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# Pedodontists' awareness of orthodontics: An online survey

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## Abstract

**OBJECTIVES:** This study aimed to document knowledge, awareness, and ability to provide different aspects of orthodontic treatment currently provided by pedodontists.

**MATERIALS AND METHODS:** A 14-item online questionnaire was sent to 120 pedodontists in different countries. Responses received within 2 months were analyzed as frequency and percentage.

**RESULTS:** The response rate was 68.3%. Most respondents demonstrated adequate information about the etiology and diagnosis of different malocclusions and paid attention to patients' facial characteristics. The desire to learn from continuing education programs was higher for preventive and interceptive orthodontics. Space maintainers, habit breakers, management of anterior crossbite, and serial extraction were the orthodontic services most provided by pedodontists.

**CONCLUSIONS:** Pedodontists should attend to continuing education about the etiology, diagnosis, and treatment planning for various malocclusions.

**Keywords:**

Education, knowledge, orthodontics, pediatric dentist

## Introduction

The extent and quality of orthodontic treatment provided by pediatric dentists is a contentious issue among pedodontists and orthodontists; so, a joint committee meeting of the American Association of Orthodontists and the American Academy of Pedodontists prepared a list of orthodontic activities that pedodontists could perform.[1] The list was organized according to the chronological development of dentition. It made no distinction between the area or severity of the particular problem, relying solely on Angle's classification for segregation. Following that, Ackerman[2] proposed integrating the two specializations into a single curriculum. Ackerman's viewpoint is founded on the observation that many graduate courses are common to both programs.[3–5]

The submission of a board case involving the management of a malocclusion necessitating tooth movement is required for certification by the American Board of Pediatric Dentistry (ABPD).[6] Interceptive therapy in primary/transitional dentition or complete treatment in teenage full permanent dentition is both included. The American Academy of Pediatric Dentistry (AAPD) has also published Guidelines for the Management of Developing Dentition.[7]

Several studies have looked at people's knowledge and awareness of orthodontics. Rawlings *et al.*[8] conducted the first attempt in 1977, surveying pediatric dental residency schools in the United States to determine the quantity of orthodontic treatment provided. They discovered that residents treat a wide range of malocclusions using fixed orthodontic equipment and extraoral appliances and that they are exposed to a wide range of orthodontic themes, including growth and development and cephalometrics.

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The second survey was conducted on the Southwestern Society of Pedodontists members to gather information about the orthodontic phase of pedodontic practice. The study found that only a minority of those professionals (25%) were involved in complete orthodontic treatment, while the majority (60%) worked in the preventive-interceptive field of orthodontics.[9]

The AAPD surveyed all diplomates of the ABPD in November 1983 to establish their orthodontic training history, trends in pediatric dental practice, and kinds of orthodontic services.[10] According to the poll, almost one-third of respondents provided full orthodontic treatment, and more than a quarter committed more than 25% of their office time to do so. According to the AAPD, the types of therapy provided may have been affected by decreasing demand for traditional restorative operations. This notion was validated by two further studies.[11,12]

Koroluk *et al*.[13] investigated the scope of orthodontic services offered by pediatric dentists in Indiana. They discovered that 62% of the pediatric dentists polled gave full orthodontic treatment and spent substantially more time doing so. However, Gorczyca *et al*.[14] surveyed general and pediatric dentists in Massachusetts on how much orthodontic therapy they provide. They concluded that pedodontists give more complete orthodontic care, spend more time on orthodontic care, and refer fewer patients to orthodontists than general practitioners do.

