

A national survey on retainer preferences and regimens among orthodontists in Malaysia

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Objectives: To identify the types of retainers used, their frequency, factors influencing retainer choice, and variations in treatment regimens among Malaysian orthodontists.

Methods: A questionnaire was developed and validated for content and face validity. The online questionnaire was distributed to orthodontists registered with the Malaysian Association of Orthodontists (MAO) and/or the Malaysian Dental Council under the National Specialist Register (NSR).

Results: The survey yielded a 43.2% response rate. Vacuum-formed retainers (VFRs) were the most frequently prescribed and preferred retainers for both maxillary (91.1%) and mandibular arches (92.4%). Traditional removable retainers (TRRs), dual retainers, and fixed retainers followed. The primary factor influencing retainer choice is the type of case (93.7%). The prevailing retention regimen for the first six months is full-time wear (64.1%). Most orthodontists prefer night-time wear for 6 to 12 months (87.2%) and for 12 to 24 months (66.7%) post-treatment. Nearly half of the respondents (51.3%) prescribed an appliance retention wear regimen of two to three times per week after 24 months, continuing indefinitely thereafter. Most orthodontists conducted face-to-face follow-ups for 1 to 2 years post-debonding.

Conclusion: Malaysian orthodontists prefer VFRs in both maxillary and mandibular arches, especially among younger practitioners. Fixed retainers are the least popular. This study provides valuable insight into the retention practices of Malaysian orthodontists. (Aust Orthod J 2025; 41: 160 - 168. DOI: 10.2478/aoj-2025-0013)

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Introduction

Retainers are passive orthodontic appliances designed to maintain and stabilise tooth positions, thereby allowing for the reorganisation of supporting structures following the active phase of orthodontic therapy.¹ Undesirable post-treatment changes in tooth

position and occlusion can jeopardise the outcome of treatment. Therefore, minimising relapse represents a paramount objective for orthodontic patients. Long-term studies have shown that in the absence of retainers, orthodontic relapse will cause 40–90% of patients to have unacceptable dental alignment ten years after treatment.²

The mode of retention can be categorised into removable or fixed. The two main types of unfixed retainers are the traditional removable retainers (TRR), and vacuum-formed retainers (VFRs). The most common TRR is the Hawley retainer, and others of similar type like the Begg wrap-around retainer and Barrer/Spring retainer. Fixed retainers consist of orthodontic wires bonded to the lingual or palatal surfaces of anterior teeth to tie them together and improve retention,³ while variations include multiple-stranded wires⁴ and resin fibreglass bands.⁵ Dual retainers are a combination of removable and fixed retainers placed on the same arch.⁶

Multiple systematic reviews have highlighted the absence of high-quality evidence supporting one retention method over another in relation to stability, the effect on periodontal health, survival rates, patient-reported outcomes, and cost-effectiveness.^{7,8} As a result, retainer selection by orthodontists is largely determined by personal preference and experience, as demonstrated by a large variation in retainer preferences by clinicians around the world.^{8–11} For instance, while Dutch and Swiss orthodontists favour fixed retainers in both arches,^{12,13} surveys in Australia and the United States have indicated a preference for removable retainers in the maxillary arch and fixed retainers in the mandibular arch.^{14,15} Factors influencing the selection of retainers include the pre-treatment malocclusion, the need for extractions, patient compliance, oral hygiene, and patient preferences.^{9,13,16,17} These choices may also be shaped by additional factors such as age, gender, the time elapsed since debonding, an understanding of proper compliance and the type of retainer.¹⁸

Similarly, no evidence-based recommendation exists regarding the duration of wear for removable retainers during the initial retention phase.⁷ This has resulted in significant variation in retention protocols, which range from 6 to 24 hr of daily wear.^{11,12} Studies have highlighted this variation, particularly research conducted in the Netherlands which revealed an inverse correlation between the prescribed number of hours of wear and the duration of the initial retention phase.¹⁰ A systematic review concluded that there is insufficient evidence to recommend the most effective retention protocol.¹⁹

An earlier study conducted in Malaysia assessed retainer preferences among orthodontists and found that the most commonly used retainer for

both arches was the VFR.²⁰ However, the previous study did not classify respondents into subgroups nor evaluate parameters such as gender, age, or years of experience.²⁰ Furthermore, there are no studies which have assessed the retention regimes prescribed by Malaysian orthodontists. With the increasing worldwide popularity of fixed retainers for the mandibular arch, it is pertinent to re-evaluate the current preferences of Malaysian orthodontists regarding retainer choice.^{10,14}

Therefore, the purpose of the present study was to evaluate retainer appliance preferences and retention regimens among currently practicing orthodontists in Malaysia. Additionally, the study sought to determine the factors which influenced retainer choice and variations of retention regimes prescribed by Malaysian orthodontists.

