RESEARCH ARTICLE

# Expectations of prospective orthodontic patients regarding post-orthodontic retention

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## Abstract

**Objective:** To assess the awareness among patients of prospective orthodontics about post-orthodontic retention.

**Method:** The cross-sectional study was conducted from May 2022 to May 2023 at the Department of Orthodontics, Ziauddin University, Karachi, and comprised patients of either gender enrolled for their first appointment at the outpatient clinic. Each patient received a validated questionnaire which explored their understanding, attitudes and expectations regarding the importance of retention after orthodontic treatment. Data was analysed using SPSS 25.

**Results:** Of the 206 questionnaires distributed, 203(98.5%) were returned duly filled. The overall mean age of the sample was 20.25±5.24 years (range: 8-48 years). There were 131(64.5%) females with mean age 12±3.2 years, and 72(35.5%) males with mean age 16±2.1 years. Majority of the participants 133(64.9%) believed that movement of teeth cannot occur without orthodontic appliances, 115(56.1%) believed that parents and guardians were responsible for the stability of the treatment results, while 88(42.9%) believed that dentists/orthodontists were responsible for the stability of the treatment outcomes. There were 132(64.4%) subjects who found removable retainer as a favourable retention device, while 71(34.6%) favoured fixed retainers.

**Conclusion:** There was a notable gap in patients' understanding of the retention phase, its importance and treatment durability expectations.

**Key Words:** Orthodontic retainers, Retention, After treatment, Care goals, Awareness.

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## Introduction

Retention plays an integral role as the final stage in orthodontic treatment, and it aims at maintaining the teeth in corrected positions after orthodontic treatment has been completed. In the case of inadequate retention, there is a possibility of relapse of final tooth positions due to forces from the periodontal fibres that surround the teeth which tend to pull the teeth back towards their original positions.[1] Hence, retention is necessary following the completion of orthodontic treatment to prevent relapse of the final outcome.[2,3] Therefore, it is now widely known that patients commonly require long-term retention to maintain the final tooth positions and remain satisfied with their final orthodontic result.[4]

In order to achieve satisfactory treatment results, awareness and understanding must exist in patients and clinicians about the substantial value of complying with retention methods. Patient cooperation and compliance are essential for successful treatment outcomes in orthodontics.[5] Over the past few years, research has been done regarding the understanding of orthodontists and their preferences. However, most of them provide insufficient evidence to help identify which factors influence patient expectations regarding post orthodontic retention. Further studies are required to adequately understand the impact of patient expectation on the treatment.[6] There is a strong link that exists between patient satisfaction and their expectation that the orthodontic results will remain stable. By forming an understanding of patient expectations, the gap between expectation and reality can be addressed, and this can lead to more successful treatment and satisfied patients.[7]

The current study was planned to assess the awareness among patients of prospective orthodontics about post-orthodontic retention.

## Subjects and Methods

The cross-sectional study was conducted from May 2022 to May 2023 at the Department of Orthodontics, Ziauddin University, Karachi. After approval from the institutional ethics review committee, the sample size was calculated using OpenEpi online[8] tool with 95% confidence level and 80% power in the light of an earlier study.[7] The sample was raised using convenience sampling technique.

Those included were patients of either gender enrolled for their first appointment at the outpatient clinic. Those who had already begun receiving treatment were excluded. Informed consent was obtained from all the

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patients, or, if necessary, from their attendants, ward or guardians.

Each patient received a validated questionnaire[7] which explored their understanding, attitudes and expectations regarding the importance of retention after orthodontic treatment. Consent from the authors was obtained prior to its use. Questions that were not applicable to local settings were omitted, the phrasing was simplified for layman's understanding, and it was translated into the Urdu language. A pilot study was conducted with 15 subjects for establishing the validity and reliability of the questionnaire in the local setup. No additional changes were needed on the basis of the pilot study's findings. The questionnaire was structured into three sections of closed-ended questions; demographic and sociocultural characteristics, knowledge of post-orthodontic retention, and attitudes and expectations.

Data was analysed using SPSS 25. Mean and standard deviation were calculated for quantitative variables, while frequencies and percentages were calculated for categorical variables. The level of knowledge and expectations on post-orthodontic retention were assessedusing binary logistic regression with univariate and multivariate analyses. To assess the relationship of dependent variables with independent variables, univariate analysis used $p<0.25$ as the cut-off mark, and the variables having that value were included in the multivariate model and adjusted odds ratios (aORs) were computed for which $p<0.05$ was considered significant.

## Results

Of the 206 questionnaires distributed, 203(98.5%) were returned duly filled. The overall mean age of the sample was 20.25±5.24 years (range: 8-48 years). There were 131(64.5%) females with mean age 12±3.2 years, and 72(35.5%) males with mean age 16±2.1 years. Majority of the participants were undergraduates 170(82.9%), and 93(45.4%) had family history of orthodontic treatment (Table 1).

