

# Knowledge and Awareness on Aligner Treatment Protocol Among General Dentists, and Non Orthodontic Specialists: A Questionnaire study

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## Abstract

The general dental practitioners and other non-orthodontic specialists can play the role of orthodontic health educators. Dentists have the responsibility to recognize, diagnose, and manage or refer abnormalities in the developing dentition. Hence for proper counseling and referral, general dentists and non-orthodontic specialists must have adequate level of orthodontic knowledge.

**Aim and objective:** This study aims to determine and evaluate the knowledge and attitude of general dentists and non-orthodontic specialists towards early orthodontic treatment. The objective of the study was to assess the knowledge of orthodontic treatment among general dentists and non-orthodontic specialists and to compare the knowledge of orthodontic treatment between the two groups.

**Material and methods:** 308 dental professionals were included in the study. The participants were divided into three groups; Group I included general practitioners, Group II had non-orthodontic postgraduate students, and Group III had non-orthodontic specialists. The questionnaire included 20 closed-ended, multiple choice questions. The first five questions include; general information such as gender, age, educational qualification, years of clinical experience and attachment to educational institutions. The next fifteen questions depict the attitude and awareness of principles and practices in orthodontics.

**Results:** The study highlights the need for better education for treatment concepts in aligner therapy to the general dentist and non-orthodontic specialist.

**Conclusion:** Conduction of Continuing Education programs to update them regularly in newer treatment protocols might be of great help to the practitioners in providing meticulous care to their patients. Overall, clear aligners have revolutionized orthodontic treatment by offering improved aesthetics, patient acceptance, and quality of life.

**Keywords:** Early orthodontic treatment, General dentist, Knowledge, Non-orthodontic specialist, Questionnaire.

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## I. INTRODUCTION

Malocclusion is considered an important oral health issue with a high global prevalence. According to the world health organization, Malocclusion is considered the third health priority of oral health disease. Malocclusion negatively leads to social stigma, social embarrassment, rejection and thereby inevitable psychological disorders.

Nonetheless, the fixed Orthodontic therapy also causes aesthetically unpleasantness along with difficulty in oral hygiene maintenance.<sup>(1,2)</sup>

An alternative to fixed appliances that has gained popularity is Orthodontic aligner therapy. It has gained rapid popularity among the potential orthodontic patients due to its reduced treatment time, more aesthetic approach and more comfort.<sup>(3,4)</sup>

Apart from these reasons, the popularity could be mainly due to advertisements in the telecommunication by the manufacturing companies. These reasons have also caused an increased number of these general dentists and non orthodontic specialists to have started providing orthodontic treatment.

With the pretreatment impressions of upper and lower arches and the intraoral and extraoral photographs, the manufacturing companies can plan the treatment and send the aligner sets accordingly. Thus this avoids the hassle of fixing appointments with orthodontic specialists and makes the work easier for the general dentist.

Although this enables any general dentist to perform orthodontic treatment, the safety and efficacy of such treatment modality is questionable. Also the risk of potential side effects due to treatment without supervision of an orthodontist increases. Therefore, the present study aims to determine and evaluate the knowledge and attitude of general dentists and non-orthodontic specialists towards early orthodontic treatment. The objective of the study was to assess the knowledge of Aligner Treatment Protocol in orthodontic treatment among general dentists and non-orthodontic specialists.

## **II. MATERIAL AND METHODS**

This study was a cross-sectional investigation among general practitioners, other department postgraduate students, and non-orthodontic specialists working in different institutions and dental clinics. The ethical approval was obtained before conducting the survey. The study was carried out from May 2023 to December 2023 during which the questionnaire was distributed via Google Forms. Informed consent was obtained from each participant before responding to the questions. No personal identification was requested.