Materials and methods

Sampling

The present cross-sectional study was conducted and involved all of the orthodontists in Malaysia through an online questionnaire consisting of open-ended and multiple-choice questions. Ethical approval was obtained from The National University of Malaysia Research Ethics Committee (UKMPPI/111/8/JEP-2023-383) and permission to conduct the study was granted from the President of the Malaysian Association of Orthodontists (MAO). The survey sample was distributed to all members of MAO who were registered under the National Specialist Register (NSR). The inclusion criteria were orthodontists currently practicing in Malaysia who had completed 3 to 4 years of postgraduate training leading to their specialist qualification. Expatriate orthodontists, general dental practitioners who practise as orthodontists, students and non-practitioners were excluded as they did not meet the scope of the study.

Questionnaire

The online questionnaire was adapted and modified from a previous study by Bahar et al., following granted permission from the original author.²¹ The questionnaire's content validity was reviewed by three orthodontists, and face validity was assessed by seven postgraduate orthodontic students. Minor modifications were made based on reviewer feedback.

The final questionnaire consisted of 59 multiple-choice and open-ended questions, divided into three sections.

The first section addressed demographic information, including gender, age, years of experience as an orthodontist, employment status, and practice location. The second section focused on orthodontist preferences for different types of retainers, the frequency of retainer prescriptions, and their opinions on the advantages and disadvantages of specific retainers. The third section asked about the retainer wear protocol during the retention phase. The survey took approximately ten minutes to complete and was administered electronically via Google Forms.

Inviting eligible participants to voluntarily take part, an email containing a detailed description of the survey and a link to the questionnaire was sent to MAO members through the association's secretariat. Data collection occurred between October and December 2023. No incentives were offered, and responses were kept anonymous to ensure confidentiality.

Data analysis

The survey responses were exported into an Excel spreadsheet. Statistical analyses were conducted using IBM SPSS software, version 29.0.1.0. Descriptive statistics were presented as frequencies and percentages. Chi-square tests and Fisher's Exact Test were employed to examine associations between demographic variables and preferred retainer choices, as well as between retainer preferences and retention regimens. Statistical significance was set at $P < 0.05$. The responses to open-ended questions were thematically grouped and represented in frequency tables where applicable.

Results

Demographic results

Of the 183 eligible orthodontists registered with the MAO, 79 responded to the survey, which represented a response rate of 43.2%. Most of the participants were female, aged between 30 and 40 years, had between five and 15 years of experience and were practicing in a government clinic or hospital. Table I summarises the demographics of the respondents.

Table I. Demographics of the survey respondents

	Count (n)	Percentage (%)
Age		
<30 years old	0	0.0
30 to < 40 years old	35	44.3
40 to < 50 years old	34	43.0
50 years and above	10	12.7
Gender		
Male	22	44.3
Female	57	72.2
Years of experience		
< 5 years	24	30.4
5 to < 15 years	40	50.6
15 to < 20 years	12	15.2
25 years and above	3	3.8
Clinical Setting		
Government Clinic/ Hospital	36	45.6
Government University Clinic/Hospital	35	31.6
Private University Clinic/ Hospital	3	3.8
Private Clinic/Hospital	15	19.0
Total	79	100%

Retainer preference and selection

Most respondents preferred VFRs, with only one choosing fixed retainers (Table II). Figure 1 presents the frequency of retainer prescriptions over the past 12 months for the maxillary and mandibular arches, indicating that VFRs were the most prescribed. Retainer selection was influenced by several factors, with the type of case identified as being the most important (Table III). Additionally, 73.4% of respondents offered patients the option to choose their retainer type, with VFRs being the most preferred by patients. Most orthodontists (82.3%) fabricated retainers in-house, while a smaller proportion utilised a combination of in-house and external laboratories (11.4%) or relied solely on external laboratories (6.3%). Orthodontists with 15 to 25 years of experience and those aged over 50 years favoured TRRs over VFRs significantly more often than

Table II. Retainer preference by orthodontists

Retainer	Count (n)	Percentage
VFR	57	72.2
TRR	12	15.2
Dual retainer	9	11.4
Fixed retainer	1	1.3

those with less than 15 years of experience or those aged 50 years or younger ($P < 0.05$). No significant differences in retainer preference were observed based on gender nor clinical setting (government versus the private sector) ($P > 0.05$).

