

A Survey of Retention Protocols among Orthodontists in Nigeria

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Abstract

Background: Teeth need to be retained in their post-treatment positions at the end of orthodontic treatment. Retention methods and protocols are therefore crucial to overall orthodontic treatment success and stability.

To assess the various retention protocols utilized by orthodontists in Nigeria as well as to evaluate the factors that determine their choices.

Methods: This was a cross sectional study carried out among 23 orthodontists in Nigeria. Self-administered questionnaires were administered during the 2014 annual orthodontic conference in Nigeria to evaluate the various retention protocols used by the practitioners.

Results: Hawley retainers were the most commonly used retainers in the upper arch (80%), while fixed bonded retention were most common in the mandible (55%). The majority practiced a 2-phase retention protocol (75%), but durations varied widely.

Conclusion: Retention protocols varied widely among practitioners. There is a need to develop guidelines for post orthodontic retention and stability of results.

Key words: Orthodontic retention, Retention protocols, Nigeria.

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Introduction

Retention still remains one of the most difficult problems faced by orthodontist,¹ as teeth need to be retained in their post-treatment positions for maintenance of the results. Over the years, several factors have been considered as the rationale for retention; such as: (i) to allow for re-organization of gingival and periodontal fibers, (ii) permit neuromuscular adaptation to the corrected tooth positions, (iii) minimize changes due to dentofacial growth.²

Age changes, in the form of ongoing dentofacial growth, as well as changes in the surrounding soft tissues, can also affect the stability of the orthodontic outcome.³ Reports from long term studies^{4,5} evaluating post treatment stability show very poor results; with up to 40% of cases showing unacceptable dental alignment; especially in the

mandibular anterior region, 10 years post treatment. Consequently treated cases are now being viewed as dynamic and constantly changing throughout life,⁴ and so this needs to be considered when making decisions about retainer type, as well as duration of retention period.

There are three main types of retainers in use today, namely: Hawley retainers, Vacuum formed retainers and fixed bonded retainers.^{1, 5-8} All three types aim to do the same thing: retain the teeth in the positions achieved at the end of active orthodontic treatment. There is a paucity of studies comparing one form of retainer to the other, and so choice of retainers have largely been dependent on factors such as clinicians preference, availability of materials and cost, amongst others.

In recent times, two phases of retention have been described.⁸ The first phase, also known as Phase 1, is characterized by remodeling re-modeling of the associated soft tissues, i.e. the periodontal ligament and the elastic supracrestal fibers. This phase is generally believed to be completed within one year.

The second phase is known as the post-retention phase. During this phase, the supporting structures of the dentition continue to remodel, as the teeth are subjected to a wide variety of muscular and occlusal forces. The aim of this phase is to maintain alignment of the teeth in the presence of these forces, hence this phase is now believed to last the rest of the patient's life.

As critical as retention protocols are to the success of orthodontic treatment, opinions vary

widely on retention protocols amongst clinicians, and so the aim of this study was to survey the various retention protocols utilized by orthodontists in Nigeria, as well as to evaluate the factors that determine their choices.

Material and Methods

This was a cross sectional study carried out among orthodontists in Nigeria. Questionnaires were distributed to 23 Orthodontists who were present at the October 2014 annual conference of the Nigerian Association of Orthodontists, held in Lagos, Nigeria

The Questionnaire included questions on types of retainers used, factors determining choice of retainers, practice of 2-phase retention as well as the duration of each phase, and practice of fibrotomy to further enhance stability. The questionnaires were self-administered, and data was analyzed using SPSS software version 18.

Results

A total of 23 questionnaires were given out, 22 were returned; giving a 95.7% response rate; out of which 2 were discarded for not being properly completed. The majority of respondents were females (60%), and more than half respondents completed their residency training between years 2000 and 2013 (Table I).

Hawley retainers were the most commonly used in the maxilla (80%), followed by vacuum formed retainers, and lastly fixed retention. In the mandible,

fixed retention was most commonly used (55%), then vacuum formed retainers, and lastly, Hawley retainers. Figure 1

While almost all respondents (95%) believed that retainer type has an effect on patient's compliance, 55% believed that their patients were more compliant with the vacuum formed retainer, 5% were undecided. Figure 2

Majority of respondents practiced 2-phase retention (80%), however, their protocols varied widely. The most common length of full time retention (phase 1) was one year, while for part time retention, it was for 6 months or patient's life. Phase 2 retention was commonly prescribed for evening/night-time wear only (Table II).

