



Original Research Article

Awareness, satisfaction and compliance on protocols of retention among orthodontically treated individuals

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Abstract

Background: The objective was to anticipate opinions of orthodontically treated patients on awareness, satisfaction and compliance about the protocols of retention in population of Gujarat, India.

Materials and Methods: This was a questionnaire-based study carried out among orthodontically treated patients who were in the retention or post retention phase. A questionnaire was designed specifically for the study in online as well as offline format. The questionnaire was divided into 4 segments with a total of 26 close ended multiple choice questions. The first segment of the survey included the demographic information of the respondent. The second was regarding awareness about the retainers. The third and fourth parts of the survey addressed satisfaction amongst the respondents in retention or post retention period; and the compliance aspects respectively.

Results: A high response rate of 91.25% was noted. All of the respondents were prescribed retainers after the orthodontic therapy in their retention phase. 125(42.8%) respondents reported to have removable retainers, followed by a combination of removable and fixed retainers; 87(29.8%). 213(72.9%) patients were aware about the requirement of retainers for maintaining the attained results. Most of the respondents indicated they were either satisfied or very satisfied with their teeth, both at the end of treatment 274(93.8%), and retention or post-retention phase 268(91.8%). Lastly, most of them followed the instructions regarding retention protocols given by the orthodontist as much as 239(81.8%).

Conclusion: The extent of awareness, satisfaction and compliance of retention protocols among patients were seemingly as high as 72.9%, 91.8% and 81.8% (cumulative) respectively. However, motivation from the orthodontist as well as patients' attitude are eminent factors contributing to all three aspects of retention protocols comprehensively.

Keywords: Orthodontic Retainer, Retention, Awareness, Satisfaction, Compliance, Orthodontic treatment.

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1. Introduction

Treatment success in orthodontics is determined by facial esthetics, occlusion and stability.¹ Retaining the results of orthodontically corrected malocclusions has been discussed in the literature since the beginning of the 20th century. It was quoted by Dr. Case that there is only one part of orthodontia that is absolutely indispensable to the success of the specialty and its establishment upon a firm foundation, it is the permanent retention of aligned teeth.²

The period can be divided into retention and post-retention phases. During the retention phase, the reorganization of the periodontal ligament occurs over the

first three to four months. The gingival collagen network typically takes four to six months to remodel, and the elastic supracrestal fibers can remain deviated for up to 232 days.³ The retention phase is considered to be a continuation of orthodontic treatment. The post-retention phase, which begins after the retention phase has ended, lasts the rest of the patient's life. During this period teeth are subjected to neuromuscular forces, dentoalveolar development and growth.⁴ Studies found that long-term alignment is both variable and unpredictable. It has been reported that 40% to 90% of patients have unacceptable dental alignment 10 years after orthodontic treatment.⁵

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In order to improve post-treatment stability, retainers used in orthodontic retention may be fixed to the dentition, such as a bonded wire, or removable, such as a Hawley type or Essix appliance. The purpose of this study was to assess the level of awareness, compliance and satisfaction in orthodontically treated patients in retention or post-retention phase wearing orthodontic retainers.

2. Materials and Methods

The survey questionnaire was developed according to similar studies; edited and prepared in the English as well as local (Gujarati) language and were circulated in online as well as offline format. Google forms were used for online format and in offline format physical copies were utilized. Sample size calculation was done and forms were distributed among 320 patients. The questionnaire was divided into 4 segments with a total 26 close ended multiple- choice type questions. First segment of the survey solicited demographic and background information of the respondents. Second segment of the survey was regarding awareness of the retainers amongst the patients. Third and fourth segments of the survey referred to the satisfaction along with the stability of the treatment, and compliance of the retainer amongst the patients respectively. Clearance from the Ethical Committee had been obtained prior to the commencement of the study (No.: FDS/DDU/EC/17/2022). Participation in the study was voluntary, hence the consent was implied from the subject’s willingness to participate in the study. Participants could withdraw at any time without any obligation towards the study team. Anonymity and confidentiality of each participant were assumed. All duly filled survey forms from orthodontically treated patients who had undergone orthodontic treatment with full fixed appliances, a minimum of 3 months to 5 years after orthodontic appliances have been removed. Incomplete forms were not included in the study and patients whose treatment was incomplete.

