

A Comprehensive Survey on Orthodontic Retention Protocols Among Iraqi Orthodontists

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Abstract

Background Little research has been conducted to evaluate protocols and trends in orthodontic retention. The objective is to identify the general retention protocols used among orthodontists in the Iraq. **Materials and methods** the study was conducted via an electronic survey (Survey Monkey® software facility) with branching logic on certain questions. The survey questionnaire was sent to 172 orthodontist members of the Iraqi Association of Orthodontists. **Results** Vacuum formed retainers were the most frequently used retainer type for the maxillary (61%) and mandibular arch (60%); followed by Hawley retainers (34%) in the maxillary and (30%) in mandibular arch; while fixed retainer was much less frequently used in maxillary arch(9%) and in the mandibular arch(19%). the orthodontists recommended an average of 22 hours a day (SD = 1.5) for retainers should be worn During the retention phase (duration average 9.2 months). The orthodontist responses revealed the patient compliance to the vacuum formed retainers about (43%) and (46%) for the maxillary and mandibular arch respectively; and for the Hawley retainers about (25%) and (40%) in maxillary and mandibular arch respectively, for the fixed retainers was reported as (25%) in the maxillary arch and (7%) in mandibular arch, (77%) of patient compliance to their retention protocol at the first six month after debonding that decrease to (46%) and (9.8%) after one and three years following active treatment respectively. **Conclusion** Vacuum Formed Retainers were the most common retainer choice in the maxilla and mandible with full-time wear which the orthodontist believed the more patient compliance followed by Hawley retainers then fixed retention.

Keywords: Survey, Orthodontic retention, Iraqi orthodontists

Introduction

Retention is the phase of orthodontic treatment that attempts to maintain teeth in their corrected positions after active tooth movement and regard one of the most difficult challenges facing the clinician in orthodontics (Melrose and Millett, 1998). Retention can be achieved by placing removable or fixed retainers. There is no recognized duration for retention, although it has been shown that; at least in relation to periodontal factors; it takes on average a minimum of 262 days for fibers around the teeth to remodel to the new tooth position (Reitan, 1959). There is a variation in retention protocols used in contemporary orthodontic practice however there is a general agreement among orthodontists that regardless of the length of retention

period or the type of retainer, patients must have some type of retention following active treatment for gingival and periodontal tissue reorganization and the changes produced by the time during growth period may alter treatment result of did not achieve within the physiological equilibrium of growing patient (Proffit et al, 2012). Many studies, surveys and systematic reviews evaluated orthodontic retention protocols, type of retainers and patient satisfaction at least 5 years posttreatment were published and a few evidence-based conclusions was reported on this subject (Littlewood et al, 2006, Bondemark et al, 2007). Keim et al, 2008 published a survey among orthodontist in the United States of America showed that although decreasing the Hawley retainer; remained the most commonly used retainer, while 'invisible' retainers had continued to gain popularity. In addition, the use of bonded retainers with permanent retention period increased with nearly one-third of the clinicians using them routinely in the mandibular arch (Keim et al, 2008). Valiathan and Hughes, 2010 surveyed 2000 members of the American Association of Orthodontists in the United States regarding orthodontic retention and concluded the maxillary Hawley retainers (58.2%) and mandibular fixed lingual retainers (40.2%) were the most commonly used for less than 9 months of full-time wear of removable retainers and most orthodontists (75.9%) did not instruct patients to have the fixed lingual retainers removed at least five years. Pratt et al, 2011 conducted the same survey showed mean retention protocols of the surveyed population predominant use of Hawley or vacuum-formed retainers in the maxillary arch and fixed retention in the mandibular arch. For both arches, there is a current shift away from Hawley retainers and toward vacuum-formed retainers and fixed retention. The retention protocols and preferred methods of retention were evaluated in Australia, New Zealand, the United Kingdom, and the Netherlands. Orthodontists in Australia and New Zealand preferred vacuum-formed retainers for the maxillary arch and fixed retention for the mandibular arch. Half of the surveyed orthodontists used a specific retention period, with a median of 2 years (Wong and Freer, 2004). Orthodontists in the Netherlands preferred fixed retention for both arches (Renkema et al, 2009). However Private practices in the United Kingdom preferred a combination of vacuum-formed retainers and fixed retention (Singh et al, 2009). Norwegian orthodontists commonly used fixed retainers in the mandible and a combination of a fixed and a removable retainer in the maxilla, and retainers in the mandible are kept much longer than in the maxilla, most often more than 5 years (Vaska et al, 2013). The purpose of the present study was to survey retention protocols used among orthodontist in Iraq and to compare the results with similar studies in other countries.

