

Perception and Treatment Outcomes of Clear Aligner Therapy (Cat) Among Dental Practitioners: A Cross-Sectional Study

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INTRODUCTION:

Over the course of the last twenty years, there have been substantial breakthroughs in orthodontic treatment. These advancements have been driven mostly by innovations that aim to improve patient compliance, comfort, and facial aesthetics. Clear Aligner Therapy (CAT) is a method of aligning the teeth using clear, custom-made plastic aligners. The aligners apply gentle pressure to the teeth to gradually move them into the desired position. The advantages include them being nearly invisible, comfortable to wear, and easy to remove for eating and brushing; that way, CAT can be used to treat a wide range of orthodontic issues.^[1]

Despite the broad acceptance of CAT, there is still a lack of integrated information that examines the perceptions of dental practitioners in conjunction with their perceptions of treatment outcomes within a single analytical framework. It is difficult to comprehend how practitioners' perspectives influence treatment planning, execution, and result

evaluation because much of the research that are currently available concentrates either on the level of satisfaction experienced by patients or on the level of knowledge possessed by practitioners.

The purpose of this study is to give useful evidence to inform instructional initiatives, policy creation, and clinical procedures in current orthodontic treatment. This will be accomplished by synthesising practitioner viewpoints across a range of experience levels and practice contexts

MATERIALS AND METHODS

The present study adopted a cross-sectional descriptive research design to evaluate the perception, practice patterns, and barriers related to Clear Aligner Therapy (CAT) among dental practitioners. A cross-sectional design was considered appropriate as the study aimed to collect data from a defined population at a single point in time without manipulating any variables. This design allows for the assessment of existing

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practices, preferences, and perceptions related to CAT among dental practitioners and enables comparison across demographic and professional characteristics.

The study was conducted among dental practitioners practicing in India. India was selected as the study area due to its well-established dental education infrastructure and high concentration of dental professionals, including general dentists and specialists. The country houses a large number of dental colleges, private clinics, hospitals, and academic institutions, making it a representative for assessing contemporary orthodontic practices.

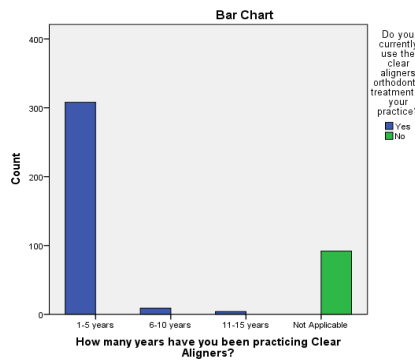
Inclusion criteria in this study included General dentists and dental specialists practicing in India, and Practitioners willing to provide informed consent. Exclusion criteria in this study included Dental students and interns, Practitioners not practicing in India and Incomplete questionnaire responses.

RESULTS

The present study provides a comprehensive insight into the evolving role of clear aligner therapy among dental practitioners, aligning closely with global trends reported in recent literature.

Table No. 1: Association between the Use of Clear Aligner Therapy and Years of Experience in Practicing Clear Aligners

		Do you currently use the clear aligners orthodontic treatment in your practice?		Total
		Yes	No	
How many years have you been practicing Clear Aligners?	1-5 years	308	0	308
	6-10 years	9	0	9
	11-15 years	4	0	4
	Not Applicable	0	92	92
Total		321	92	413



Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	413.000 ^a	3	.000
Likelihood Ratio	438.093	3	.000
Linear-by-Linear Association	409.143	1	.000
N of Valid Cases	413		

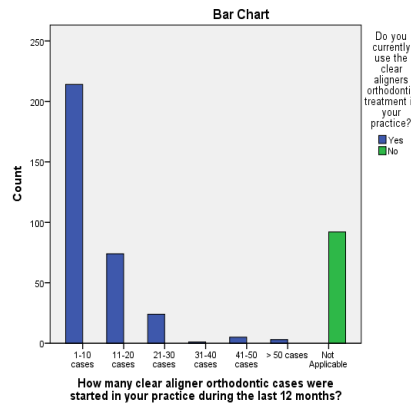
Table 1 shows that all practitioners who reported experience of 1–15 years in practicing clear aligners were current users of clear aligner therapy, whereas all respondents who did not use clear aligners fell under the “Not Applicable” category. The Pearson

chi-square test revealed a highly significant association between the variables ($p < 0.001$). This indicates that the current use of clear aligner therapy is strongly dependent on practitioners’ experience with aligner practice.

