

COMPARISON OF PERCEPTION AND KNOWLEDGE BETWEEN ORTHODONTISTS AND GENERAL DENTISTS REGARDING THE USE OF CLEAR ALIGNERS

KHAN EB*, MUHAMMAD T, GHAFAR H, JEHAN NS, RASHID HU, AHMED M, NAZ H

Department of Orthodontics, Saidu College of Dentistry, Swat, Pakistan

*Corresponding author's email address: erumbhroz@gmail.com

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Abstract: Clear aligners, a modern orthodontic solution for malocclusions, have gained widespread popularity due to their aesthetic appeal, convenience, and technological advancements. Understanding the perceptions and attitudes of orthodontists and general dentists toward clear aligners is essential to enhance their adoption and effectiveness in orthodontic care. **Objective:** To assess orthodontists' and general dentists' awareness, attitudes, and confidence levels toward using clear aligners in orthodontic practice. **Methods:** A descriptive cross-sectional study was conducted using a 10-item questionnaire distributed via Google Forms. The sample consisted of 200 participants: 100 orthodontists and 100 general dentists. The responses were rated on a 5-point Likert scale, and the data were analyzed using SPSS version 23. Chi-square tests and t-tests were applied to assess differences between the two groups, with a significance level set at $p < 0.05$. **Results:** The response rate was 85%. Orthodontists demonstrated significantly higher confidence in using clear aligners than general dentists ($p < 0.001$). Orthodontists were also more likely to view aligners as the future of orthodontics and reported fewer challenges, such as patient compliance and accessibility. In contrast, general dentists expressed lower confidence in achieving precise outcomes with aligners and faced more difficulties during treatment. **Conclusion:** Orthodontists show greater confidence and a more positive outlook on using clear aligners than general dentists. Addressing the differences in experience and perceptions between these groups could lead to improved implementation of clear aligner therapy in dental practice, ultimately benefiting patient outcomes.

Keywords: Aligners, Orthodontists, General dentists, Treatment difficulties, Patients' compliance

Introduction

Orthodontic care has seen an exponential rise in demand from the adult population, along with the emergence of aesthetic alternatives to traditional fixed labial appliances (1). This shift has led to the development of more discreet, comfortable treatment options, as patients prioritize both appearance and convenience. In an era where the perfect smile is increasingly desired, the decision to pursue orthodontic treatment is influenced not only by clinical assessments but also by the patient's perception of their own facial aesthetics, self-esteem, and psychological well-being (2).

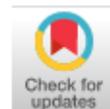
One contemporary treatment method utilizing clear aligners has emerged to respond to these challenges. With an increasing emphasis on aesthetic outcomes in dentistry, patients actively seek visually pleasing alternatives to traditional orthodontic interventions (3). Although introduced years ago, clear aligners faced challenges in gaining popularity due to a lack of awareness and promotion in earlier decades.

The inception of clear aligners dates back to 1945, when Kesling introduced this innovative approach, marking a significant moment in dentistry (4). Over time, the integration of graphic design with digital diagnostic tools, virtual treatment plans, and biomechanical design has facilitated a three-dimensional visual interface. This empowers dentists to customize treatment plans, monitor progress, and make necessary adjustments (5).

Clear aligners are crafted from polyurethane plastics, a transparent material with superior aesthetics. The removable nature of aligners also aids in effective oral

health maintenance (6-8). Although introduced years ago, clear aligners faced challenges in gaining popularity due to a lack of awareness and promotion in earlier decades. However, technological advancements and the adoption of promotion strategies, including social media and digital marketing, have significantly boosted the utilization of clear aligners in orthodontics in the last decade (9, 10). In 2022, a study conducted in Saudi Arabia assessed dentists' knowledge of clear aligners, revealing a moderate level of awareness. Similarly, a survey conducted in Gujarat, India, in the same year demonstrated a high awareness among dentists (11, 12).

With the increasing prominence of clear aligners in orthodontic treatment, it becomes imperative to systematically evaluate the awareness and attitudes of orthodontists and dentists regarding their utilization (13). This study explores the awareness and acceptance of clear aligners among professionals in orthodontics and dentistry. Understanding the perspectives and potential barriers these professionals face is crucial for refining educational initiatives, addressing misconceptions, and optimizing the integration of clear aligners into orthodontic treatment protocols. The results are expected to improve professional training programs, support informed decision-making, and ultimately enhance patient care in the constantly changing field of orthodontic treatments. Thus, the study's objective was to evaluate and compare the awareness and attitudes among Orthodontists and General Dentists regarding using Clear Aligners in Orthodontic Treatment.



