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Knowledge, Attitude and Practice of Aligner Use in Children Among General Dentists, Orthodontists and Paediatric Dentists

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Abstract

Introduction: To meet the growing aesthetic desire for an alternative to traditional braces, researchers have created a variety of alternatives. Among these, in the recent years clear aligners have gained immense popularity due to ardent marketing. Hence, it is important to assess the awareness about different types of aligners and its use in pediatric patients among practitioners.

Aim: The present questionnaire survey was conducted to evaluate and compare the knowledge, attitude and practice of aligner use in Pediatric patients among Orthodontist, Pedodontist and General dentists.

Methods: A cross-sectional study was carried out among 100 dentist, which included General dentist (36),

Pedodontist (33), Orthodontist (31). The knowledge, attitude, and practice of dentist toward use of clear aligners in pediatric patients was assessed. A validated self-administered structured questionnaire was developed, and distributed as google forms. The data collected was subjected to statistical analysis.

Results: 73% of dentists recommend aligners as a treatment option in children. 60% of the pedodontist recommend aligners in treating certain malocclusions. However 83% of the orthodontist prefer metal braces over aligners treatment. It was also found that dentists are well aware about the ill-effects of (DIY) aligners and majority of Dentist are against Do- it- yourself (DIY) aligners.

Conclusion: Dentists have good knowledge on the use of aligners and are well aware of its advantages and disadvantages. 90% of Dentist agree that the use of aligners in children can be beneficial to reduce the severity of malocclusion when they used under trained specialists and are monitered regularly.

Keywords: Aligners, Attitude, Knowledge, Practice

Introduction

The desire for appliances that are aesthetically pleasing and more comfortable than traditional fixed appliance has increased in individuals seeking orthodontic treatment. Over the past three decades, there has been revolutionary changes in this field[1]. One such breakthrough development is the invention of clear aligners(1997).Clear aligners are transparent trays made of Polyvinylchloride. Clear Aligner Therapy (CAT) refers to a broad category of appliances with varying functions, construction techniques, and suitability for different malocclusion therapies. Their main advantage is superior aesthetics, removable nature, reduced treatment time and patient comfort. Aligners can be created manually by taking impression using poly vinyl siloxane impression materials or by using an intraoral scan[2]. Through the use of intraoral scans, which digitally scan teeth and dental arches and stage tooth movement in accordance with treatment plans, an exact three-dimensional digital model is created. The digital models are forwarded to the casting plant, wherein a stereolithographic model is produced for every phase, and the model is then coated with transparent thermoplastic material. Following which, each aligner is positioned to produce a suitable 0.25–0.30 mm of orthodontic tooth movement in 2 weeks time period [5,19].

Over the last few years, “Do-it yourself' (DIY)Aligners have been marketed widely. These kind of treatment without the proper guidance of a certified dental specialist can cause long term complication , especially when the use is in a young growing child[3,4].This makes it imperative that proper knowledge of its application is essential. Hence, the study was done to assess the knowledge, attitude, and practice of aligner use in children among General dentists, Orthodontists and Pediatric dentists.

Materials and Method

This study was conducted among 100 dental professionals which included Orthodontist, General Dentist and Pediatric dentist.

A validated structured close–ended questionnaire was prepared to assess the knowledge, attitude and practice of aligner’s usage among dentists. The questionnaire consists two sections. First section assessed the demographic details of the respondents. The second section assessed the Knowledge, Attitude and Practice of the participants towards the use of aligners in pediatric patients. Each section contains 5 questions. The Google form questionnaire was then distributed to all the participants in the study via WhatsApp and Email. Reminder email/ message was sent 1 week apart to gain

more number of responses. The data collected was subjected to statistical analysis. Both descriptive and analytical statistical dimensions were used to describe the primary variables by SPSS 18 (IBM Corporation, Armonk, NY, USA) software.

Results

Table 1 gives socio-demographic details of the study participants.100 dentists were included in the study, of which 71 were females and 29 were males. A total of 30 BDS and 70 MDS dentists (General Dentist=36, Pedodontics =33, Orthodontist=31) participated in this study.

Table 2 highlights the response to the questionnaire of the study participants.

Table 3 shows the comparison of mean Knowledge, Attitude and Practice among dentists towards the use of aligners in children. The mean KAP score is 56.73% in Pedodontists,55.74% in Orthodontists and 54.81% in General Dentists. A Statistical significant difference in the KAP score was seen between Pediatric Dentist and General Dentist.

Discussion

Orthodontic correction aims to achieve functional occlusion, facial balance, stability, and periodontal integrity. A conventional orthodontic treatment can take 18–36 months, which depends on the distance the teeth need to be moved, treatment goals, the type of technique employed, and the cooperation of the patient [6]. Fixed orthodontic treatment has been a traditional practice for orthodontists working worldwide, facing the challenge of prolonged treatment duration (2–3 years)[7].