Table No.2: Association between the Use of Clear Aligner Therapy and the Number of Clear Aligner Cases Initiated in the Last 12 Months

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		Do you currently use the clear aligners orthodontic treatment in your practice?		Total
		Yes	No	
How many clear aligner orthodontic cases were started in your practice during the last 12 months?	1-10 cases	214	0	214
	11-20 cases	74	0	74
	21-30 cases	24	0	24
	31-40 cases	1	0	1
	41-50 cases	5	0	5
	> 50 cases	3	0	3
	Not Applicable	0	92	92
Total		321	92	413



Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	413.000 ^a	6	.000
Likelihood Ratio	438.093	6	.000
Linear-by-Linear Association	380.033	1	.000
N of Valid Cases	413		

Table 2 indicate that all practitioners who initiated clear aligner cases within the last 12 months were current users of clear aligner therapy, while all non-users were categorized under the “Not Applicable” group. Among current users, the majority initiated

1–10 cases, followed by 11–20 cases, reflecting moderate adoption levels. The Pearson chi-square test demonstrated a statistically highly significant association between the variables ($p < 0.001$).

Table No.3: Clinical Preferences Regarding Malocclusion Types for Clear Aligner Therapy

Malocclusion Preferred				Malocclusion Not Preferred			
		Frequency	Percent			Frequency	Percent
Class I Spacing	No	33	8.0	Class I Spacing	No	308	74.6
	Yes	288	69.7		Yes	13	3.1
	Not Applicable	92	22.3		Not Applicable	92	22.3
	Total	413	100.0		Total	413	100.0
Class I Crowding	No	106	25.7	Class I Crowding	No	245	59.3
	Yes	215	52.1		Yes	76	18.4
	Not Applicable	92	22.3		Not Applicable	92	22.3
	Total	413	100.0		Total	413	100.0

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Class II Division 1	No	170	41.2	Class II Division 1	No	217	52.5
	Yes	151	36.6		Yes	104	25.2
	Not Applicable	92	22.3		Not Applicable	92	22.3
	Total	413	100.0		Total	413	100.0
Class II Division 2	No	195	47.2	Class II Division 2	No	217	52.5
	Yes	126	30.5		Yes	104	25.2
	Not Applicable	92	22.3		Not Applicable	92	22.3
	Total	413	100.0		Total	413	100.0
Class III	No	268	64.9	Class III	No	53	12.8
	Yes	53	12.8		Yes	268	64.9
	Not Applicable	92	22.3		Not Applicable	92	22.3
	Total	413	100.0		Total	413	100.0
Openbite	No	243	58.8	Openbite	No	79	19.1
	Yes	78	18.9		Yes	242	58.6
	Not Applicable	92	22.3		Not Applicable	92	22.3
	Total	413	100.0		Total	413	100.0
Deepbite	No	219	53.0	Deepbite	No	149	36.1
	Yes	102	24.7		Yes	172	41.6
	Not Applicable	92	22.3		Not Applicable	92	22.3
	Total	413	100.0		Total	413	100.0