Materials and methods

The study was conducted via an online questionnaire survey sent to the orthodontists in Iraq using the Survey Monkey® software facility, full lists of names and addresses of orthodontists were randomly selected from the Iraq Society of Orthodontists directory who's working in private practice and dental centers with different years of practice. The survey form was formulated after undertaking a pilot study among six orthodontists prior to the study to ensure clear understanding of questions, validate the relevance of the questions to a specialist orthodontist population and establish the approximate time taken to complete the questionnaire (10 mins) with minor modification of questions after pilot study. Adequate space was also provided for additions or further comment. Non-responders (42 Orthodontists) were sent a reminder question-

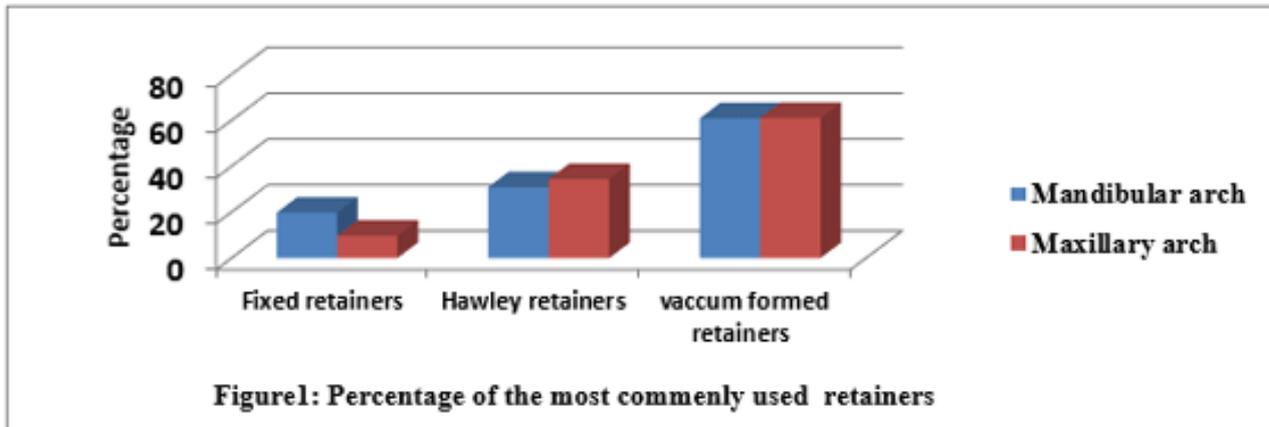
naire after one month of the original deadline, 26 of the non-responder orthodontists were replied, no further reminders were issued after the second deadline.

Statistical analysis

Data were statistically analyzed by a software computer program SPSS, version 18 to obtain descriptive statistics (means, standard deviation, and standard error), and Chi-square analysis.

Results

The orthodontist responses were 156 of 172 questionnaires (90%) that was e-mailed, Vacuum formed retainers were the most frequently used retainer type for the maxillary arch (61%); followed by Hawley retainers (34%) while fixed retainer (9%) was much less frequently used. In the mandibular arch, there was also most frequently used of vacuum formed retainer (60%); followed by Hawley retainers (30%) and fixed retention (19%) was more frequently used than maxillary arch (Figure 1). Most of surveyed orthodontist (80.8%) practiced the post retention phase of retention protocol and reported increase in use of vacuum formed retainer in maxillary ($p=1.43 \times 10^{-6}$) and fixed retainer in mandibular arch ($p=1.2 \times 10^{-6}$), while about (19.2%) of respondents was not practiced the post retention phase. Orthodontist who practice post retention phase and preferred to use vacuum formed retainer in maxillary arch instruct their patient to wear their appliance at night for the post retention period ($p=43 \times 10^{-5}$).



The responses about the number of hours per day the orthodontist recommended for retainers should be worn and the duration of the retention phase summarized in Table 1. The orthodontists reported that the percentage of patient compliance to their retention protocol was (77%) at the first six month after debonding and this percent decrease to (46%) and (9.8%) after one and three years following active treatment respectively; the least patient compliance to retention protocol reported as (4%) in 5 years following active orthodontic treatment. The orthodontist responses revealed the patient compliance to the vacuum formed retainers about (43%) and (46%) for the maxillary and mandibular arch respectively; and for the Hawley retainers about (25%) and (40%) in maxillary and mandibular arch respectively; the compliance of patient to the fixed retainers was reported as (25%) in the maxillary arch and (7%) in mandibular arch, (6%) of responses was reported no difference in patient compliance to types of retainers.

Table 1: The responses about the recommended number of hours per day for retainers worn.