In a series of studies, Hilgers *et al*.[15] attempted, in 2003, to document pediatric dentists' orthodontic treatment for comparison with previous and future research, as well as to identify characteristics that impact upon practitioners' orthodontic treatment patterns. They discovered that pediatric dentists spent overall less time giving orthodontic treatment since the last study of ABPD diplomates in 1983,[10] although the percentage of practitioners delivering full orthodontic treatment remained constant. Furthermore, while many practitioners provided thorough orthodontic therapy, many others gave only minimal treatment or did not give orthodontic treatment at all. Then after, Hilgers *et al*.[16] investigated the amount and type of orthodontic training provided in pediatric dental residencies, discovering that U.S. pediatric dental residency programs allowed residents to provide orthodontic treatment in different dentitions, beginning with six to 10 orthodontic cases and spending a half-day to a full day per week providing a wide range of orthodontic treatments, and finally, Hilgers *et al*.[17] investigated whether pedodontists' orthodontic treatment followed the orthodontic instruction delivered in pediatric dentistry residency programs in 2004. They discovered that the majority of orthodontic treatment delivered by pediatric dental residents was identical to that delivered by diplomates, although residents were exposed to a broader range of orthodontic techniques than diplomates. Additionally, residents were more likely than diplomates to increase the quantity of orthodontic treatment delivered over the following 5 years.

A comparison of the orthodontic diagnostic skills, referral patterns, and perceptions of orthodontic benefits among pedodontists and orthodontists in KSA was conducted by Aldrees *et al*.[18] in 2015. They discovered that treatment need and urgency were rated higher among pediatric dentists as they are the first dental healthcare professionals to clinically observe children and are more oriented toward the complications of malocclusion as soon as they are observed.

Pachas and Pizarro[19] compared the perception, knowledge, and attitude toward interceptive orthodontics among pedodontists and orthodontists and found comparable responses. Finally, Rajab *et al*.[20] recognized the interceptive and orthodontic treatment currently afforded by Jordanian pediatric dentists. They found that the majority of pedodontists provide orthodontic treatment with high expectations regarding the benefits of providing it.

This study aims to assess the pedodontists' knowledge, awareness, and ability to provide different aspects of orthodontic management.

## Materials and Methods

After approval was granted by the Scientific and Ethical Committees in the College of Dentistry, University of Baghdad (ID. 287 in 2-5-2021), this study was conducted on pedodontic specialists in various countries. An invitation was sent by e-mail and social media to 120 pedodontists, asking them to fill out an online Google Form questionnaire about their attitudes toward orthodontics. Only 82 pedodontist specialists have participated in this study from Iraq, Jordan, Lebanon, and the UK.

### Statistical analyses

The collected responses were analyzed using the Statistical Package for the Social Sciences (SPSS) (version 25) for frequency distributions and percentages.

## Results

Table 1 shows the participants' demographics. Generally, 76% of the total participants were females, and about 59% of respondents were more than 40 years old. Most participants (72%) had been awarded a master's degree, and 96% reported experience of 5 years or more. The distribution of workplace was nearly equal between public, private, and both places.

**Table 1: Demographic data for the sample**

| Demographic data | *n* | % |
|---|---|---|
| Gender | | |
| Male | 20 | 24 |
| Female | 62 | 76 |
| Total | 82 | 100 |
| Age | | |
| <30 years | 3 | 4 |
| 30-40 years | 31 | 38 |
| >40 years | 48 | 59 |
| Total | 82 | 100 |
| Qualification | | |
| Diploma | 8 | 10 |
| M.Sc. | 59 | 72 |
| Ph.D. | 15 | 18 |
| Total | 82 | 100 |
| Year of experience | | |
| <5 years | 3 | 4 |
| ≥5 years | 79 | 96 |
| Total | 82 | 100 |
| Place of work | | |
| Private | 28 | 34 |
| Public | 26 | 32 |
| Both | 28 | 34 |
| Total | 82 | 100 |

Table 2 shows the frequency distributions and percentages of responses regarding the questions. About 65% of the participants reported having adequate information about orthodontic treatment in their study course of pediatric dentistry; yet, 78% reported paying attention to the facial characteristics of the patients at the initial consultation.

Regarding the ability to diagnose cases that need orthodontic intervention, 57% of the participants responded positively, while 43% said that they could diagnose some of these cases. About 21% of pedodontists report being able to treat cases orthodontically, while 37% say that they cannot treat such cases, and 43% report treating the case according to the type of malocclusion.

The responses about which problems need urgent intervention varied among participants [Figure 1]. About 40 responses selected all of the listed problems. The level of orthodontic practice the participants can provide to their patients is presented in Figure 2, showing a preponderance of space maintainers, habit breakers, management of anterior crossbite, and serial extraction.