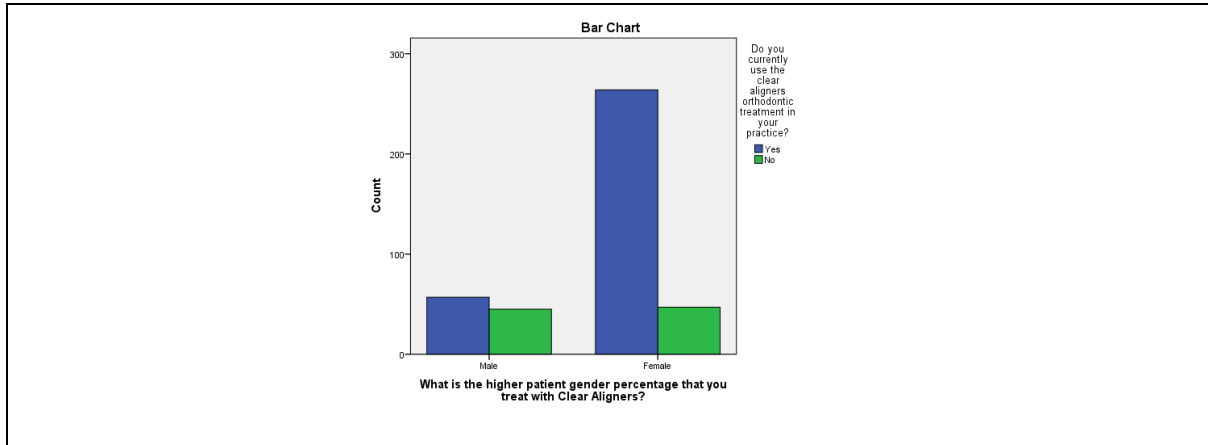
Table 3 show a clear trend toward the use of clear aligner therapy in simple to moderate malocclusions. A large majority of practitioners preferred clear aligners for Class I spacing (69.7%) and Class I crowding (52.1%), indicating high confidence in aligners for less complex cases. Moderate acceptance was observed for Class II Division 1 (36.6%) and Class II Division 2 (30.5%) malocclusions. In contrast, Class III malocclusion

was predominantly not preferred for clear aligner therapy (64.9%), reflecting perceived biomechanical limitations. Similarly, a substantial proportion of practitioners did not prefer aligners for open bite (58.6%) and deep bite (41.6%) cases. These findings suggest that dental practitioners primarily reserve clear aligner therapy for straightforward malocclusions while avoiding complex skeletal and vertical discrepancies.

Table No. 4: Association between the Use of Clear Aligner Therapy and Predominant Patient Gender Treated

		Do you currently use the clear aligners orthodontic treatment in your practice?		Total
		Yes	No	
What is the higher patient gender percentage that you treat with Clear Aligners?	Male	57	45	102
	Female	264	47	311
Total		321	92	413

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Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	37.322 ^a	1	.000		
Continuity Correction	35.666	1	.000		
Likelihood Ratio	33.970	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	37.232	1	.000		
N of Valid Cases	413				

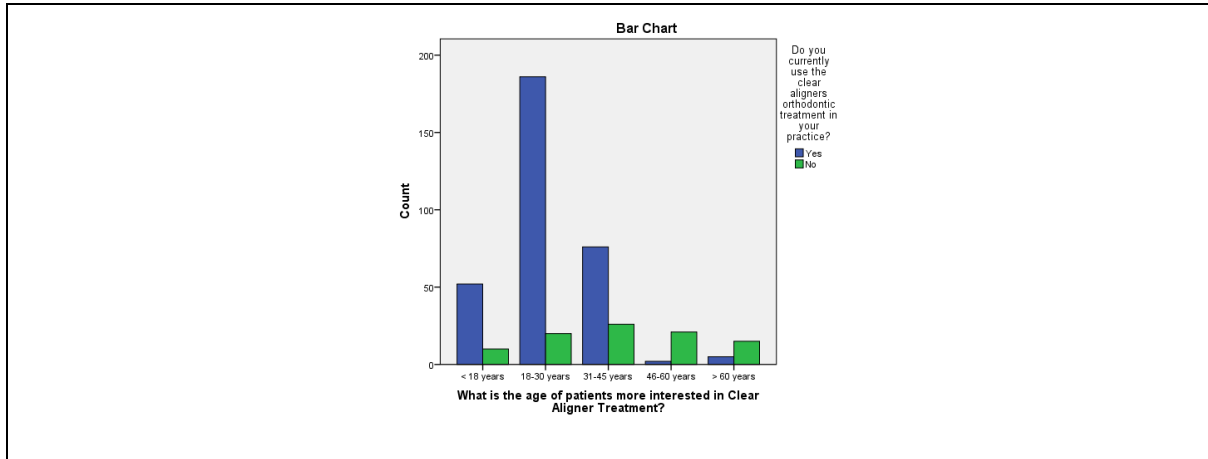
Table 4 shows that among practitioners using clear aligner therapy, a substantial majority reported treating a higher percentage of female patients (264) compared to male patients (57). In contrast, among non-users, the distribution between male (45) and

female (47) patients was nearly equal. The Pearson chi-square test revealed a statistically significant association between current use of clear aligner therapy and patient gender ($p < 0.001$), which was further supported by Fisher’s exact test.