Question	Responses (n)	Mean	SD
How many hours per day do you require patients to wear their retainers during the retention phase of treatment?	156	22 hours	1.5
How long does your retention phase last?	156	9.7 months	6.7
How many hours per day do you require patients to wear their retainers during the post retention phase of treatment?	156	12 hours	3.1
How long does your post-retention phase last?	156	9.2 months	2.9

Discussion

The response rate to this survey was ninety percent regarded a high percentage of the Iraqi orthodontists participated in this survey which gave a reliable result; the non-responding orthodontists was so small that might be due to the time for replay or the number of questions; however, it could not affect the result of the study. The pilot testing of the questionnaire undertaken prior to study; gave strength of this study and to ensure its validity, reliability and acceptability. The Vacuum Formed Retainers (VFR) used to considerable degree in maxillary and mandibular arch; these findings were consistent with those from the surveys in the USA and Australia/New Zealand that showed the VFR is the most retainer type which gain popularity, the popularity of VFR may be due to cost-effectiveness for the orthodontist who found it quicker and easier to fit; also most of Iraqi orthodontist fabricate the VFR at their clinic laboratory. The VFR has a good patient preference due to the transparent appearance and superior esthetics; also, the improvement in the patient quality of life encouraged the patient seeking for bleaching after active orthodontic treatment who motivated about the use of VFR as a tray for dental bleaching gel and the orthodontist aware for that use by patient leading to increase the use of VFR. A minority of the orthodontists used fixed retainers and believed that fixed retainers often deboned and become loose with time and cause plaque accumulation. The fixed retainers were more frequently used in mandibular than maxillary arch, this might be attributed to minimal need for patient compliance, in addition some orthodontist considered the mandibular anterior teeth highly susceptible to relapse (Bondemark et al, 2007). There are similar and different points with similar studies conducted in other countries about retention protocols; most of orthodontist in these studies reported the fixed retention as

the least preferred option among retainers (Keim et al, 2008, Valiathan and Hughes, 2010, Michael et al, 2011). The popularity of VFRs was similar to findings in Australia, New Zealand and in the UK (Wong and Freer, 2004 and Singh et al, 2009). VFRs, in addition, was the second most common maxillary retainer choice in the USA and the second most common mandibular retainer in both The Netherlands and in the USA (Keim et al, 2008, Valiathan and Hughes, 2010, Renkema et al, 2009). The extraction decision as a part of treatment plan was the factor that influenced (50.6%) of Iraqi orthodontists' retainer choice in which the orthodontist tend to use the fixed retainer in non-extraction cases in mandibular arch which highly susceptible to relapse while the VFRs used mostly in maxillary arch in extraction and non-extraction cases which that in agreement with the findings in The Netherlands and Australia/New Zealand (Bondemark et al, 2007, Wong and Freer, 2004, Renkema et al, 2009). Most of surveyed orthodontist practiced the post retention phase of retention protocol because they expect even if the teeth are held in position during retention period, in the long term they can show relapse therefore, preferred to retain for longer post retention periods with VFR in maxillary arch and fixed retainer in mandibular arch with periodic follow up of patient to check the relapse, oral hygiene and the patient compliance. The patient compliance for six month is different largely from the compliance in five years retention period in the opinion of the Iraqi orthodontist because some of their patient missing the follow up appointment for that length of time (Littlewood et al, 2006, Keim et al, 2008). The orthodontist not reported favorable compliance rate of Hawley retainer because the orthodontist may stop the regular checkup of their patient to know the percentage of patient compliance with long retention time (Littlewood et al, 2006, Keim et al, 2008). The orthodontist recommended wearing retainers for an average 22 hours a day (full time wear) in retention phase could be due to a greater confidence in minimizing relapse in the retention phase. The orthodontist recommended their patient to wear the retainer for 12 hours (the part-time wear, night time wear) in the post retention phase, because the retainer does not interfere with the patient's daily activities, becomes a habit, more patient compliance, patients are also less likely to lose them and minimize the relapse.

Conclusion

- Vacuum Formed Retainers were the most common retainer choice in the maxilla and mandible with full-time wear followed by Hawley retainers then fixed retention.
- The orthodontist advised the patient to wear the retainer for an average of 22 hours a day during 9 months of retention phase, and 12 hours a day during the next 9 months of post-retention phase.
- The orthodontist believed the more patient compliance was to the vacuum formed retainers followed by the Hawley retainers for the maxillary and mandibular arch respectively at the first six month; while minimum patient compliance to the fixed retainers, (6%) of responses reported no difference in patient compliance to types of retainers. percentage of patient compliance to their retention protocol decreased after one and three years following active treatment.

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