**Table-1: D**emographic characteristics.

| Variables | Frequency (n) | Percentage (%) |
|---|---|---|
| **Gender** | | |
| Male | 72 | 35.5 |
| Female | 131 | 64.5 |
| **Educational Qualification** | | |
| Undergraduate | 170 | 83.7 |
| Graduate | 33 | 16.3 |
| **Family history of Orthodontic Treatment** | | |
| Yes | 93 | 45.8 |
| No | 110 | 54.2 |

**Table-2:** Univariate and multivariate analyses.

| **Awareness of Retainers Given after Orthodontic Treatment.** | | | | |
|---|---|---|---|---|
| **Variables** | **Crude OR** | **p-value** | **Adjusted 0** | **p-value** |
| Age (in years) | 0.92 | 0.01 | 0.91 | 0.01 |
| **Gender** | | | | |
| Male | 0.76 | 0.36 | | |
| Female | Ref | | | |
| **Education** | | | | |
| Undergraduate | Ref | | | |
| Graduate | 0.50 | 0.10 | 1.19 | 0.73 |
| **Family history of orthodontic treatments** | | | | |
| Yes | 0.45 | 0.01 | 0.37 | 0.00 |
| No | Ref | | | |

| **Awareness of Stability of Treatment with Retainers** | | | | |
|---|---|---|---|---|
| **Variables** | **Crude OR** | **p-value** | **Adjusted 0** | **p-value** |
| Age (in years) | 0.98 | 0.57 | | |
| Gender | | | | |
| Male | 1.06 | 0.83 | | |
| Female | Ref | | | |
| Education | | | | |
| Undergraduate | Ref | | | |
| Graduate | 1.82 | 0.19 | 1.74 | 0.23 |
| Family history of orthodontic treatments | | | | |
| Yes | 2.35 | 0.01 | 2.31 | 0.01 |
| No | Ref | | | |

| **Movement of Teeth without Orthodontic Appliances (Mobility).** | | |
|---|---|---|
| **Variables** | **Crude OR** | **p-value** |
| Age (in years) | 0.98 | 0.33 |
| Gender | | |
| Male | 0.81 | 0.50 |
| Female | Ref | |
| Education | | |
| Undergraduate | Ref | |
| Graduate | 0.67 | 0.34 |
| Family history of orthodontic treatments. | | |
| Yes | 0.77 | 0.39 |
| No | Ref | |

| **Responsibility of the Stability of Treatment Results (patient /orthodontist)** | | |
|---|---|---|
| **Variables** | **Crude OR** | **p-value** |
| Age (in years) | 0.96 | 0.19 |
| Gender | | |
| Male | 0.98 | 0.95 |
| Female | Ref | |
| Education | | |
| Undergraduate | Ref | |
| Graduate | 1.41 | 0.38 |
| Family history of orthodontic treatments | | |
| Yes | 0.90 | 0.71 |
| No | Ref | |

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| Knowledge of Favourable Retention Device (removable / fixed) | | | | |
|---|---|---|---|---|
| **Variables** | **Crude OR** | **p-value** | **Adjusted O** | **p-value** |
| Age(in years) | 1.05 | 0.05 | 1.041 | 0.240 |
| Gender | | | | |
| Male | 0.441 | 0.013 | 0.457 | 0.019 |
| Female | Ref | | | |
| Education | | | | |
| Undergraduate | Ref | | | |
| Graduate | 0.589 | 0.171 | 0.764 | 0.56 |
| Family history of orthodontic treatments | | | | |
| Yes | 0.801 | 0.448 | 1.434 | 0.450 |
| No | Ref | | | |

Ref: Reference Category.

Majority of the participants 133(64.9%) believed that movement of teeth cannot occur without orthodontic appliances, 115(56.1%) believed that parents and guardians were responsible for the stability of the treatment results, while 88(42.9%) believed that dentists/orthodontists were responsible for the stability of the treatment outcomes. There were 132(64.4%) subjects who found removable retainer as a favourable retention device, while 71(34.6%) favoured fixed retainers.

The odds of having awareness regarding retainers being given after treatment were more in participants with positive family history of orthodontic treatment (OR: 0.366; 95% confidence interval [CI]: 0.198-0.677; p=0.001). The odds of having awareness of stability regarding orthodontic treatment with retainers were greater with positive family history of orthodontic treatment (OR: 2.31; 95% CI: 1.25-4.26; p=0.007).

