ^2 test was performed between different variables compared with participants' gender, and it showed that variables with significant *p*-value were orthodontist referral, recommendation of orthodontic treatment only after the eruption of all permanent teeth, consideration of skeletal malocclusions in patients with incompetent lips and inclined teeth, awareness of tooth extraction for alignment of irregular teeth, and awareness regarding worsening of temporomandibular joint (TMJ) problems by orthodontic treatment (Table 1).

The χ^2 test results among different variables depending on the specialty showed a significant *p*-value of the following variables: recommendation of orthodontic treatment for patients with periodontal problems, orthodontist referral, the conducting of diagnostic orthodontic procedures, counseling of patients for orthodontic treatment, and awareness regarding worsening of TMJ problems by orthodontic treatment (Table 2).

Table 1

Relationship between gender of GDPs and non-orthodontics specialists with orthodontic treatment and other features

Variable	Male	Female
First orthodontic consultation	0.763	0.376
Possibility of treating orthodontic problems during the mixed dentition stage	0.234	0.333
Assessment of orthodontic problems on clinical examination	0.567	0.111
Importance of well-aligned teeth for facial aesthetics	0.209	0.161
Awareness regarding functional orthodontic therapy	0.173	0.440
Recommendation of orthodontic treatment for patients with periodontal problems	0.532	0.492
Relationship of caries in primary teeth and orthodontic problems	0.981	0.846
Effect of a functional appliance with treatment advised during pre-pubertal growth spurt period	0.240	0.151
Orthodontist referral	0.036	0.005
Conducting diagnostic orthodontic procedures	0.389	0.158
Counseling of patients for orthodontic treatment	0.583	0.169
Recommendation of orthodontic treatment only after the eruption of all permanent teeth	0.041	0.025
Consideration of skeletal malocclusions in patients with incompetent lips and inclined teeth	0.046	0.030
Awareness of tooth extraction for alignment of irregular teeth	0.007	0.009
Awareness of mouth breathing or thumb-sucking leading to improper skeletal form	0.529	0.419
Importance of awareness of teeth eruption and exfoliation timing	0.728	0.948
Awareness regarding the treatment of TMJ problems by orthodontic treatment	0.167	0.378
Awareness regarding worsening of TMJ problems by orthodontic treatment	0.028	0.017

GDPs – general dental practitioners; TMJ – temporomandibular joint.

Table 2

Impact of GDPs and specialists or consultants on orthodontic treatment characteristics

Variable	GDPs	Specialists/ consultants
First orthodontic consultation required at which stage of dentition	0.009	0.040
Possibility of treating orthodontic problems during the mixed dentition stage	0.385	0.487
Assessment of orthodontic problems on clinical examination	0.050	0.041
Importance of well-aligned teeth for facial aesthetics	0.972	0.346
Awareness regarding functional orthodontic therapy	0.001	0.041
Recommendation of orthodontic treatment for patients with periodontal problems	0.595	0.055
Relationship of caries in primary teeth and orthodontic problems	0.115	0.089
Effect of a functional appliance with treatment advised during pre-pubertal growth spurt period	0.078	0.047
Orthodontist referral	0.000	0.023
Conducting diagnostic orthodontic procedures	0.049	0.567
Counseling of patients for orthodontic treatment	0.009	0.237
Recommendation of orthodontic treatment only after the eruption of all permanent teeth	0.000	0.012
Consideration of skeletal malocclusions in patients with incompetent lips and inclined teeth	0.412	0.381
Awareness of tooth extraction for alignment of irregular teeth	0.003	0.045
Awareness of mouth breathing or thumb-sucking leading to improper skeletal form	0.617	0.891
Importance of awareness of teeth eruption and exfoliation timing	0.005	0.057
Awareness regarding the treatment of TMJ problems by orthodontic treatment	0.192	0.018
Awareness regarding worsening of TMJ problems by orthodontic treatment	0.000	0.055

GDPs – general dental practitioners.

Discussion

This study was carried out to evaluate the awareness of patients' orthodontic problems and referral practices among GDPs and non-orthodontic specialists practicing in the Kingdom of Saudi Arabia.

In this study, GDPs constituted the highest percentage, i.e., 44%, followed by other specialists. This is inconsistent with the study conducted by AlBaker et al. [12], who reported that the total number of dentists working in Saudi Arabia was 16,887 in December 2016, with the majority of them being general dentists (70.27%), followed by prosthodontists and orthodontists.