The Statistical software IBM SPSS statistics 20.0 (IBM Corporation, Armonk, NY, USA) was used for the analyses of the data descriptive and inferential statistical analyses were carried out in the present study. Results on categorical measurement were presented in number (%).

The value of $p < 0.05$ was considered to be statistically significant. Chi square test was used to find the significance of study parameters on categorical scale.

3. Results

Out of 320 circulated forms, 292 had reverted with completed forms, thus the overall response rate of 91.25% was attained. 160(54.80%) respondents were females and 132(45.20%) were males (**Figure 1**). The first segment of the survey included the general information of the respondents, duration since debonding of the orthodontic appliances and the type of retainer provided. 123(42.8%) participants reported to have removable retainer and followed by 87 (29.8%) having a combination of removable and fixed retainer. (**Table 1**)

Awareness of the retainer among the orthodontically treated individuals in retention or post- retention phase was assessed. 213(72.9%) patients were aware about the purpose of orthodontic retainers. 188(64.4%) of the participants thought that the teeth can move after the treatment without the utilization of the retainer. 105(36.0%) patients believed that they were responsible for the stability after the orthodontic treatment whereas 152(52.1%) believed that the Orthodontists were responsible for the stability after the orthodontic treatment. (**Table 2**)

Table 3 refers to satisfaction amongst the patients at the end of the treatment and the same at present i.e. while submitting the response in the post-retention period. 181(62.0%) patients were very satisfied and 93(31.8%) were satisfied at the end of treatment. 164(56.2%) patients were very satisfied and 104(35.6%) were satisfied with the appearance of the teeth at the present stage.

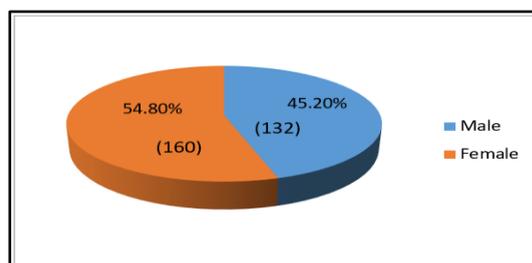


Figure 1: Depicting the percentage of male and female participants of the study.

Table 1: Responses regarding general information.

Question	Response [n (%)]				P
Time since the braces were removed	3months - 1 year	1 - 3 years	3 - 5 years	5 years or more	0.556
	99 (33.9)	123(42.1)	46(15.8)	24(8.2)	
Type of retainer used	No retainer	Removable retainer	Fixed retainer	Removable + Fixed Retainer	0.171
	32(11.0)	125(42.8)	48(16.4)	87(29.8)	

Values are presented as Number (%); by a Chi-square test * $p < 0.05$

Table 2: Responses to questions regarding the awareness of the respondent on the retainers.

Questions	Response [n (%)]				P
	Yes		No		
Are you aware that retainers are used after orthodontic treatment for retaining attained results?	213 (72.9)		79(27.1)		0.545
	188(64.4)		104(35.6)		
Do you think teeth can also move after removal of braces without orthodontic retainer?	188(64.4)		104(35.6)		0.459
	188(64.4)		104(35.6)		
Who is responsible for stability after removal of braces?	Me	My Orthodontist	My General Dentist	No One	0.279
	105(36.0)	152(52.1)	7(2.4)	28(9.6)	

Values are presented as Number (%); by a Chi-square test *p < =0.05

Table 3: Responses to questions regarding the satisfaction of the respondent on the retainers.

Question	Response [n (%)]				P
	Very Satisfied	Satisfied	Not Satisfied	Do not know	
How satisfied were you with appearance of your upper and lower teeth after your braces were removed?	181(62.0)	93(31.8)	6(2.1)	12(4.1)	0.465
	181(62.0)	93(31.8)	6(2.1)	12(4.1)	
How satisfied are you with appearance of your upper and lower teeth today?	164(56.2)	104(35.6)	14(4.8)	10(3.4)	0.619
	164(56.2)	104(35.6)	14(4.8)	10(3.4)	
Did your teeth move after removal of braces?	95(32.5)	154(52.7)		43(14.7)	0.885
	95(32.5)	154(52.7)		43(14.7)	

Values are presented as Number (%); by a Chi-square test *p < =0.05

Table 4: Responses to questions regarding the compliance of the respondent on the retainers.