The awareness that movement of teeth can occur without orthodontic appliances was statistically non-significant related to age, gender, level of education and family history of orthodontic treatment (p>0.05). There was also no significant association between these four factors and the participant's understanding of whether the responsibility of treatment stability lies with the patient or the orthodontist (p>0.05). The odds of having knowledge of favourable retention device were higher among those with graduate-level education (OR: 0.764; 95% CI: 0.304-1.889; p=0.56). The odds were higher in males compared to females (OR: 0.457; 95% CI: 0.237-0.879; p=0.019) (Table 2).

## Discussion

In first world countries, such as the United States, dental school clinics have proven to be better than private practices in terms of the care delivered to patients[9] Over the past two decades there has been a rise in tertiary care dental centres mostly associated with rise in the number of teaching hospitals in Pakistan as well.[10] Majority of these offer orthodontic treatments which are more economical than the ones offered in private practice. With Pakistan facing economic challenges,[11] These clinics at dental institutes would now seem to be at the centre of delivery of dental care. As a result of this availability of affordable treatment and a greater need in urban areas, such as Karachi where malocclusion is 57.4%,[12] there are more people seeking orthodontic treatment.

With this rise, given the diversity in culture and the disparity of educational systems,[13,14] it is important to look into patients' understanding of dental treatments in order to identify gaps as their cooperation as this is important in the treatment's success and longevity.

Although there are a number of studies regarding patient perceptions and experiences of retainers centred on treated patients,[15-18] there has been a need to evaluate what people know about retention before beginning their orthodontic treatment to direct them better for their role in it. According to a study, patients in Pakistan have different expectations regarding orthodontic treatment in general.[19] The current study, to our knowledge, is the first in Pakistan to attempt to analyse the level of knowledge and understanding of post-orthodontic retention amongst patients who aspire to seek orthodontic treatment.

According to the findings, more than half the participants (59.6%) were aware that retainers were given after orthodontic treatment.

Majority of the current participants had undergraduate academic qualification (82.9%) and less than half of the participants (45.4%) had a positive family history of orthodontic treatment. Similar to an earlier study[7], the current results showed that awareness regarding retainers appeared to be much higher in participants with a positive family history of orthodontic treatment. However, their expectations as to how long they will be required to wear them may vary.

A significant majority of the current participants (64.9%) believed that movement of teeth cannot occur without the help of orthodontic appliances. This emphasises the need of educating patients and enhancing their understanding of the basic biomechanics of their teeth, which, in turn, should buttress the importance of wearing retainers in accordance with the prescription of their orthodontist. Age, gender, level of education and family history of orthodontic treatments were non-significantly related to awareness of movement of teeth among 34.1%

of the participants who believed that teeth can move without the need of orthodontic appliances.

Majority of the current participants (64.4%) favoured a removable retention device, and a considerably large number of them (42.9%) still believed that dentists/orthodontists/parents/guardians were responsible for the stability of the treatment results. However, according to a study assessing factors affecting compliance of patients with Hawley retainers and vacuum-formed retainers, the responsibility of wearing these was with the patient and the process was beyond the control of the orthodontist.[20] Also, according to a study, patients who did not feel they were responsible for the stabilisation of their treatment results were often found to be dissatisfied with their treatment outcome.[21] Studies have also shown that the effectiveness of the cooperation of parents during the treatment is also a factor in ensuring positive outcomes.[22,23] These go to emphasise that there is a lack of understanding among participants regarding their own role in the post-orthodontic retention phase, and soft tissues and growth after the treatment has ended, are often not factors that an orthodontist can direct.[24] It also endorses the need for greater efforts on patient awareness so that patients set realistic expectations. Nonetheless, understanding the patient's perspectives and preferences when deciding on the type of retention should be of prime importance to the orthodontist as they are significantly associated with patient compliance.[25]

The current participants also predominantly (64.9%) believed that teeth cannot move without the help of orthodontic appliances. This demonstrates the lack of understanding of how teeth naturally move and the occurrence of relapse as the tendency to return to their original positions[26] with inadequate retention measures among the participants.

Logistic regression models for "movement of teeth occurring without orthodontic appliances" and for "whether the responsibility of treatment stability lies with the patient or the dentist" showed no significant association with sociocultural factors.

The current study has limitations as it was conducted at a single centre. Further extensive research with larger sample size and random sampling needs to be conducted in multi-centre settings to validate the current findings.

## Conclusion

There was a notable gap in patients' understanding of the retention phase, its importance, and treatment durability expectations, which are often shaped by familial treatment experiences. Addressing this highlights the urgency for patient education programmes to cultivate realistic expectations and enhancing the understanding of orthodontic treatment, with a focus on the crucial role of retention.

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## Authors' Contribution:

**HKM:** Research design, data interpretation and drafting.
**SM:** Concept, data analysis, interpretation and critical revision.
**JM:** Input in planning, data acquisition and write-up.

All authors have given final approval.
All authors have agreed to be accountable for all aspects of the work.