Orthodontic aligner therapy has gained increased recognition within the dental community in the past decade. In 1945, Kesling introduced the orthodontic aligners, which enabled clinicians to perform minor tooth moments during the finishing stage of the treatment or minor alignment of relapse cases[8]. Compared with conventional fixed braces, clear aligners displayed improved esthetics, comfort and oral hygiene for patients[9]. On the other hand, clear aligners had some disadvantages in controlling tooth movement[10].A systematic review by Gabriele Rossini concluded that clear aligners were effective in controlling anterior intrusion and posterior buccolingual inclination but not anterior buccolingual inclination[12]. Extrusion was the most difficult movement (30% of accuracy), followed by rotation. Bodily distalization of upper molar within 1.5 mm revealed the highest predictability (88%). Thus, clear aligners were recommended in simple malocclusions[12,19]. However, in recent times, aligners have been marketed widely and have been gaining immense popularity.

The present study assessed the Knowledge, Attitude, Practice on the use of aligners in children patients among General Dentist, Orthodontist and Pedodontists and found that all participants are well aware about the use of aligners in Children. 60% of Pedodontists recommended the use of aligners in treating malaligned teeth. In constrast 93% of the Orthodontist recommended the conventional fixed orthodontic treatments. Fabrizida et al, states that majority of the orthodontists do not want to use clear aligners because of the limited orthodontic final treatment outcomes and higher price in comparison to traditional fixed appliances[13].

Majority of the Orthodontists and Pedodontist claimed that the main reason for aligner treatment to be ineffective was the lack of orthodontic guidance. Infact most of the dentist agreed that unmonitored orthodontic treatment with aligners could cause irreversible damages to teeth and jaws. Renuka et al, reported that 77 % of their study participants believes that lack of orthodontic

guidance as a the major cause of failure of aligners[14]. Most of the Pedodontists agreed that aligners could be used in only certain malocclusion. Sheldon C et al, also reported that the clear aligner treatments is ineffective in the correction of anteroposterior discrepancies, extrusion cases and posterior torque[15]. Majority of the Pedodontists and Orthodontists agree that aligners had an impact on the development of cranio-facial structures. Zou et al, reported the effectiveness of clear aligners in correcting anterior cross-bite and facial asymmetry in primary dentition. Clear aligner therapy shows great potential in early intervention for deciduous teeth malocclusion due to its accurate three-dimensional tooth movement control, low cariogenic rate, and high coordination of children[16]. The study done by Levrini et al in 2021, evaluated the efficacy of clear aligners in achieving palatal expansion during mixed dentition, showed the potential of clear aligners in increasing arch width in a shorter period of time and also acknowledged the comfort and aesthetic benefits of clear aligners therapy[17].

83.9% of the orthodontist do not agree with the use of Do-it-yourself (DIY) aligners. The findings of this research about DIY aligners are consistent with previous studies in the field[18,20]. According to a study by Anna Wexler on participants who have undergone aligner treatment, 6.6% of subjects had to visit an orthodontist due to severity of side effects[18]. However, most of the dentist agrees that aligners could be used for mild orthodontic corrections in teenagers and adolescents instead of the conventional braces. A systematic review by Aakriti et al, highlighted that preference for clear aligners is rooted in providing quality treatment, contributing to a positive impact on a child's self-esteem throughout the treatment[5]. Alissa et al, 2021 shows that treatment with orthodontic aligners for mild malocclusions resulted in significantly better results in terms of tooth alignment, occlusal relations and overjet. Studies on oral health-related quality of life, which compare treatments with aligners to those with fixed appliances, concluded a higher quality of life with aligner therapy and psychosocial well-being also increases throughout the course of the treatment[11].

The results of the present study revealed that the Pedodontist had a better mean KAP score, followed by Orthodontist and General dentist. Statistical significant difference was seen in the KAP score between the Pedodontist and the General dentist. Pedodontists plays a crucial role in early intervention in mixed dentition period of a child and provides a proactive approach in addressing orthodontic concerns in its initial stages. Clear aligner therapy can be an appropriate treatment when used correctly. A healthy and harmonious smile requires preparation, adherence to treatment guidelines, and ongoing monitoring by an experienced dental specialist.

Conclusion

The KAP of Pediatric dentist was significantly higher than that of the General dentist. Most of the dentist are aware of the limitation of clear aligners and are against the use of unmonitored orthodontic treatment with DIY(Do-it-yourself) aligners. Clear aligners have many advantages, including improved dental hygiene, comfort, ease of use, and better aesthetics during treatment. However, it is essential that aligners are used under trained dental professionals.