Question	Response [n (%)]					P
	I don't remember	Every day for 24 hours	Every Night (8-9 hrs)	Every Alternate night	2 Nights in a week	
What was the instructed duration for wearing the retainer by your orthodontist?	86(29.5)	138(47.3)	60(20.5)	5(1.7)	3(1.0)	0.260
	86(29.5)	138(47.3)	60(20.5)	5(1.7)	3(1.0)	
What is the duration of your wear of the retainer?	As instructed by my orthodontist		Doesn't wear	Whenever wills to		0.120
	239(81.8)		35(12.0)	18(6.2)		
Did you ever feel discomfort while wearing the retainer?	Yes		No	Sometimes		0.172
	59(20.2)		197(67.5)	36(12.3)		
Did you have difficulty in eating while wearing the retainer?	Yes		No	Eating without the retainer		0.692
	45(15.4)		172(58.9)	75(25.7)		
Have you ever faced any difficulty in removing and reinserting the retainer?	Yes		No			0.363
	39(13.4)		253(86.6)			
Have you ever felt gagging while wearing the retainer?	Yes		No			0.923
	37(12.7)		255(87.3)			
Did the retainer ever affect your speech?	Yes		No			0.643
	52(17.8)		240 (82.2)			
Do you keep the retainer clean?	Yes		No			0.236
	207(70.9)		85(29.1)			

What method you use to keep the retainer clean?	New brush	Old brush	Denture cleansing solution	Denture cleansing tablet	None of the above	0.025*
	74(25.3)	85(29.1)	83(28.4)	8(2.7)	42(14.4)	
Did you ever have any pain or ulcer while using the retainer?	Yes		No			0.289
	50(17.1)		242(82.9)			
Has your retainer ever been broken/ lost?	Yes		No			0.091
	54(18.5)		238(81.5)			

Values are presented as Number (%); by a Chi-square test *p <=0.05

154(52.7%) of patients perceived that there was no movement of teeth and 95(32.5%) of patients thought that there was movement in the teeth. (Table 3)

Lastly, the compliance aspect during the retention or post-retention phase was surveyed. In which 138(47.3%) patients reported that the Orthodontist asked them to wear the retainer every day for 24 hours. 239(81.8%) of the patients followed the instructions of Orthodontist about the retention protocols. 197(67.5%) of respondents did not face any discomfort during the wear of the retainer. 172(58.9%) did not have any problem while eating. 253(86.6%) patients faced no difficulty in removing and re-inserting of the retainer. 255(87.3%) of the respondents did not face any gagging while wearing the retainer. The retainer did not affect the speech in 240(82.2%) of the respondents. 207(70.9%) of the patients kept the retainer clean. The statistically significant findings were seen in the methods of keeping the retainer clean. 85(29.1%) of respondents reported to clean the retainer with an old brush. 242(82.9%) of the respondents never faced any pain or ulcer during the wear period of the retainer. 238(81.5%) of the patients did not ever break the appliance or lost the appliance. (Table 4)

4. Discussion

Orthodontists strive to balance patients’ concerns, occlusion, facial esthetics and ultimately maintaining the results achieved during treatment. Attaining these goals is dependent not only on the practitioners’ skills but also on their knowledge of patient preferences and the patient’s willingness to comply with prescribed protocols. Compliance may be affected by gender, age, patient satisfaction and appliance comfort and esthetics. ¹ It has been suggested that involving patients in the decision-making process pertaining to retention protocols increases compliance. ⁴ Studies done by Mathew R et al. and Sri TS et al. discussed about the knowledge, attitude and patient’s perception about the orthodontic treatment. ^{6,7} This cross-sectional study addressed various aspects of retention encompassing awareness, satisfaction and compliance from patients’ perspective.