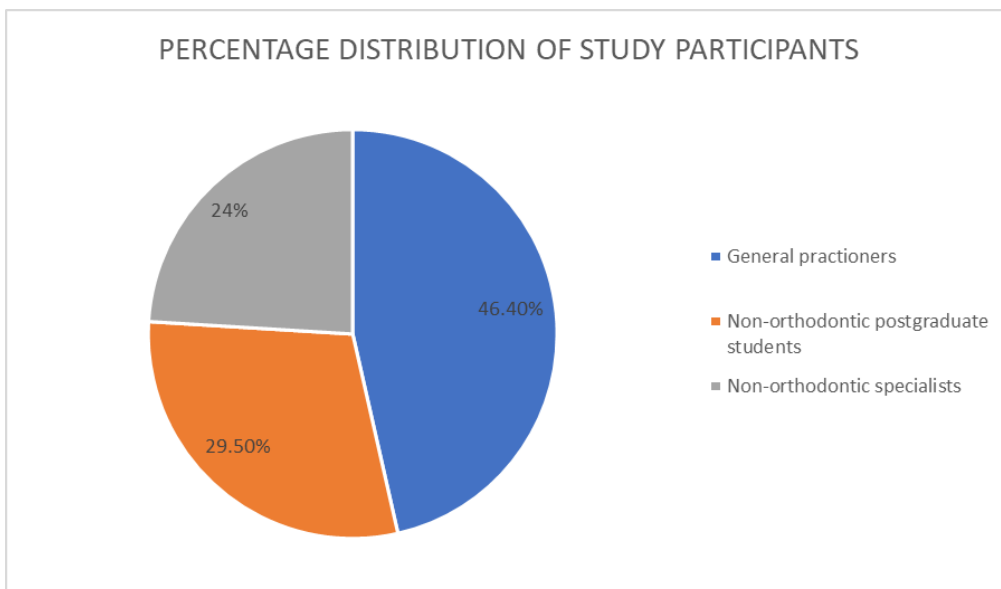
The sample includes 300 participants who were divided into three groups; Group I included general practitioners, Group II had non-orthodontic postgraduate students, while Group III had non-orthodontic specialists. The questionnaire used for this study is illustrated in Table 1. The survey consisted of 20 closed ended, multiple choice questions. The first five questions include; general information such as gender, age, educational qualification, years of clinical experience and attachment to educational institutions. The next fifteen questions depict the attitude and awareness of aligner therapy protocol in orthodontics. The Frequency of correct/incorrect responses were used to assess knowledge and attitude of aligner therapy in orthodontics and their association with different variables included in this study.

### **STATISTICAL ANALYSIS**

Scores were calculated based on the responses given by participants and the individual scores were summed up to calculate the number of correct/incorrect answers. Statistical analysis was done using SPSS software (version 23.0; IBM, Armonk, NY, USA).

## **III. RESULTS**

A questionnaire containing 20 closed-ended, multiple-choice questions was filled in by 308 dental professionals. Majority of the study participants (56.2%) were aged between 20-30 years, 37.5% of them were aged between 31-40 years, 7.1% aged between 41-50 years, and 1% aged greater than 50 years. Out of the 308 dental professionals, 57.1% were females and 42.9% were males. Graph 1 represents that Group I included 46.4% general practitioners, Group II had 29.5% non-orthodontic postgraduate students, and Group III had 24% non-orthodontic specialists. 49.7% of the dental professionals had 1-5 years of clinical experience. 32.1% of the dental professionals were associated with academic institutions while 69.7% were not associated with academic institutions. Table 2 represents the responses for the questionnaire by general practitioners, other department postgraduate students, and non-orthodontic specialists



Graph-1; Percentage distribution of the study participants

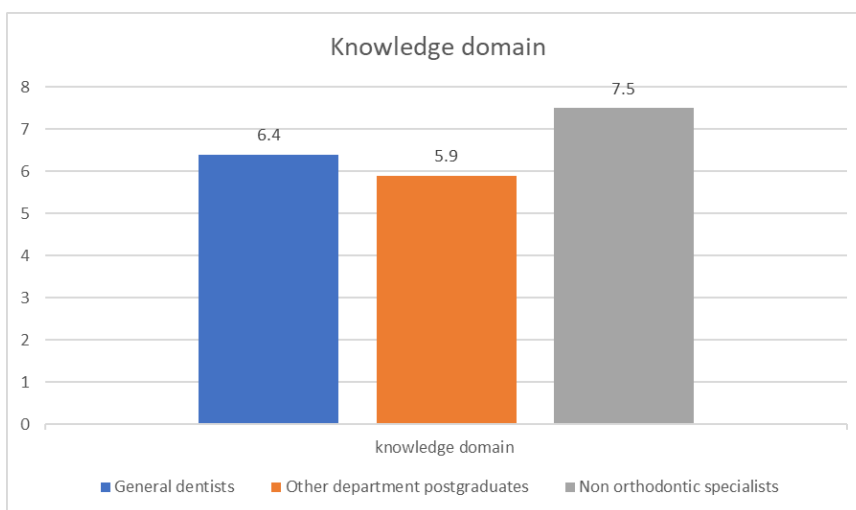


Table-1; Questionnaire with 20 closed ended questions

S.no	Questionnaire items	Choices			
1	Age	21-30 years of age	31-40 years of age	41-50 years of age	>50 years of age
2	Gender	Male		Female	
3	Educational qualification	General dentist	Post graduate students (other departments)	Non-orthodontic specialists	
4	Years of clinical experience	1-5 years	6-10 years	11-15 years	>15 years
5	Are you associated with any academic institutions?	yes		No	
6	At what age will you suggest orthodontic treatment for a child ?	<6 years	7-9 years	10-14 years	>15 years