Methodology

This cross-sectional study, conducted in 2024, assessed the awareness and perception of clear aligners among orthodontists and dental specialists. It used a structured questionnaire to evaluate participants' perceptions and knowledge about clear aligners. Before data collection, ethical approval was obtained from the institutional review board of Saidu Medical and Dental College, Swat. The questionnaire comprised ten questions: eight close-ended questions that assessed participants' perceptions using a 5-point Likert scale (1 = Strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree, 5 = Strongly disagree), and two open-ended questions focused on the participants' awareness and their preferred treatment choices regarding clear aligners. The survey was distributed through a Google form, and the link was emailed to all participants.

The study targeted orthodontists, general dentists, and dental specialists across different dental fields. A prior survey indicated that 93.5% of orthodontists and 60% of general dentists and dental specialists were aware of clear aligners. These proportions (P1 = 93.5% and P2 = 60%) were used to calculate the sample size with a 95% confidence interval and 90% power (14). Based on this calculation, a minimum sample of 32 participants per group was required. However, to increase the robustness of the findings, 100 participants from each group (orthodontists and general dentists/dental specialists) were enrolled in the study.

The Google form remained open for responses for four weeks. To maximize participation, reminders were sent to non-respondents at weekly intervals. All data were anonymized before analysis to protect participants' confidentiality.

Descriptive statistics were used to summarise the demographic characteristics and responses. The perceptions of clear aligners were analyzed using frequencies and percentages for the Likert scale responses. A chi-square test was employed to compare the awareness levels between orthodontists and other dental specialists. A p-value of <0.05 was considered statistically significant. The open-ended responses were analyzed qualitatively to assess everyday awareness and treatment preference themes.

Results

Two hundred dental practitioners participated in the survey, with equal representation of general dentists and orthodontists. Almost all male and female participants were equal, with 49% male and 51% female participation. More than half of them had experience of <5 years (69.5%). Most worked in urban areas (77.5%) and teaching institutes (65%). Table 1 displays a summary of participants' features. Table 2 compares responses on knowledge items. The proportion of orthodontists was significantly higher than general dentists who agreed the following: clear Aligners are an effective treatment option for orthodontic cases (p=0.002), we're confident in my ability to recommend and manage precise aligner treatments (p<0.001), the cost of clear aligners is justified by the benefits they offer in orthodontic treatment (p<0.001), patient satisfaction with clear aligners is comparable to that of traditional braces (p<0.001), Both aligner and fixed braces can be used subsequently on a patient for orthodontic treatment (p<0.001) and clear aligner can effectively serve as positioners for minor orthodontic adjustments (p<0.001).

Participants were asked about their perception: To what extent do they agree that aligner therapy represents the future of aesthetic orthodontic treatment? The majority, 40% of orthodontists, agreed, whereas only 31% of general dentists agreed, but there was no statistical significance (Table 3).

Table 4 represents participants' perceptions regarding retention strategies to preserve the outcomes of the clear aligners. Out of 200, 55 orthodontists and 52 general dentists did not respond to this question. Some orthodontists thought that fixed retainers should be used (24.4%), whereas 26.7% said they didn't know. Nearly half of general dentists also said they do not know about retention strategies (47.9%).

Table 5 summarises specific experiences or challenges you have faced using clear aligners in practice. Out of a total of 200 participants, 65 orthodontists and 85 general dentists did not know clear aligners yet, While those who had experience with it listed down issues including accessibility issues (18%), breaking of attachment (12%), cost issues (6%), non-compliance of patients (12%), difficulty in complex cases (2%), fitting issues (4%). Some said that they had no challenge (10%).

Table 1: Summary of participants' features

Variables	Groups	Orthodontist n(%)	General Dentist n(%)	Total n(%)	p-value
Gender	Male	45(45.9)	53(54.1)	98(49)	0.258
	Female	55(53.9)	47(46.1)	102(51)	
Experience	<5 years	81(58.3)	58(41.7)	139(69.5)	<0.001
	5-9 years	15(27.3)	40(72.7)	55(27.5)	
	Ten years or more	4(66.7)	2(33.3)	6(3)	
Location	Urban	79(51)	76(49)	155(77.5)	0.704
	Rural	21(47.7)	23(52.3)	44(22)	
Organization	Teaching	96(73.8)	34(26.2)	130(65)	<0.001
	Non-teaching	1(9.1)	10(90.9)	11(5.5)	
	Private clinic	3(5.1)	56(94.9)	59(29.5)	

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Table 2: Comparison of responses on knowledge items between orthodontist and general dentist