Figure 3 shows opinions regarding the continuation of orthodontic education. Many pedodontists indicated that they would like to know more about preventive and interceptive orthodontics, and partial and full corrective fixed orthodontic treatment. Only 10 respondents did not like it.

Concerning unilateral extraction of lower primary canine, 39% preferred extraction of the contralateral one,

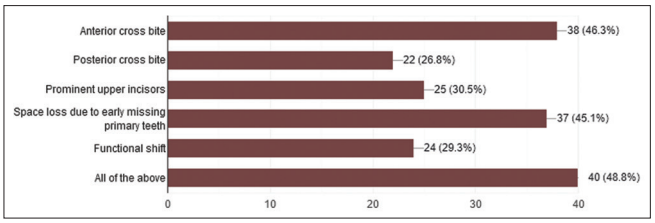


**Figure 1:** Bar chart showing the response about the case(s) participants think that it (they) need urgent intervention

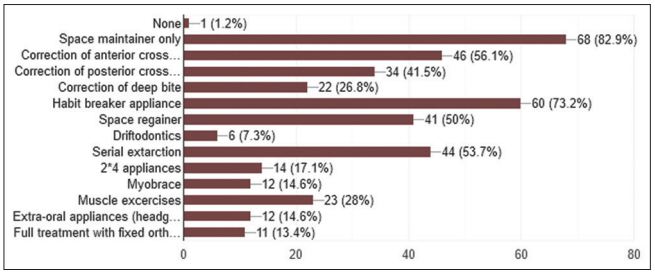


**Figure 2:** Bar chart showing the responses about the level of orthodontic practice the participants can provide

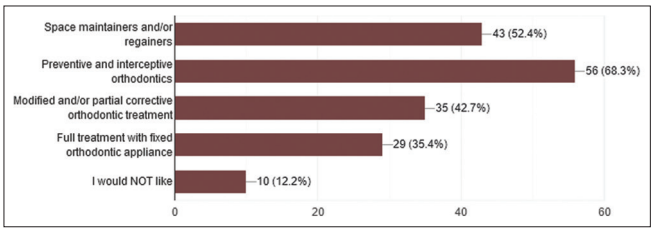


**Figure 3:** Bar chart showing the responses of the participants toward continuing education in orthodontics in different aspects

while fabricating space maintainer or referring to the orthodontists was preferred by 61% of the participants.

To consult an orthodontist regarding balancing and compensating extractions, 74% of the participants report consulting and 26% do not. Moreover, 63% report not using a distal shoe space maintainer in case of early loss of the primary second molar.

Examining the buccal sulcus or the palate at the age of 9–10 years to detect the canine bulge was reported by 70% of the respondents; about 95% said that they could interpret the panoramic X-ray to address suspicion of any abnormality.

Regarding the management of median diastema, 82% said that they reassure the parents that this is a normal phenomenon and will be resolved after the eruption of the canines, while the other 18% reported referring this situation to orthodontists.

Finally, 44% of the participants report referring patients with gingival recession associated with an anterior crossbite to orthodontists for treatment. Of the remaining, 39% report reassuring parents that the case