7	Upper age limit for orthodontic therapy	40 years old	50 years old	Doesn't exist	Not sure
8	In your general practice what is the percentage of patients that enquire about clear aligner therapy?	5-10%	10-20%	30-40%	40% and above
9	Would you prefer an orthodontist's opinion, starting with an aligner treatment ?	Yes	No	Maybe	Don't Know
10	According to you, how many aligner systems are available in the Indian market ?	10-30 systems	31-50 systems	<10 system	>50 systems
11	According to you, which malocclusion do you think would be easier to treat with aligners ?	Mild to moderate crowding	Spaced dentition	Proclined teeth	Skeletal malocclusion
12	Which type of tooth movements do you believe is easier to achieve with clear aligner therapy ?	Bodily movement	Tipping	Intrusion and extrusion	Rotation
13	Have you come across any aligner therapy that has expanders incorporated in its design ?	Yes		No	
14	Which out of the given appliance systems, do you think is more technique sensitive ?	Fixed orthodontic appliances		Clear aligner	
15	Do you believe fixed orthodontic appliances will become obsolete in the upcoming years, with the advent of clear aligner therapy ?	Yes	No	Maybe	Not sure
16	What would you prefer?	Clear aligner by general dentist	Direct consumer aligner	Clear aligner by orthodontists	Fixed orthodontic treatment
17	How long you think the patient has to wear each Aligner tray?	1 week	2 weeks	3 weeks	One month
18	What should be the follow up protocol for clear Aligner therapy	30 days	45 days	60 days	90 days
19	Will clear Aligner therapy interfere with the quality of a patient ?	Yes	No	Maybe	Not sure
20	How would you want to dispose of your aligner trays ?	Treat as general waste	Treat like medical waste	Send back to aligner company	Store it for future usage

**Table-2; Responses on questions by the study participants**

Questionnaire	Responses	Frequency (N)	Frequency percentage (%)
At what age will you suggest orthodontic treatment for a child ?	<6 years	22	7.1%
	7-9 years	70	22.7%

	10-14 years	172	55.8%
	>15 years	44	14.3%
Upper age limit for orthodontic therapy	40 years old	31	10.1%
	50 years old	231	75%
	Doesn't exist	38	12.3%
	Not sure	8	2.6%
In your general practice what is the percentage of patients that enquire about clear aligner therapy?	5-10%	101	32.8%
	10-20%	121	39.3%
	30-40%	33	10.7%
	40% and above	53	17.2%
Would you prefer an orthodontist's opinion, starting with an aligner treatment ?	Yes	46	14.9%
	No	164	53.2%
	Maybe	81	26.3%
	Don't know	17	5.5%
According to you, how many aligner systems are available in the indian market ?	10-30 systems	34	11%
	31-50 systems	150	48.7%
	<10 system	110	35.7%
	>50 systems	14	4.5%
According to you, which malocclusion do you think would be easier to treat with aligners ?	Mild to moderate crowding	150	48.7%
	Spaced dentition	90	29.2%
	Proclined teeth	46	14.9%
	Skeletal malocclusion	22	7.1%
Which type of tooth movements do you believe is easier to achieve with clear aligner therapy ?	Bodily movement	41	13.3%
	Tipping	112	36.4%
	Intrusion and extrusion	123	39.9%
	Rotation	32	10.4%

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Have you come across any aligner therapy that has expanders incorporated in its design ?	Yes	227	77.5%
	No	66	22.5%
Which out of the given appliance systems, do you think is more technique sensitive ?	Fixed orthodontic appliances	119	38.7%
	Clear aligner	189	61.3%
Do you believe fixed orthodontic appliances will become obsolete in the upcoming years, with the advent of clear aligner therapy ?	Yes	46	14.9%
	No	112	36.4%
	Maybe	122	39.6%
	Don't know	28	9.1%
What would you prefer?	Clear aligner by general dentist	34	11%
	Direct consumer aligner	127	41.2%
	Clear aligner by orthodontists	97	31.5%
	Fixed orthodontic treatment	50	16.2%
How long you think the patient has to wear each Aligner tray?	1 week	92	29.9%
	2 weeks	114	37%
	3 weeks	83	26.9%
	One month	19	6.2%
What should be the follow up protocol for clear Aligner therapy	30 days	131	42.5%
	45 days	101	32.8%
	60 days	48	15.6%
	90 days	28	9.1%
Will clear Aligner therapy interfere with the quality of a patient ?	Yes	198	64.3%
	No	55	17.9%
	Maybe	37	12%
	Don't know	18	5.8%

How would you want to dispose your aligner trays ?	Treat as general waste	128	41.6%
	Treat like medical waste	87	28.2%
	Send back to aligner company	30	9.7%
	Store it for future usage	63	20.5

#### IV. DISCUSSION

In the recent years, there has been a increase in adults seeking orthodontic treatment, there has been a corresponding increase in demand for appliances that are both more aesthetic and more comfortable than conventional fixed appliances.