Vacuum formed retainers

The primary reasons cited by respondents who preferred VFRs were their aesthetic appeal and ease of fabrication (89.5%, $n=51$). Other notable factors included reduced chairside time (71.9%, $n=41$), the ease of maintaining oral hygiene (43.9%, $n=25$), cost-effectiveness (42.1%, $n=24$) and the option for part-time wear (19.3%, $n=11$). The majority of respondents indicated that VFRs typically had a lifespan of 1 to 3 years (50.9%, $n=29$). Additionally, most of those who preferred VFRs reported that TRRs were aesthetically inferior (56.1%, $n=32$) and required high levels of patient compliance (47.4%, $n=27$).

Furthermore, fixed retainers were perceived as having a high risk of breakage and impeded interdental cleaning (80.7%, $n=46$).

Traditional removable retainers

TRRs were preferred based on the ease of oral hygiene by patients (83.3% $n=10$), their part-time usage (58.3%, $n=7$), and less required chairside time (33.3%, $n=4$). The most preferred TRR was the Hawley retainer (75%, $n=9$), followed by the Begg wrap-around retainer (16.7%, $n=2$) and modified Hawley retainer (8.3%, $n=1$). TRRs were preferred over fixed retainers due to several concerns including the potential risk of caries development (100%, $n=12$), the susceptibility of breakage (91.7%, $n=11$), the hindrance to interdental cleaning (83.3%, $n=10$), application technique sensitivity (75.0%, $n=9$), and the longer chairside time required (66.7%, $n=8$). Additionally, it was felt that VFRs had a high likelihood of breakage or being lost (100%, $n=12$), along with substantial patient wear compliance (25%, $n=3$).

Dual retainers

The majority of orthodontists who preferred dual retainers ascribed their choice due to the low risk of relapse (88.9%, $n=8$). Additionally, the respondents considered that dual retainers prevented localised relapse if partial debonding of a fixed retainer occurred (55.6%, $n=5$) and patients could reduce

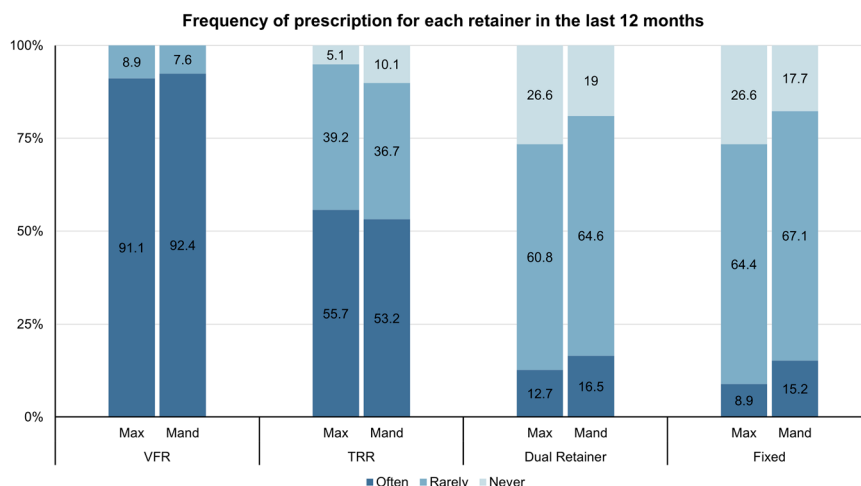


Figure 1 Frequency of prescription for different types of maxillary and mandibular retainers in the past 12 months.

Table III. Percentage of orthodontists indicating that a certain factor is important in deciding retainer type

Factor	Percentage (%)
Type of case	93.7
Gingival and periodontal condition	70.9
Oral hygiene	64.6
Compliance and cooperation	53.2
Availability	35.4
Cost	19.0
Age	10.1

wearing time for removable retainers to two nights per week with the help of lower fixed retainers (11.1%, $n=1$). Conversely, the respondents expressed reluctance to prescribe only fixed retainers due to their high incidence of breakage (66.7%, $n=6$) and the associated risk of caries development (55.6%, $n=5$). It was also highlighted that TRRs demanded high levels of patient compliance (77.8%, $n=7$), while VFRs were considered prone to breakage (77.8%, $n=7$).