**Table 2: Frequencies and percentages of participants' responses**

| Questions | Answers | *n* | % |
|---|---|---|---|
| Did you have adequate information about orthodontic treatment in your study course in pediatric dentistry (i.e., regarding the etiology, diagnosis, and management of different types of malocclusion)? | Yes | 53 | 65 |
| | No | 29 | 35 |
| | Total | 82 | 100 |
| Did you pay attention about the facial characteristics (such as long or short face, state of lips, depression of the naso-maxillary area, protrusion or retrusion of one of the jaws, or both) of your patients during first contact ? | Yes | 71 | 87 |
| | No | 11 | 13 |
| | Total | 82 | 100 |
| Did you think that you have the ability to diagnose cases need orthodontic intervention? | Yes | 47 | 57 |
| | Some cases not all | 35 | 43 |
| | Total | 82 | 100 |
| Did you treat patients required orthodontic intervention? | According to the case | 35 | 43 |
| | No | 30 | 37 |
| | Yes | 17 | 21 |
| | Total | 82 | 100 |
| How did you manage a case of unilateral extraction of lower primary canine? | Extracting the primary canine in the other side | 32 | 39 |
| | Refer for specialist orthodontist | 25 | 30.5 |
| | Using space maintainer | 25 | 30.5 |
| | Total | 82 | 100 |
| Did you consult the orthodontist regarding the balancing or compensating extraction? | Yes | 61 | 74 |
| | No | 21 | 26 |
| | Total | 82 | 100 |
| Did you do distal shoe space maintainer in case of early loss of the primary second molar? | Yes | 30 | 37 |
| | No | 52 | 63 |
| | Total | 82 | 100 |
| Did you examine the buccal sulcus or the palate at the age of 9–10 years to detect the canine bulge? | Yes | 57 | 70 |
| | No | 25 | 30 |
| | Total | 82 | 100 |
| If you suspect a problem and refer the patient for panoramic X-ray (OPG), did you have the ability to interpret this radiograph? | Yes | 78 | 95 |
| | No | 4 | 5 |
| | Total | 82 | 100 |
| How can you manage a case of median diastema at the mixed dentition stage? | I refer the case to the specialist orthodontist | 15 | 18 |
| | Reassure the parents as this is a normal phenomenon that will resolve later | 67 | 82 |
| | Total | 82 | 100 |
| How can you manage a case of gingival recession associated with incisor crossbite? | I refer the case to the specialist orthodontist | 36 | 44 |
| | I refer the case to the specialist periodontist | 14 | 17 |
| | Reassure the parents as this case will be resolved after correction of the crossbite | 32 | 39 |
| | Total | 82 | 100 |

will be resolved after crossbite correction, and only 17% report referring these cases to periodontists.

## Discussion

Pediatricians and general dentists are frequently the first professionals who come to mind when discussing oral health. General dentists, however, are unable to treat everyone who needs dental care on their own. The pediatric dentist has the specialist knowledge required to instruct both the family and the child on how to avoid future dental problems.[21]

Preventive orthodontics focuses on educating patients and their parents as well as keeping track of how dentition and craniofacial structures are growing and developing. Diagnostic tests are undertaken to predict when malocclusion may develop, and treatment measures are then implemented to postpone the onset of malocclusion. Overall, preventive orthodontics seeks to detect and rectify any anomalies and misalignments of the developing dentofacial complex. Numerous procedures are common to both preventive and interceptive orthodontics, but their timings differ: Preventive measures are conducted before a problem develops, while interceptive actions are implemented after a problem has already arisen.[22]

The response rate in this study (68.3%) was good in comparison with the expected response rate of a mailed survey[23,24] and close to the 75% reported by Hilgers *et al*.[15] which was higher than in another study.[14] The

results can hence be generalized to show an awareness of orthodontics by pedodontists overall. Closed-ended questions were utilized to limit uncertainty and facilitate analysis. Definitions were not included in this survey to avoid unnecessary length.

The majority of the respondents are females aged over 30 years, with a master's degree in pediatric dentistry, and more than 5 years of experience [Table 1]. Most of the questions in this survey differed from those in other studies because, here, the focus was on awareness and sound knowledge of the etiology, diagnosis, and management of common orthodontic cases that may relate to pediatric dentistry [Table 2].

About 65% of the participants reported having adequate information about the etiology, diagnosis, and management of orthodontic problems. Moreover, 87% of participants reported paying substantial attention to patients' facial characteristics during the first consultation, and that they were able to distinguish between skeletal and non-skeletal orthodontic abnormalities in children which are treated by shifting teeth and changing growth. Despite all of that, only 21% of participants said that they could provide orthodontic treatment for the patient; 37% responded that they provided no orthodontic treatment, and 43% provided the treatment according to the case. Hilgers *et al*.[15] reported that 9–11% of their sample did not provide orthodontic treatment. The lack of trust or adequate information to examine and recommend or consult orthodontic cases may be accounted for the higher percentage in this study.