Clear aligners (CA) have been used in orthodontics since 1946 when Dr. Harold Kesling introduced the use of a series of thermoplastic tooth positioners to obtain tooth alignment. CA treatment has evolved mainly over the last 15 years through new technologies and materials to widen the range of tooth movements. The main advantages of CA treatment are better aesthetics with higher patient acceptance and a general better quality of life. [7] CA treatment causes less pain compared to conventional fixed orthodontic treatment and also provides an improvement of the gingival and periodontal health. [8]

The purpose of this study was to assess knowledge and attitude of Aligner Treatment Protocol in orthodontic treatment among general dentists, other department postgraduate students and non-orthodontic specialists. In the present study, most of the general dentists, other department postgraduates students and the non-orthodontic specialists were aware of the basic concept of Aligner Treatment but to varying degrees.

Similarly in a study, it was found that a poor to moderate knowledge in relation to the application of the aligner therapy among general dentist and postgraduate students. [7] Especially for the question regarding the disposal of the aligner, very poor knowledge was noted. Aligners are made up of non-biodegradable thermoplastic material especially, Polyethylene Terephthalate which is highly resistant to decomposition. In addition, toxic gases released during combustion like Polychlorinated biphenyls, dioxins, etc. pose a threat to all living organisms when released into the atmosphere. However there are very limited studies regarding aligner waste management in clinical practice. Hence there is a need to create awareness not only among practitioners but also the general population.

In a study conducted by Gaurav Acharya et al.[6] among dental students and interns in a medical college, it was found that both had a good knowledge about orthodontic treatment but awareness about aligners was not evaluated. A study conducted by Kumar MD et al [5] among the general population in Chennai, Tamil Nadu, concluded that though the population was moderately aware of the orthodontic aligners, they lacked knowledge regarding when to choose aligners for their orthodontic treatment. In contrast to the present study, Kumar MD et al had conducted the study on the general population and Gaurav Acharya et al.[6] had conducted on medical students and interns.

Niveda and Dinesh in Chennai, India conducted a similar study to assess the knowledge and awareness prevalent among the general dentist and non -orthodontic specialist. The knowledge and awareness level among the study participants was found to be moderately satisfactory in their study, but they concluded that general dentists and non -orthodontic specialists lack the knowledge of therapeutic options and advanced treatment modalities. Qualification and specialty participants showed significant and positive correlation with the level of knowledge about orthodontic treatment. This may be due to the increase in the number of cases who were treated by other specialists whose aspects of orthodontic treatment directly or indirectly interfere with their specialties.

General dentists, other department postgraduates and Non orthodontic speciality participants should have clear knowledge that even newer generation Clear aligners are efficient only in resolving mild to moderate malocclusions and cannot be utilized in severe malocclusion and complex tooth movements.

A study by Sanaa Alami et al., on the inconveniences caused with the use of aligners by patients. They concluded that patients had pronunciation and speech problems and few patients had difficulty chewing. Few of

their patients reported mucosal injuries. On the other hand, some patients in their study (13.2%) felt bothered by food accumulation. [8]

In the present study, the amount of patients that are being treated with clear aligners in their general practice are very few indicating the demand might be less and secondly, aligner company representatives do not usually proceed towards General practitioners for marketing their system. Hence there is a major gap in the awareness of the aforementioned fact.

In the present study, the degree of attitude and knowledge evaluation of general dentists, other department postgraduates students and non-orthodontic specialists was mainly based on clinical experience but not on their theoretical background. In addition, answers to questions may represent the actual clinical practice or clinical scenarios of the respondents. Moreover, our study outlines the need to spread more awareness regarding the aligner therapy protocol practices amongst general dentists and other specialists. All these contribute to the strengths of our study.

However, studies with Larger number of study participants and in different geographical locations should be carried out for better results. Therefore, generalizability of the current findings to all dental communities must be dealt with caution.

The present study highlights the need for better education of treatment concepts in aligner therapy and a requirement of protocol formulation to the general dentist and non-orthodontic specialist. This shows the need for further research and awareness are needed regarding aligner waste management in clinical practice to address the environmental impact of aligners.

## V. CONCLUSION

Our study results conclude that most of the respondents have information about aligner therapy, but with varying degrees. The existing knowledge and approach of general dentists, other department postgraduates and non-orthodontic specialists towards orthodontic treatment should be improved. Continuing Education programs to update them regularly in newer treatment techniques might be of great help to the practitioners in providing meticulous care to their patients. The qualification of the dentists had the most significant impact on the awareness and referral of the patient to a specialist.

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