The overall response rate was as high as 91.25%, compared to the rates reported previously. ^{8,9} More than half of the respondents were females. Greater number of patients seeking orthodontic treatment has also been reported to be females in the literature which is in lines with the reported findings. ^{10,11,12}

The most commonly prescribed retainer was the removable retainer (42.8%), followed by the combination of removable plus fixed retainers (29.8%) and the bonded retainer (16.4%). This was in conjunction with the findings of Valiathan et al. and Pratt et al. ^{13,14} Conversely, Padmos et al. observed that bonded retainers to be most recommended. ¹⁵

4.1. Awareness

Most of the patients surveyed, were aware about the purpose of retention and the type of retention method used. They were aware about the responsibility of the stability of orthodontic treatment in retention period and were aware that the teeth can move after the orthodontic treatment without orthodontic retainer. Awareness about the orthodontic retainer and its advantages were established as high as 72.9% amongst the orthodontically treated individuals. However, the orthodontists were considered to be responsible for the stability of the achieved results according to our findings; in contrast to results reported by Mollov et al. which concluded that patients perceived their own attitude to be responsible for their orthodontic treatment outcomes and its stability. ¹⁶

4.2. Satisfaction

It was found that female patients were more satisfied with results achieved and retained than the males. Similar findings were observed by Mollov et al. and Al- Omiri et al. stating that a larger percentage of females seemed to be happy with the alignment of their dentition after the treatment being accomplished as well as in the retention and post-retention phase, when compared to males. ^{16,17} Satisfaction with dental alignment after the treatment and in retention period was reported by 62% and 56.2% of the participants as Very Satisfied respectively. Whereas 31.8% and 35.6% participants were Satisfied respectively at both stages.

Psychological traits of individual patients may affect their satisfaction with orthodontic treatment outcomes. In addition, Anderson et al. found that posttreatment satisfaction was positively correlated with pretreatment motivation levels. In the present study, satisfaction was greater for patients who claimed responsibility for maintaining post treatment outcomes. However, the perception that alignment and fit of the teeth remained stable over time was also an important factor for level of satisfaction.¹⁸

4.3. Compliance

In the present study, a large number of patients were asked to wear their removable retainer on a full-time (24hrs per day) basis. Demographically, different studies were done in different regions of the world including the study conducted in the United States revealed that most orthodontists prescribe full-time removable retainer use, followed by lifetime, part-time wear.¹⁹ In Australia and New Zealand, it has been reported that orthodontists more commonly prescribed a regular retention period of removable retainer.²⁰ On the contrary, Pratt et al. stated that patient compliance with removable retainer use is not acceptable and bonded retention should be evaluated as a preferable alternative to removable retainers.¹⁴ A trend towards more dual retention instead of solitary removable or solitary fixed retention, as well as more Vacuum formed retainer instead of Hawley-type retainers has been demonstrated in India.²¹

The participants reported retainer neither to be affecting the speech, gagging, mastication nor faced difficulties in removal and reinsertion of the appliance. It did not cause any pain or ulcer and similar findings were reported by Stratton et al. and Kulak Kayikci ME et al. Managing acrylic coverage effectively and temporary nature of speech problems by retainers as reported previously are in conjunction with our findings.^{22,23} There was considerable use of old brush for the cleansing of the removable retainer. Similarly previous studies have reported toothbrushes, gels and solutions to be preferred method for cleansing removable orthodontic appliances.^{24,25,26} In the present study, majority of the patients did not break or loose the appliance similar to observations reported by Pratt et al. and Pandis et al. reported that 46% of failure of fixed retainers would require replacement over a similar two-year observation term.^{14,27}

The present study is an attempt to describe the level of awareness, satisfaction and compliance of orthodontists' patients in Western Indian population and minimal data is available in the existing literature with presented population and aspects covered. A multicentered, population-based survey in future with increased sample size on the similar lines could definitely further help filling in the lacunae in present pool of data while adding the value to the findings of the present study.

5. Conclusion

With respect to the population surveyed, the conclusions established are:

1. The most commonly prescribed retainer was removable retainer followed by combination of removable and fixed retainer.
2. The level of awareness about orthodontic retainers and their advantages were established as high as 72.9% amongst the orthodontically treated individuals.
3. The extent of satisfaction with dental alignment was reported as “very satisfied” and “satisfied” by 62% and 31.8% of the participants respectively, immediately after the treatment. During retention and/or post retention phase 56.2% were very satisfied and 35.6% were satisfied. Females were more satisfied with treatment.
4. Compliance of the orthodontically treated individuals was reported to be 81.8% during the retention phase of orthodontic treatment in accordance with instructions by orthodontists. Diminutive reports of broken or lost retainers were noted.

6. Source of Funding

None.

7. Conflict of Interest

None.

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