Considering different variables connected with orthodontist referral, the most significant were the recommendation of orthodontic treatment only after the eruption of all permanent teeth, consideration of skeletal malocclusions in patients with incompetent lips and inclined teeth, awareness of tooth extraction for alignment of irregular teeth, and awareness regarding worsening of TMJ problems by orthodontic treatment.

Orthodontics is a specific specialty of dentistry that requires deep knowledge of dentofacial mechanics and thorough treatment planning. According to Reddy et al. [13], GDPs have poor referral practices due to an ineffective referral pathway. However, in our study, orthodontic referral appeared to be a significant variable, and awareness regarding orthodontist referral was well established among GDPs and specialists. Another study published in 2017 by Alnusayri et al. [11] revealed a significant difference between knowledge and attitude of GDPs and non-orthodontic specialties regarding orthodontic referral. However, no difference was observed in a study published by Acharya et al. [10] among GDPs and non-orthodontic specialists in terms of knowledge and orthodontic referral.

The recommendation of orthodontic treatment only after the eruption of all permanent teeth is another significant factor in both cross-tabulations. Orthodontic treatment depends upon the age at which the patient reports and seeks orthodontic treatment. Treatment after the age of eruption of all teeth has the advantage of patient cooperation and compliance but limited treatment outcome. It also depends upon the emergence and eruption of teeth. A study published in 2016 revealed that the age of the mixed dentition period is increased in children born in the period between 1999–2000 compared to the children born between 1976–1985. Girls showed more advanced eruption compared to boys [14]. Therefore, the patient should be thoroughly examined and treatment outcomes discussed after considering all factors for the orthodontic referral.

The consideration of skeletal malocclusions in patients with incompetent lips and inclined teeth is another factor that showed a significant influence on patient referral [15]. It has been considered that patients with inclined teeth and incompetent lips are more likely to have skeletal malocclusion, and the treatment of these patients along with orthodontic fixed appliance therapy in combination with orthognathic surgery will dramatically modify the treatment outcomes and save overall treatment time [16]. Patients with incompetent lips and inclined anterior teeth should be thoroughly investigated and referred to the orthodontist for further treatment [17].

A study of Hassan et al. [18], published in the Saudi Medical Journal in 2014, evaluated different factors of lip incompetency among Saudi children. Their study revealed that lip incompetence was not related only to bimaxillary protrusion, pointing to other skeletal, dental, and soft tissue factors, which also play an important role in lip competency.

GDPs are aware of tooth extraction significance for the alignment of irregularly positioned teeth. However, the extraction of permanent teeth performed to create space and relieve crowding could be a factor that demotivates patients to seek orthodontic treatment. A study conducted on Yemeni children revealed that only 2% of children had undergone orthodontic consultation and treatment, the extraction of teeth being one of the factors that deferred orthodontic treatment [19]. Another study revealed that almost 100% of non-orthodontic specialists and 87.5% of GDPs are aware of the significance that the extraction of teeth has for orthodontic treatment [13].

Another important factor is awareness of the possible worsening of TMJ problems by orthodontic treatment. It is considered that orthodontic treatment could worsen a pre-existing TMJ problem. In our study, this factor appeared significant, showing a general belief that GDPs and non-orthodontic specialists consider worsening of TMJ problem after orthodontic treatment [20]. However, a study published in 2016, conducted at Oulu University Hospital, revealed that treatment of severe malocclusion leads to improvement in the overall Visual Analogue Scale (VAS) score of facial and TMJ-related pain [21].

In our study, we compared and determined the awareness and referral practices of dentists for orthodontic patients reported to dental clinics and compared different variables connected with referral practice. The variables which showed significant *p*-value were the recommendation of orthodontic treatment for patients with periodontal problems, the conducting of diagnostic orthodontic procedures, counseling of patients for orthodontic treatment, and awareness regarding worsening of TMJ problems by orthodontic treatment. The limitations of the study were the small sample size and a cross-sectional design. Other factors should also be considered for evaluating referral for orthodontic treatment, i.e., socioeconomic status, patient expectations, practitioner's expertise, etc.

It is recommended that awareness programs, talks, and seminars be arranged for GDPs and non-orthodontist specialists to enhance their understanding of orthodontics. The use of social media should be made effective so that patients seek early orthodontic treatment and consultation.

Conclusion

Referral practices for orthodontic patients of dentists practicing in the Kingdom of Saudi Arabia were satisfactory, although awareness regarding orthodontic problems requires continuous learning and considerate positive progression towards basic orthodontics.

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