Factors determining choice of retainers are shown in table III. Complexity of the case being treated, followed by whether extraction were performed as a part of the treatment; were considered most important. Patient's preference was also sometimes considered.

Discussion

Excellent and durable retention is the key to

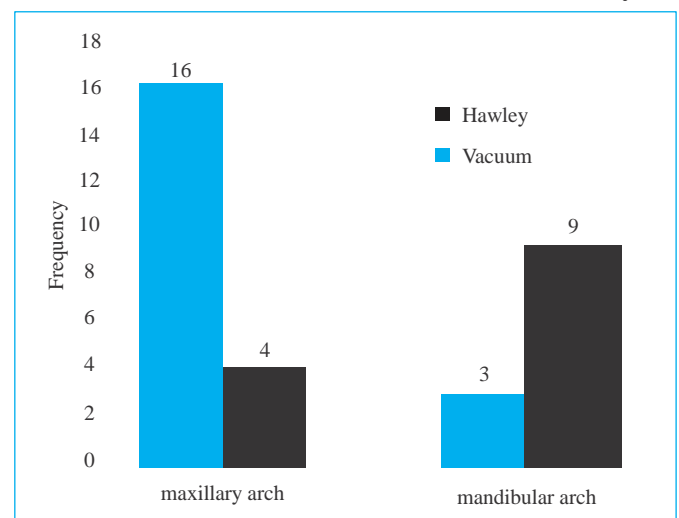


Figure 1: Distribution of Retainer Type Used By Respondents

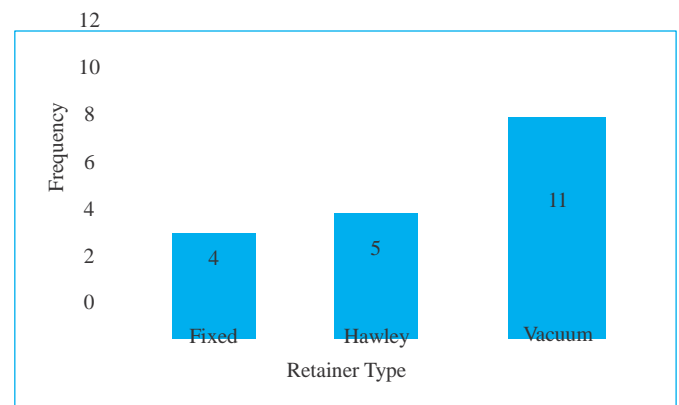


Figure 2: Respondents' Views on Retainer Type and Patient Compliance

Table I: Socio-demographic Characteristics of Respondents

Variables	Frequency	Percentage
Gender		
Male	8	40.0
Female	12	60.0
Period of completion of training		
1990 – 2000	7	35.0
2001 – 2015	13	65.0
Practice type		
Government hospital	5	25.0
Private practice	5	25.0
Teaching hospital	10	50.0

Table II: Respondents Practice of 2-Phase Retention

Variables	Frequency	Percentage
Practice of 2 phase retention protocol		
No	4	20.0
Yes	16	80.0
Duration of phase 1 retention protocol		
No response	5	25.0
1 – 2 years	2	10.0
1 year	7	35.0
3 months	1	5.0
6 months	4	20.0
9 months	1	5.0
Duration of phase 2 retention protocol		
No response	5	25.0
1 year	2	10.0
2 – 5 years	3	15.0
6 months	6	30.0
Patient's life	4	20.0
How many hours in a day do you advice phase 2 wear?		
No response	5	25.0
6 or more hours	3	15.0
Evening/Night time wear only	12	60.0

successful orthodontic treatment. It is not enough to have an excellent finished case which will quickly relapse. The orthodontic community must continually research into improving patient compliance with retainers and how to achieve stability of orthodontic cases. There may also be the need to establish a retention protocol that will guide orthodontists in choice of retention for patients.