Fixed retainers

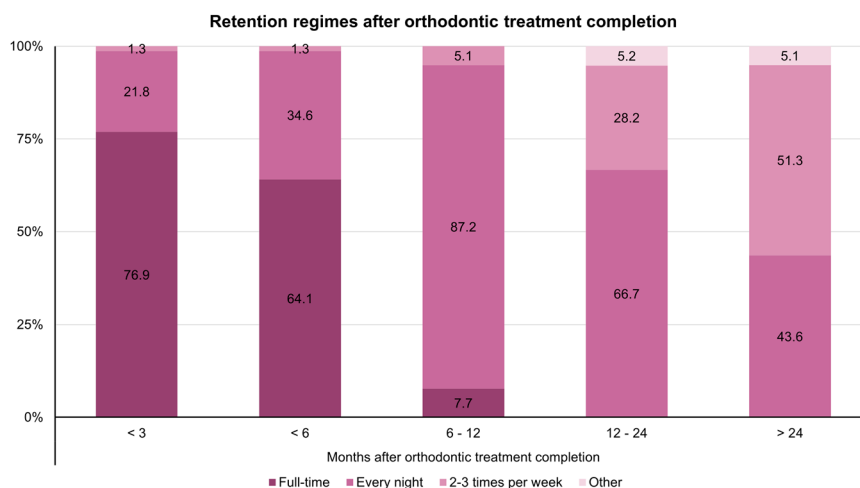
Only one respondent preferred fixed retainers, citing the advantages of low compliance demand, lower relapse risk and discreet nature. Multi-strand retainers were the preferred choice due to their superior retention. Stainless steel co-axial

retainers were favoured for their adaptability. The main indication for fixed retainers was good oral hygiene. Should caries develop under a fixed retainer, the retainer would be removed, the carious lesion restored and a removable retainer substituted as a replacement. The anticipated average lifespan of fixed retainers was 3–5 years. The respondent was against prescribing both TRRs and VFRs as they have a high compliance requirement while dual retainers were not preferred due to the high cost.

Treatment regime

Figure 2 illustrates the orthodontists' preferred retention regimes. For the first six months following the completion of active treatment, the majority of respondents prescribed a full-time retention regimen, which was at least 20 hr per day. A night-time regimen was the most common at 6 to 24 months after treatment. Beyond 24 months, most orthodontists prescribed a wear regime of 2–3 times per week. During the retention phase, respondents monitored patient compliance via face-to-face appointments up to 6 months (9%, $n=7$), at 1 year (60.3%, $n=47$) and at 2 years (14.1%, $n=11$). Ten (12.8%) respondents did not monitor patients during their retention phase. There was no significant difference in the type of preferred retainer and retention regime ($P > 0.05$).

Forty-nine respondents (62.0%) expressed confidence that 75–100% of their patients adhered to the retention regimen for up to one year following

**Figure 2** Distribution of recommended retainer wear schedules at different time points.

debonding. This confidence decreased over time, with six respondents (7.6%) remaining confident regarding patient compliance after 1–3 years, and three respondents (3.8%) maintained confidence beyond three years. The majority of the respondents (86.1%, $n=68$) indicated that they rarely encountered treatment relapse. When relapse did occur, the patient's attitude (92.4%, $n=73$) and a broken or lost retainer (79.7%, $n=63$) were the most frequently cited attributing factors.

Discussion

The response rate of 43.2% for the questionnaire was considered acceptable, as it compared favourably to the 32.9% to 39.3% response rates from other national surveys conducted of Malaysian orthodontists.^{20,21} However, this response rate remains lower than that reported in similar studies conducted internationally, in which response rates ranged from 58% to as high as 91%.^{12,14} Factors contributing to the relatively low response rate may include the busy schedule of potential participants, changes in email addresses, or the relatively short two-month completion window. A higher percentage of Malaysian orthodontists in the government sector (77.2%) was reported in this study compared to the previous survey of ten years ago (59.4%).²⁰