Knowledge items	Groups	Orthodontist n(%)	General Dentist n(%)	p-value
Clear Aligners are an effective treatment option for orthodontic cases	Strongly agree	6(6)	6(6)	*0.002
	Agree	73(73)	49(49)	
	Neutral	16(16)	39(39)	
	Disagree	5(5)	6(6)	
I believe that clear aligners can be effectively used in complex orthodontic cases	Strongly agree	3(3)	2(2)	*0.002
	Agree	5(5)	10(10)	
	Neutral	12(12)	33(33)	
	Disagree	71(71)	47(47)	
	Strongly disagree	9(9)	8(8)	
I am confident in my ability to recommend and manage clear aligner treatments	Strongly agree	6(6)	1(1)	*<0.001
	Agree	65(65)	25(25)	
	Neutral	20(20)	40(40)	
	Disagree	7(7)	32(32)	
	Strongly disagree	2(2)	2(2)	
Treatment recommendations are influenced by the aesthetic appeal of clear aligners	Strongly agree	29(29)	37(37)	0.095
	Agree	65(65)	52(52)	
	Neutral	2(2)	8(8)	
	Disagree	4(4)	3(3)	
I believe that patient compliance is a significant factor in the success of clear aligner treatments	Strongly agree	75(75)	44(44)	*<0.001
	Agree	23(23)	46(46)	
	Neutral	1(1)	6(6)	
	Disagree	1(1)	4(4)	
The cost of clear aligners is justified by the benefits they offer in orthodontic treatment	Strongly agree	4(4)	6(6)	*<0.001
	Agree	73(73)	40(40)	
	Neutral	12(12)	47(47)	
	Disagree	11(11)	7(7)	
Patient satisfaction with clear aligners is comparable to that of traditional braces	Strongly agree	8(8)	3(3)	*<0.001
	Agree	68(68)	29(29)	
	Neutral	16(16)	34(34)	
	Disagree	7(7)	33(33)	
	Strongly disagree	1(1)	1(1)	
Both aligner and fixed braces can be used subsequently on a patient for orthodontic treatment	Strongly agree	9(9)	6(6)	*<0.001
	Agree	52(52)	46(46)	
	Neutral	28(28)	15(15)	
	Disagree	8(8)	3(3)	
	Strongly disagree	3(3)	0(0)	
Clear aligners can effectively serve as Positioners for minor orthodontic adjustments	Strongly agree	26(26)	46(46)	*<0.001
	Agree	71(71)	32(32)	
	Neutral	3(3)	21(21)	
	Disagree	0(0)	1(1)	

*Significant at $p < 0.05$

Table 3: Perception of participants regarding the future of aligner therapy

Question	Response	Orthodontist n(%)	General Dentist n(%)	p-value
To what extent do you agree that aligner therapy represents the future of aesthetic orthodontic treatment?	0%	7(7)	7(7)	0.548
	50%	9(9)	11(11)	
	60%	2(2)	2(2)	
	70%	0(0)	1(1)	
	80%	8(8)	14(14)	
	90%	1(1)	0(0)	
	100%	40(40)	31(31)	

Table 4: Perception of participants regarding retention strategies to preserve the outcomes of clear aligner

Perception of participants regarding retention strategies to preserve the outcomes of clear aligner	Orthodontist n(%)	General dentists n(%)	Total n(%)
Aligner method	0(0)	2(4.2)	2(2.2)
Bonded fixed retainers	0(0)	2(4.2)	2(2.2)

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Both are mandatory to avoid immediate relapse and dissatisfaction from patients	9(20)	2(4.2)	11(11.8)
CAT as retainer	2(4.4)	1(2.1)	3(3.2)
Depending on the complexity of the case	3(6.7)	9(18.8)	12(12.9)
don't know	12(26.7)	23(47.9)	35(37.6)
Fixed retainers	11(24.4)	3(6.3)	14(15.1)
GIC button	1(2.2)	0(0)	1(1.1)
Long term retainers	3(6.7)	2(4.2)	5(5.4)
Regular FUP	2(4.4)	1(2.1)	3(3.2)
Vacuum form retainers	2(4.4)	1(2.1)	3(3.2)
Custom-made retentive aligners	0(0)	2(4.2)	2(2.2)

Table 5: Summary of specific experiences or challenges you have faced in using clear aligners in practice

Specific experiences or challenges you have faced in using clear aligners in practice	Orthodontist n(%)	General dentists n(%)	Total n(%)
Overcoming limitations in armamentarium accessibility	4(11.4)	0(0)	4(8)
Accessibility	4(11.4)	5(33.3)	9(18)
Breaking of attachments	4(11.4)	2(13.3)	6(12)
Correction of rotation and incisor torque control	5(14.3)	0(0)	5(10)
Dependency on the aligner company has been the only challenge.	1(2.9)	1(6.7)	2(4)
Difficulty in complex cases	1(2.9)	0(0)	1(2)
Expansion cases	2(5.7)	0(0)	2(4)
Fitting issues	2(5.7)	0(0)	2(4)
making adjustments	2(5.7)	1(6.7)	3(6)
No challenge	3(8.6)	2(13.3)	5(10)
No retention	1(2.9)	0(0)	1(2)
Non-compliance of patients	4(11.4)	2(13.3)	6(12)
non-availability of attachment design	0(0)	1(6.7)	1(2)
Expensive and unavailable	2(5.7)	1(6.7)	3(6)

Discussion

In recent years, precise aligner treatment has gained significant relevance and usage. However, studies comparing clear aligners to traditional fixed appliances often exhibit flaws, such as poor methodology, high risk of bias, lack of control groups or blinding procedures, and small sample sizes, compromising these studies' internal validity and outcomes.