Anterior and posterior crossbite, prominent upper incisors, space loss due to early missing primary teeth, and functional shift are considered urgent cases that need treatment to prevent other problems [Figure 1]. The majority of the respondents were aware of these conditions, and this was considered a positive point for them as referring to or treating these cases is mandatory.

The level of orthodontic treatment provided by pedodontists is presented in Figure 2. Space maintenance and breaking bad oral habits, followed by correction of anterior crossbite and serial extraction, are the main treatments provided. These are considered simple cases for management by removable appliances. It, thus, becomes clear that respondents provided preventive-interceptive treatment modalities following the findings of other studies.[9,14–17,19,20] Comprehensive treatment with fixed orthodontic appliances and using extraoral appliances were reported to be provided by fewer pedodontists unlike found in other studies.[14–17]

Many dental practitioners and pedodontists applied to private orthodontic courses to expand their awareness and information about this branch. The majority in this study preferred attending continuous education programs in preventive-interceptive orthodontics, space maintenance, and partial corrective orthodontics. According to these findings, more such programs, in accord with the AAPD guidelines,[7] should be included in postgraduate study to improve the knowledge of pedodontists, especially those who work in rural areas.

Unilateral extraction of lower primary canines and first molar causes dental midline shift. This can be managed either by extraction of the contralateral tooth or by constructing a space maintainer.[25] About 39% preferred to extract the primary tooth on the other side, and equal responses went to referral or constructing a space maintainer. This is considered a positive point to prevent the midline shift keeping in mind the state of dentition upon deciding the extraction.

One management method for some orthodontic cases is compensating and balancing extraction. The decision for dental extraction needs thorough examination to reach the correct diagnosis and planning. The majority of pedodontists (74%) preferred to consult an orthodontist about such cases; however, 26% reported being able to decide for themselves.

Early extraction of the primary second molar can cause mesial drifting of the permanent first molars and space loss of the second premolars. Ideally, this problem can be solved using a distal shoe space maintainer, which requires a skillful pedodontist and a laboratory technician to construct an appliance of the proper length. About 63% reported not using one, which decision may lead to space loss and drift in the future. Gorczyca *et al*.[14] reported that 80% of the pedodontists in Massachusetts used such a space maintainer. The difficulty of fabricating one can be resolved by the availability of cone-beam computed tomography (CBCT) and three-dimensional (3D)-printed technology that offers a quick, precise design and manufacturing solution. Other types of space maintainers were not addressed as they were easy to construct without soft tissue penetration.

When children are 9–10 years old, observing the canine bulge in the buccal sulcus is important as this indicates the maxillary canine eruption. In this study, 70% of the respondents reported examining the buccal sulcus, and 30% did not. Those 30% need to be more cautious about their manner and should advance their awareness and knowledge about canine problems.

An essential diagnostic aid is the panoramic radiograph (OPG). It has many advantages especially for children as it does not provoke the gag reflex and the dentist can examine wide areas including the bone

and teeth for problems in the teeth or jaws.[25] About 95% of the participants report confidence in interpreting orthopantomogram (OPG) against 5% not.

Median diastema is considered a major concern for parents at the early mixed dentition stage. Normally, it resolves spontaneously without intervention after the eruption of the permanent maxillary canines and just needs reassurance to the parents after excluding other causes.[25] This was the response of 82% of the participants against 18% who preferred referral to the specialist orthodontist.

Instanding maxillary incisors may cause a gingival recession in the lower one. Simple treatment of this case with a removable appliance or even bite opening will resolve that recession. Here, 44% of the respondents refer such cases to an orthodontist and 39% reassure parents that the situation will be resolved after treatment.

The major limitation in this study is the limited sample size. Another study is recommended to be performed again after 5 years as more private courses are held now in addition to the online courses.

## Conclusions

Pedodontists need regular continuing education, both face-to-face and online about the etiology, diagnosis, and treatment planning for different cases of malocclusion. Postgraduate students should be taught more about orthodontics to recognize the severity of cases that they encounter, so they can treat simple ones, and refer the complex ones to specialist orthodontists.

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### Conflicts of interest
There are no conflicts of interest.

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