The present survey identified the VFR as the most preferred and frequently prescribed appliance provided by Malaysian orthodontists, followed by the TRR, dual retainer and the fixed retainer, with this pattern consistent for both the maxillary and mandibular arch. The trend was also in line with the preferences of patients. In the maxillary arch, retainer preference demonstrated significant geographic disparity. The preference of Malaysian orthodontists for the VFR is shared with practitioners in Australia, Canada, Ireland, New Zealand, and the United Kingdom. Hawley retainers are favoured in Saudi Arabia and the United States, dual retainers in India, Iraq, Lithuania, and Norway, and fixed retainers in the Netherlands, Turkey, and Switzerland.^{14,17,22–26}

In the mandibular arch, however, orthodontists in countries such as Australia, Canada, India, New Zealand, Saudi Arabia, and Turkey tend to favour fixed retainers.^{14,17,22–26} The under-utilisation of fixed retainers may be attributed to the relative preference for dual retainers, as data for 'fixed retainers' may have been included within the 'dual retainer' category.

The present study also revealed a predilection for older, more experienced orthodontists to prefer TRRs over VFRs, compared to their younger colleagues. This inclination may be attributed to the older clinicians being primarily trained to use TRRs and felt more comfortable prescribing a familiar appliance given its well-established usage.²⁷ Conversely, younger orthodontists may have received greater training on VFRs, due to their increasing popularity over recent decades.^{14,23,24} This generational discrepancy is also evident in the findings of Padmos et al., who observed a positive correlation between orthodontists' experience and the use of a Hawley-type retainer in the maxillary arch.¹⁰

Dual retainers ranked third in relation to utilisation and preference among Malaysia orthodontists, as their use was lower than solitary removable retention modes but greater than that of solitary fixed retainers. The combination of removable and fixed retainers offers the advantage of preventing dental changes in the event of a bond failure or an unintentional activation of retainers.²³ Contrary to the current findings, studies from India, Iraq, Lithuania, New Zealand, and Norway have demonstrated a preference for dual retention over solitary removable or solitary fixed retention, especially in the maxillary arch.^{9,11,23,24,28}

Fixed retainers were the least preferred mode of retention among Malaysian orthodontists who replied to the present study. Those who favoured other retainers expressed concerns about the potential for breakage and hindered interdental cleaning as a result of fixed retainer placement. The literature presents conflicting findings on the durability of fixed retainers as one study reported a significantly higher failure rate for fixed retainers (50%) compared to VFRs (20%) used in the mandibular arch,²⁹ while an alternative study reported a higher failure rate for VFRs.³⁰ The survey respondents who preferred fixed retainers indicated that retainer breakage was 'rare' in their practice. While previous studies have consistently found increased plaque and calculus accumulation associated with fixed retainers due to hindered interdental cleaning, this rarely translated to periodontal disease.^{31–33}

The present survey found that orthodontists in Malaysia considered the 'type of case' (93.7%) to be the most important factor in selecting retainers. This result mirrors surveys conducted globally and

supports the contemporary view that orthodontic retention should be individualised rather than adopting a 'one size fits all' approach.⁶ Multiple studies in other countries have reported that orthodontists identified the type of case as the main factor that influenced their choice of retainer.^{11,17,28} Respondents in the present survey also indicated the tailored nature of their retention strategies by providing examples for TRR choice instead of VFR, particularly in maxillary expansion cases, the closure of extraction spaces or cases which required occlusal settling. Similarly, TRRs have been reported to be more suitable for occlusal settling compared to VFRs.³⁴ Dual retainers were prescribed for cases involving severe crowding, rotation, spacing, or a high relapse risk. However, no consensus emerged on specific retainer types for particular cases, which reflected the individualised nature of retention strategies. This aligns with a recent Cochrane review, which found insufficient evidence to determine the superiority of any single retention approach.⁷

When selecting retainers, approximately half (53.2%) of orthodontists in Malaysia based their decisions on both their professional judgement and patient's preference; the remaining half either relied solely on their judgement (43.0%) or solely on the patient's preference (3.8%). The foremost approach aligned with the concept of shared decision making, which involved patient awareness, deliberation, and incorporation of their preferences.³⁵ A study conducted in the United Kingdom found that orthodontists have a good understanding of shared decision-making.³⁶ While no similar studies have been conducted in Malaysia, the result of the current study may suggest that more than half of Malaysian orthodontists may be incorporating a shared level of decision-making into their practice.