Table No. 5: Association between the Use of Clear Aligner Therapy and Age Group of Patients Interested in Treatment

		Do you currently use the clear aligners orthodontic treatment in your practice?		Total
		Yes	No	
What is the age of patients more interested in Clear Aligner Treatment?	< 18 years	52	10	62
	18-30 years	186	20	206
	31-45 years	76	26	102
	46-60 years	2	21	23
	> 60 years	5	15	20
Total		321	92	413

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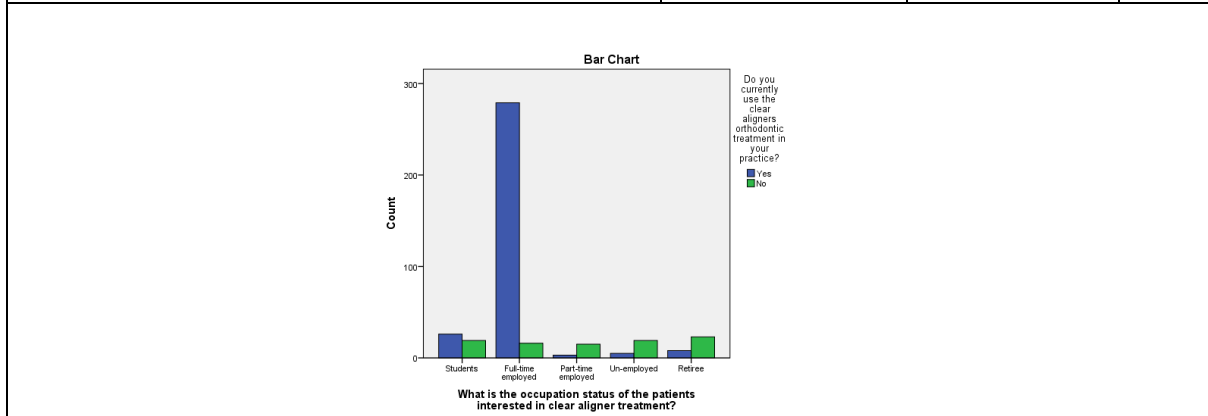
Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	116.162 ^a	4	.000
Likelihood Ratio	100.146	4	.000
Linear-by-Linear Association	74.453	1	.000
N of Valid Cases	413		

Table 5 demonstrates a clear age-related pattern in the demand for clear aligner therapy. Among practitioners who use clear aligners, the highest interest was reported in the 18–30 years age group (186 cases), followed by 31–45 years, indicating strong acceptance among young and middle-aged

adults. In contrast, non-users reported greater interest from older age groups, particularly 46–60 years and above 60 years, though overall numbers were lower. The Pearson chi-square test showed a highly significant association between aligner use and patient age group ($p < 0.001$).

Table No. 6: Association between the Use of Clear Aligner Therapy and Occupation Status of Interested Patients

		Do you currently use the clear aligners orthodontic treatment in your practice?		Total
		Yes	No	
What is the occupation status of the patients interested in clear aligner treatment?	Students	26	19	45
	Full-time employed	279	16	295
	Part-time employed	3	15	18
	Un-employed	5	19	24
	Retiree	8	23	31
Total		321	92	413



Chi-Square Tests			
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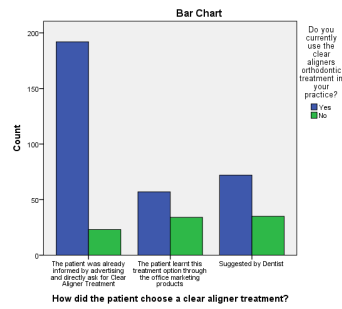
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	190.612 ^a	4	.000
Likelihood Ratio	176.240	4	.000
Linear-by-Linear Association	85.358	1	.000
N of Valid Cases	413		

Table 6 indicates that among practitioners who use clear aligners, the majority of interested patients were full-time employed individuals (279 cases), followed by students, suggesting higher demand among economically active and socially conscious groups. In contrast, non-users reported greater

interest from retirees, unemployed, and part-time employed patients. The Pearson chi-square test demonstrated a highly significant association between aligner use and patient occupation status ($p < 0.001$).