Among the many suggested factors mentioned that influence stability, three deserve further elaboration: (i) the involvement of the periodontal ligament fibers and gingival fibers (ii) late mandibular growth and, (iii) physiologic imbalance of local extrinsic forces acting on the

Table II: Factors That Determine Choice of Retainer

Factors that determine choice of retainer:		
Factor 1 (Extraction/Non-extraction case)		
Always	9	45.0
Often times	7	35.0
Sometimes	3	15.0
Rarely	1	5.0
Factor 2 (Complexity of case)		
Always	11	55.0
Often times	7	35.0
Sometimes	2	10.0
Factor 3 (Type of Mechanics used)		
Always	2	10.0
Often times	7	20.0
Sometimes	6	30.0
Rarely	4	20.0
Never	1	5.0
Factor 4 (Personal Preference of practitioner)		
Always	1	5.0
Often times	10	50.0
Sometimes	6	30.0
Rarely	2	10.0
Never	1	5.0
Factor 5 (Patient's Preference)		
Always	1	50.0
Often times	5	25.0
Sometimes	7	35.0
Rarely	5	25.0
Never	2	10
Factor 6 (Availability of materials)		
Always	4	20.0
Often times	5	25.0
Sometimes	5	25.0
Rarely	5	25.0
Never	1	5.0

corrected dentition.⁹

Hawley retainers were the most commonly used maxillary retainer in this study. This preference for Hawley retainers in the maxilla has also been reported in some other studies^{1, 7, 8}. They were however not so popular in the mandibular arch. Vacuum formed retainers were most commonly used, followed by fixed bonded retention. This was not surprising as removable appliances in general, are poorly tolerated in the lower arch due to encroachment on tongue space, as well as interference with speech. However, the popularity of the Hawley retainer even in the maxilla has witnessed a steady decline with the advent of "invisible retainers" (vacuum formed retainers and bonded canine-to-canine retainers), as the later are obviously more aesthetically pleasing and less cumbersome.⁸ Similar studies⁶ carried out in Australia and New Zealand also showed that upper clear retainers were becoming increasingly popular and lower canine-to-canine bonded retainers were most commonly used.

Very few prospective studies have evaluated the effectiveness of retention. A Cochrane review revealed only two randomized clinical trials and three pseudorandomized clinical trials that evaluated the effectiveness of different retention strategies used to stabilize tooth position after orthodontic treatment.¹⁰ No reliable evidence could be taken from the data on which to base clinical practice of retention.

It has been shown that it takes on average a minimum of 232 days for fibers around the teeth to remodel to the new tooth position.^{11, 12} Half of the surveyed orthodontists in Australia and New Zealand used a specific retention period, with a median duration of 2 years.⁹ Orthodontists more commonly recommended a regular retention period of more than two years, and defined permanent retention as "lifetime".^{11, 13}

A survey carried out in the UK found that the most commonly used retention protocol was 12 months.¹ This approach is supported by histological studies which have shown that the supracrestal periodontal fibers remain stretched and displaced for more than 7 months after the cessation of orthodontic tooth movement,^{2, 3} suggesting that the retention period should generally be at least 7 months. However, individual patient factors can often modify the length of the retention phase.¹⁴ In this study, majority of the respondents practiced a 2 phase retention protocol, while only 20% practiced only a single retention phase. Six months was the most

common duration for post retention (2nd retention phase), and 60% of

Among the Orthodontists that practiced a 2 phase retention protocol, 6 months was the most common duration of the 2nd phase, and 60% of them prescribed evening / night time retainer wear only. It is generally believed that patients need to wear retainers for less time during this post retention phase compared with the retention phase.⁸

Concerning factors that determine choice of retainers, a high percentage of respondents (55% and 45% respectively) always considered complexity of case as well as whether extractions were carried out as important factors. However, when patients' preferences are considered, 50% of respondents stated that they will always consider their patients preference in prescribing retainers! It is safe to infer that there was no consistent evidence based pattern seen among the orthodontists in this study regarding retention protocols. This observation is in agreement with study by Wong and Freer in Australia and the Netherlands.⁶

Conclusion

The conclusion of this study is that retention protocols among Nigerian Orthodontists are variable and depended largely on personal preferences. There does not seem to be any consistent pattern in the application of retention methodologies.

Recommendations

There is the need to develop evidence based practice guidelines on retention protocols that would be effective, as well as have a good patient compliance after orthodontic treatment. The Nigerian Association of Orthodontists should look at developing a protocol for Orthodontic retention for orthodontists in Nigeria.

Contributors

Ernest MA was responsible for conceptualization of research topic and data analysis.

Victor-Osho O.O was responsible for questionnaire design, data collection and final manuscript writing.

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Conflict of interests:

Nil

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