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Legends Tables

Table 1: Demographic details of study participants

	Frequency	Percent
Gender		
Female	71	71
Male	29	29
Qualification		
MDS	70	70
BDS	30	30
Specialities		
Pediatric Dentist	33	33
Orthodontist	31	31
General Practitioner	36	36

Table 2: Response of the study participants

Knowledge based		Pedodontist	Orthodontist	General Dentist
Q1.What renders DIY(Do -It-Yourself) aligner treatments ineffective?	Lack of knowledge	18.20%	3.20%	25.00%
	Lack of orthodontic guidance	72.75	83.90%	66.70%
	Poor customer service	9.10%	12.90%	8.30%
Q2.According to you ,what limits one from using aligners in a child patient?	Cost of aligners	24.20%	41.90%	52.80%
	Ineffective in certain Malocclussion	63.60%	32.30%	22.20%
	Patient compliance	12.10%	25.80%	19.40%
	Duration of the treatment			5.60%
Q3.TMJ examination has great significance in prognosis of the aligner treatment?	Disagree	3.00%	3.20%	8.30%
	Neutral	6.10%	22.60%	8.30%
	Agree	90.9%	74.2%	83.3%
Q4.Unmonitered orthodontic treatment with DIY aligners can cause irreversible damage to your teeth and jaws?	Disagree	3.00%		8.30%
	Neutral	9.10%		11.10%
	Agree	87.8%	100%	80.6%
Q5.Using aligners on younger patients have an impact on how the cranio-facial structures grow and develop?	Disagree	9.10%	3.20%	5.60%
	Neutral	15.20%	41.90%	27.80%
	Agree	75.8%	54.9%	66.7%

Attitude based

		Pedodontist	Orthodontists	General Dentist
Q1.Do you agree with treating malocclusion using DIY(Do -It-Yourself) aligners?	Agree	3.0%	3.2%	16.7%
	Disagree	57.6%	83.9%	52.7%
	Neutral	39.40%	12.90%	30.60%
Q2.Using aligners to treat malocclussion in teenagers and adolescents produces better outcomes?	Disagree	3.00%	9.70%	5.60%
	Neutral	24.20%	32.30%	36.10%
	Agree	72.8%	58.1%	58.3%
Q3.In your professional practice, have you encountered any DIY aligner failures?	Often	12.1%	45.2%	33.4%
	Rarely	57.6%	25.8%	30.6%
	Never	30.3%	29%	36%
Q4.Do you think using aligners for teenager's orthodontic treatment will boost their confidence more than using traditional braces?	Always	63.6%	45.2%	61.1%
	Often	33.3%	32.3%	30.6%
	Rarely	3.1%	22.5%	8.3%
Q5.Children with protruding upper front teeth may benefit from Aligners treatment?	Disagree	6.10%	32.20%	8.30%
	Neutral	15.20%	19.40%	41.70%
	Agree	78.7%	48.40%	50%

Practice based

		Pedodontist	Orthodontists	General Dentist
Q1.Which treatment would you recommend for malaligned teeth?	Aligners	60.60%	6.50%	33.30%
	Metal braces	36.40%	83.90%	47.20%
	Ceramic braces	3.00%	9.70%	13.90%
	Lingual braces			5.60%
Q2.In your day-to-day clinical practice, how frequently do you find that patients choose aligner treatment regardless of the cost?	Rarely	78.80%	83.90%	58.30%
	Often	15.20%	12.90%	41.70%
	Never	6.10%	3.20%	
Q3."Invisalign Teen" treatment is appropriate for treating teenagers and adolescents in your regular practice?	Disagree	3.00%	3.20%	11.10%
	Neutral	45.50%	45.20%	36.10%
	Agree	51.5%	51.60%	52.8%
Q4.Do you let the patients know about relapses and the necessity for retention strategies?	Always	87.90%	96.80%	69.40%
	Often	12.10%	3.20%	25.00%
	Rarely			5.60%
Q5.Do you think that using aligners instead of traditional braces for milder orthodontic treatment in teenagers and adolescent age groups is preferable?	Always	94%	71%	72.2%
	Never	6%	29%	27.80%

Table 3: Comparison of Mean KAP among General Dentist, Orthodontist and Pedodontist based on their practice

Comparison of mean Knowledge, Attitude & Practice Domains including total KAP scores based on their Practice Type using Kruskal Wallis Test followed by Dunn's post hoc Test							
Domains	Practice	N	Mean	SD	p-value [a]	Sig. Diff	p-value [b]
Knowledge	Pedodontist	33	15.06	2.02	0.03*	P vs O	0.19
	Orthodontist	31	14.65	1.58		P vs G	0.01*
	General Dentist	37	13.95	2.07		O vs G	0.14
Attitude	Pedodontist	33	23.91	1.49	0.04*	P vs O	0.31
	Orthodontist	31	23.55	2.19		P vs G	0.04*
	General Dentist	37	23.08	1.86		O vs G	0.26
Practice	Pedodontist	33	17.76	1.35	0.80	P vs O	0.67
	Orthodontist	31	17.55	1.63		P vs G	0.76
	General Dentist	37	17.78	1.97		O vs G	0.53
KAP	Pedodontist	33	56.73	3.66	0.04*	P vs O	0.22
	Orthodontist	31	55.74	3.74		P vs G	0.03*
	General Dentist	37	54.81	4.14		O vs G	0.54

* - Statistically Significant

Note: a. Kruskal Wallis Test & b. Dunn's post hoc Test

P – Pedodontist; O – Orthodontist & G – General Dentist