Table No.7: Perception on Mode of Patient Awareness and Selection of Treatment

		Do you currently use the clear aligners orthodontic treatment in your practice?		Total
		Yes	No	
How did the patient choose a clear aligner treatment?	The patient was already informed by advertising and directly ask for Clear Aligner Treatment	192	23	215
	The patient learnt this treatment option through the office marketing products	57	34	91
	Suggested by Dentist	72	35	107
Total		321	92	413



Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	35.338 ^a	2	.000
Likelihood Ratio	36.283	2	.000
Linear-by-Linear Association	25.502	1	.000
N of Valid Cases	413		

Table 7 shows that among practitioners who currently use clear aligner therapy, the majority of patients chose the treatment after being already informed through advertising and directly requesting clear aligners (192 cases), highlighting the strong influence of external marketing and media exposure. A smaller proportion learned about the treatment through office marketing products or dentist recommendation. In contrast, among non-users, patient choice was more evenly distributed across office marketing and dentist suggestion. The Pearson chi-square test demonstrated a statistically significant association between aligner use and patient awareness pathways ($\chi^2 = 35.338$, $df = 2$, $p < 0.001$). These findings suggest that advertising and public awareness play a major role in driving patient demand for clear aligner therapy, leading to rejection of the null hypothesis.

DISCUSSION

Out of the total 413 dental practitioners who participated in the study, 53% were males and 47% were females, indicating a fairly balanced gender distribution. The majority of the respondents belonged to the 24–30 years age group (55.9%), followed by those aged 31–40 years (28.6%), suggesting that the study sample predominantly consisted of young practitioners. With regard to educational qualification, MDS orthodontists constituted the largest group (56.4%), followed by BDS graduates (24.9%) and MDS practitioners from other specialties (18.6%). This reflects strong participation from orthodontic specialists. Most practitioners had 1–10 years of clinical experience (78.7%), indicating that the sample largely represented early-career professionals.

The demographic findings indicate a younger practitioner base, which corroborates studies by Baxmann et al. (2022), who reported higher aligner adoption among early-career clinicians. Increased exposure to digital dentistry and manufacturer-led education appears to have facilitated this trend. [2]

A substantial proportion of respondents (77.7%) reported that they currently use clear aligner therapy in their practice, demonstrating a high level of adoption of CAT among dental practitioners. Among those using clear aligners, 73.6% had been practicing CAT for 1–5 years, suggesting that aligner therapy is a relatively recent addition to routine practice for most clinicians.

In terms of case load, 51.3% of practitioners initiated 1–10 clear aligner cases in the previous 12 months, while smaller proportions reported managing higher numbers of cases. This indicates moderate but consistent use of CAT rather than very high-volume practice.

Clear aligners were most commonly preferred for adult patients (49.2%), followed by teen patients (27.4%), indicating that CAT is predominantly used for adult orthodontics. Periodontally treated and stable patients accounted for 13.8%, while pre-prosthetic and surgical cases were less commonly selected. Clinical preference findings highlight the importance of patient selection, mirroring conclusions drawn by Lim and Meade (2025) and Cengiz and Goymen (2025). [3,4]

With respect to the severity of malocclusion, 46% of practitioners preferred treating mild crowding of 1–3 mm, and 40% treated moderate crowding of 4–6 mm using aligners. Only a small proportion attempted to correct crowding greater than 7 mm, reflecting cautious case selection. This confirms previous findings that have shown good confidence of the practitioners in treating a mild crowding than a severe one. [5,6]

Among malocclusions preferred for treatment, Class I spacing (79.4%) and Class I crowding (63.2%) were most preferred, followed by Class II Division 1 (49.2%). Conversely, malocclusions not preferred for CAT included Class III (76.3%), open bite (70.5%), and deep bite (53.8%), indicating that practitioners perceive limitations of aligner therapy in managing complex vertical and sagittal discrepancies. In comparing data with previous results of Best et al., a major number of orthodontists in that had declared to treat class I and II malocclusions with deep bite. [7]