The study shows a notable difference in the belief about the efficacy of clear aligners. While 79% of orthodontists and 55% of general dentists agree they are effective, confidence drops for complex cases. Only 8% of orthodontists and 12% of general dentists believe clear aligners can handle complex cases effectively. This confirms previous findings that have shown better confidence in the practitioners in treating mild crowding than severe crowding (15-17). This significant difference (p=0.002) suggests a gap in understanding capabilities, possibly due to varying exposure to complex cases.

Orthodontists show substantially higher confidence in recommending and managing precise aligner treatments, with 71% agreeing or strongly agreeing, compared to only 26% of general dentists. This finding aligns with results from a 2017 study, which also highlighted that orthodontists' specialized training and expertise contribute to their greater confidence in handling these treatments (17). The aesthetic appeal of clear aligners influences treatment recommendations for both groups, though not significantly. However, patient compliance shows a significant difference, with 98% of orthodontists and 90% of general dentists agreeing on its importance. This suggests a

universal recognition of compliance's role, but general dentists may need to emphasize it more in patient education as emphasized in previous studies conducted on the compliance of patients in clear aligner therapy (18-20). Perceptions of the cost-benefit ratio of clear aligners vary notably, with 77% of orthodontists and 46% of general dentists considering the cost justified. This contrasts with findings from earlier studies, which suggested that clear aligners were not seen as cost-effective, and their limited use was largely attributed to their high price (21,22). The shift in perspective may indicate changing attitudes within the field, possibly driven by advancements in aligner technology and increased demand for aesthetic treatment options.

Additionally, 76% of orthodontists believe that patient satisfaction with clear aligners is comparable to traditional braces, in contrast to just 32% of general dentists. This perspective of Orthodontist aligns with a 2018 study, which found that patients treated with Invisalign reported similar satisfaction levels across most dimensions compared to those with traditional braces, apart from eating and chewing, where Invisalign users expressed greater satisfaction (23). Most orthodontists and a smaller proportion of general dentists agreed that aligner therapy represents the future of aesthetic orthodontic treatment. This difference, however, was not statistically significant (p=0.548). This suggests that while both groups see potential in aligner therapy, orthodontists are slightly more optimistic about its future role.

Participants were considerably uncertain regarding retention strategies to preserve the outcomes of precise aligner treatments. A notable proportion of orthodontists

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and fewer general dentists preferred fixed retainers. In comparison, both groups admitted not knowing the best retention strategy. Among those with experience, common challenges included accessibility issues (18%), breaking of attachments (12%), and patient non-compliance (12%). Only a tiny percentage faced difficulty with complex cases (2%) and fitting issues (4%). Some participants reported no significant challenges.

The survey provided valuable insights into practitioners' perceptions and experiences with precise aligner therapy. It highlighted that while many orthodontists and general dentists see aligners as the future of aesthetic orthodontic treatment, there is still a notable gap in confidence and knowledge, particularly concerning retention strategies. A limitation of this study is that it uses a cross-sectional design, which cannot track changes in perceptions and practices over time. Future research with a larger, more engaged sample and a longitudinal approach could offer a clearer picture of how clear aligners evolve in orthodontic treatment.

Conclusion

This study reveals significant differences between orthodontists and general dentists in their views and experiences with clear aligners. Orthodontists generally have greater confidence and a more positive perspective on aligners, while both groups encounter common challenges such as accessibility issues and patient non-compliance. The findings emphasize the need for better education and resources. Future research should use a longitudinal approach to understand better how clear aligners are affecting the treatment biomechanics in orthodontics.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBCE-BUES-09933/20)

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

ERUM BEHZOZ KHAN

Conception of Study, Development of Research Methodology Design, Study Design, manuscript Review, and final approval of manuscript.

TUFAIL MUHAMMAD

Coordination of collaborative efforts.

HUDA GHAFAR

Study Design, Review of Literature.

NEELAM SHAH JEHAN

Conception of Study, Final approval of manuscript.

HAROON UR RASHID

Manuscript revisions, critical input.

MUNIR AHMED & HASINA NAZ

Drafting and manuscript writing

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