In the current study, Malaysian orthodontists indicated that they 'rarely' (86.1%) or 'never' (13.9%) encounter orthodontic relapse in their practice. The low relapse occurrence may partly explain why removable orthodontic retainers are preferred over fixed retainers by Malaysian orthodontists. When relapse does occur, the most frequently cited aetiology was the patient's attitude (92.4%). Approximately half (53.0%) of Malaysian orthodontists believed that patient compliance was higher when wearing VFRs rather than traditional removable retainers, which is consistent with findings of Pratt et al.¹⁵ Contrary to

this finding, a study conducted in the United States found that compliance with VFR wear was higher than that for Hawley retainers in the first two years, but reduced significantly during the two years post-debonding.¹⁵

In the present study, most orthodontists used in-house laboratories (82.3%) as only a small percentage reported a combination of in-house and external facilities (11.4%) or relied exclusively on external laboratories (6.3%). This finding corroborates results by Ab Rahman et al., in which 81.3% to 84.4% of retainers were fabricated in-house and suggested a similar trend for Malaysian orthodontists over the past 10 years.²⁰ The predominance of an in-house laboratory facility is likely as the majority of the respondents worked in a government clinic or hospital which provided in-house laboratory services.

Orthodontists tend to prescribe a shorter duration of full-time wear for TRRs compared to VFRs. For patients wearing a TRR, the full-time wear duration was less than 4 months, whereas for VFR patients, it was typically 4 to 6 months. A Cochrane review by Martin et al. revealed that 6 months of full-time and 6 months of part-time VFR wear provided similar stability to Hawley retainer wear.⁷ A landmark study found that wearing removable retainers for approximately 10 hr per day was sufficient to maintain a treatment outcome,¹⁹ while a further study recommended at least 9 hr per day to maintain the alignment of the mandibular anterior segment.³⁷

Most Malaysian orthodontists do not have a specific timeline in their retainer regime, but suggested a preference for indefinite wear, in a trend that aligns with worldwide practice. As an example, the percentage of Australian orthodontists who recommend indefinite retainer wear increased from 66% in 2004 to 85.3% to 87.4% in 2019.^{14,38} In cases requiring a prosthesis, Malaysian orthodontists advised full-time retainer wear until the prosthesis was provided.

Orthodontists in Malaysia generally assumed that patient compliance decreased over time, with the majority expected to achieve 75% to 100% of adherence to the retention regime within the first year after debonding and subsequently decrease to 25% to 50% after three years. Despite this, most orthodontists monitor patients face-to-face for only one (60.3%) to two years (14.1%) following debonding. This difference highlights the need for an extended follow-up period,

especially given the preference for removable retainers, which are associated with suboptimal compliance and a patient's tendency to overestimate wear time.³⁹ A study in Poland similarly found that only 41.7% of orthodontists reported patient co-operation during the retention phase.⁴⁰ Notably, a small portion of Malaysian orthodontists (12.8%) do not monitor patients at all during retention phase, and the use of tele-consultation and remote monitoring remains uncommon.

The variation in both retainer preference and retention regimes in Malaysia coupled with the absence of reliable scientific evidence regarding the long-term effectiveness of various retention appliances suggest a need for practice retention guidelines. The insights from the present study may assist in the development of a guideline to enhance retention protocols in Malaysia.

A key strength of the present study is the rigorous questionnaire validity testing process. The current questionnaire also included demographic parameters to explore correlations with retainer preferences. The main limitation was a modest response rate. However, it surpassed the response rate of previous Malaysian studies, and the demographic profile of the respondents was representative of the overall distribution of orthodontists in Malaysia. Future research could consider offering incentives or conducting phone follow-ups with non-respondents to encourage increased participation.

Conclusions

The preference for VFRs in the maxillary arch is consistent with the prevailing global trend. However, in contrast to certain countries that preferred fixed retainers, Malaysian orthodontists exhibit a preference for VFRs in the mandibular arch as well. The preference towards VFRs is particularly evident among younger Malaysian orthodontists. The preferred retention regimen for the first 6 months following debonding is full-time wear, followed by night-time wear for up to 24 months, and two to three times per week beyond 24 months. Most orthodontists schedule follow-up appointments up to two years following debonding.

Conflicts of interest

The authors declare that there is no conflict of interest.

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Ethical Clearance

The study was approved by The National University of Malaysia Research Ethics Committee (UKMPPI/111/8/JEP-2023-383).

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