A majority of practitioners reported that female patients (74.8%) were more likely to seek clear aligner treatment compared to males. The age group 18–30 years (48.4%) showed the highest interest in CAT, followed by those aged 31–45 years (22.5%), suggesting greater demand among young adults. This is in accordance from the study by Azaripour et al which showed that CAT was predominantly chosen by female patients. [8]

In terms of occupation, full-time employed individuals (72.6%) formed the largest group seeking clear aligners affirming with the study by Cooper et al, reflecting the importance of esthetics and convenience and also the affordability among working professionals. [9]

More than half of the patients (52.1%) were already aware of clear aligners through advertising and directly requested the treatment, while 25.9% opted for aligners based on dentist recommendation. Recent studies have

also underlined the increased relevance of marketing and social media in the working activities. This highlights the significant influence of media and marketing on patient decision-making. ^[10,11]

Among non-users of clear aligner therapy, 20.3% expressed an intention to use CAT in the future, indicating a generally positive attitude toward future adoption. Very few respondents reported having no intention to use aligners or lacking knowledge about them. The most common reason for not using clear aligners was lack of experience (15.3%), followed by high cost for providers (6.1%). Very few practitioners cited limited treatment outcomes or lack of patient demand as barriers. When managing patient requests for clear aligners, the most common approach was referral to an orthodontist who uses clear aligners (8.7%), followed by referral to hospitals or convincing patients to opt for fixed appliances. Previous study by Gothankar et al. emphasize the need additional CAT-related training for the practitioners. ^[12]

Overall, the findings indicate high adoption and positive perception of clear aligner therapy among dental practitioners, particularly among younger and orthodontically trained clinicians. CAT is predominantly used for mild to moderate malocclusions in adult patients, while complex cases are generally avoided. Lack of experience remains the primary barrier among non-users, suggesting the need for structured training and continuing education to further expand the effective use of clear aligner therapy

Perceptions and barriers identified in the study reveal a nuanced professional mindset. While aligners are widely perceived as comfortable and hygienic, concerns regarding compliance and predictability persist. These findings parallel studies by Timm et al., which highlighted compliance as a critical determinant of treatment success. ^[13,14] Furthermore, apprehension toward direct-to-consumer orthodontics, as reflected in this study, aligns with Kadi et al. (2025), emphasizing ethical and safety considerations. ^[15]

The discussion highlights that clear aligner therapy is firmly established as a valuable orthodontic modality but remains dependent on clinician expertise, patient compliance, and careful case selection. The findings support a balanced integration of aligners into contemporary dental practice, complementing rather than replacing conventional orthodontic appliances.

CONCLUSION

The study concludes that clear aligner therapy has gained considerable awareness and acceptance among dental practitioners, reflecting the growing influence of digital orthodontics in contemporary dental practice.

A majority of the respondents belonged to younger and mid-career age groups, indicating that newer generations of dental practitioners are more inclined toward adopting technologically advanced treatment modalities such as clear aligners.

Although both general dental practitioners and orthodontists demonstrated awareness of clear aligner therapy, orthodontists exhibited greater confidence, knowledge depth, and clinical experience in managing aligner cases.

Clear aligner therapy was primarily utilized for mild to moderate malocclusions, relapse cases, spacing, and anterior crowding, confirming that practitioners exercise careful case selection rather than universal application.

Adult and young adult patients with high esthetic expectations, professional demands, and good compliance were identified as the most suitable candidates for clear aligner treatment.

Despite positive perceptions, several barriers were identified, including high treatment costs, patient compliance issues, limited hands-on training, and concerns regarding predictability in complex orthodontic movements.

The study revealed cautious attitudes toward managing severe malocclusions, skeletal discrepancies, and extraction cases using clear aligners, reinforcing the continued relevance of fixed appliances.

The study concludes that clear aligner therapy serves as a valuable adjunct to conventional orthodontic treatment, rather than a complete replacement, with its success largely dependent on clinician expertise, patient compliance, and appropriate case selection.

The findings underscore the need for structured training programs, evidence-based guidelines, and continuous professional development to enhance the safe and effective use of clear aligner therapy in dental practice.

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