



Original Research Article

Orthodontic retention protocols—A survey among Indian practitioners

Renuka Bamal^{1,*}, Anup K Holla², Divyaroop Rai¹, Akanksha Jaswal³, Lucky Yadav⁴¹Dept. of Orthodontics and Dentofacial Orthopaedics, NIMS Dental College, Jaipur, Rajasthan, India²Dept. of Orthodontics and Dentofacial Orthopaedics, Raj Dental College, Jaipur, Rajasthan, India³Dept. of Orthodontics and Dentofacial Orthopaedics, Mahatma Gandhi Dental College, Jaipur, Rajasthan, India⁴Dept. of Orthodontics and Dentofacial Orthopaedics, Lady Hardinge Medical College, New Delhi, India

ARTICLE INFO

Article history:

Received 17-03-2022

Accepted 09-05-2022

Available online 04-06-2022

Keywords:

Frenectomy

Debonding

Supracrestal

ABSTRACT

Objective: The study was to identify the different types of retainers that are commonly used and to investigate the variations in retention practices among orthodontists in India.

Design: A web-based survey study and was conducted in Department of Orthodontics and Dentofacial Orthopaedics. This survey was conducted for a period of 10 months and included orthodontists practicing in India.

Materials and Methods: The questionnaire comprised of 53 questions which were divided in seven parts containing multiple choice questions, tabular and free response questions. These seven parts gathered information about socio-demographic status of the respondent, selection of retention system, removable and fixed retainer choices, duration and supervision of retention period and instruction given to patients.

Results: Dual retention, fixed retainers with vacuum formed retainers was the common type of retention in both arches with extraction largely influencing the choice of retainer. The bonded wire from canine to canine is the most frequent fixed retainer in non-extraction cases and from premolar to premolar is most frequent retainer in extraction cases. Frenectomy and supracrestal fibrotomy is used as adjuvant applications for retention.

Conclusion: A trend towards frequent use of vacuum formed retainer by young orthodontists compared to removable acrylic retainer is seen with dual retention being most commonly used.

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

Tendency of teeth to return to their initial positions once active orthodontic treatment has been completed is known as relapse. Patient's time and money are generally affected by relapse and can also cause esthetic inconvenience because of unfavorable changes that often appears in the front teeth. This kind of situation unsympathetically affects both the patient and the doctor. To restrict or minimize a relapse, some type of retainers should be given to every patient who had undergone orthodontic treatment. This

is essential for favorable orthodontic treatment, as the post-treatment stability is unpredictable for any corrected malocclusion. The aim of orthodontic retention is to maximize the stability of the dentition after orthodontic treatment. Relapse is triggered by the recoil of periodontal fibers that clutches the teeth in the jaw bone; pressures from the cheeks, lips and tongue; further growth and the way the teeth meet together.^{1,2}

This logic for retention includes reorganizing the tissue, minimization of changes caused by growth and allowing neuromuscular adaptation to the tooth in corrected position. Retention can be attained by placing appliances on the

* Corresponding author.

E-mail address: bamalrenuka12@gmail.com (R. Bamal).

teeth called retainers, or by performing additional or adjunctive procedures to the teeth or the surrounding structures. Atack mentioned that retainers can either be fixed to the teeth or they can be removable.³ in orthodontic treatment various forms of retention are used, the most frequently used retainers are bonded and spring retainers. Many studies, systematic reviews and surveys evaluated orthodontic retention protocols, type of retainers and patient satisfaction.⁴

The purpose of this study was to identify the different types of retainers that are frequently used among Indian orthodontists and to investigate the variations in retention practices among them. Recently, researches are going on the retention protocols among orthodontist in various countries to allow formation of proper clinical guidelines regarding orthodontic retention protocols. The main objectives of this study were to reckon the protocols and trends used in an orthodontic practice and to identify any frequently used types of dental retainers.

2. Materials and Methods

A web-based survey study and was conducted in Department of Orthodontics and Dentofacial Orthopaedics. This survey was conducted for a period of 10 months and included orthodontists practicing in India (all the registered members of Indian Orthodontic Society). This web-based questionnaire was made using Google Forms and questions were modified from Andrikuta et al.⁵, Pasagula et al.⁶ and Valiathan et al.⁷

3. Results

Same type of retainer for maxilla and mandible is chosen by maximum. Maximum breakage is seen in fixed retainers and in maxillary arch.

A summary of majority of responses from this study is presented in Tables 1, 2, 3, 4, 5, 6 and 7 in order of the sections the questionnaire was divided.

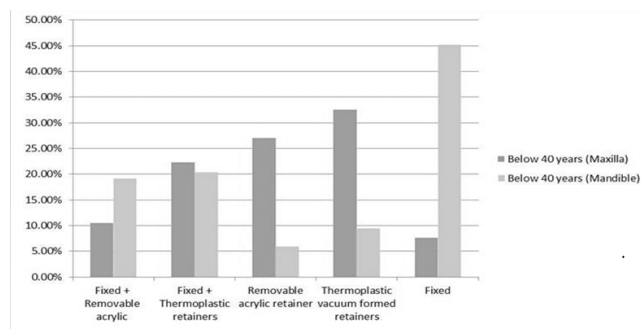


Fig. 1:

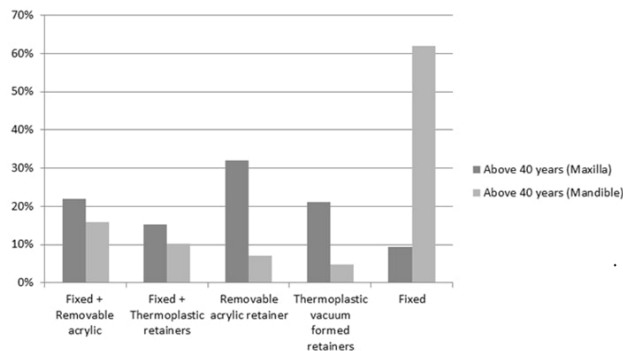


Fig. 2:

Table 1: Summary of Socio-demographic status of the respondent

Question	Response
Gender	Male
Zone of practice	South and west India
Age	Below 35years of age
Years practicing orthodontics	Since 0-5yrs
Type of practice involved	Private practice
Type of private practice	Both consultancy and own clinic

Table 2: Summary of selection of retention system

Question	Response
Average cases debonded per month	0-5 cases
Explain retention protocol need	At the beginning of the treatment
Retention protocol is decided when	At the beginning of treatment
Patient preference of retainer	Gives a choice of retainer to the patient and give preference to their choice
Percentage of patients receiving extractions as part of treatment	26-50% patients
Does extraction influence the choice of retainer	Yes
Factors influencing the choice of retention protocol in case of removable, fixed and combination retainer	Pre-treatment situations, oral hygiene, periodontal condition and end result of treatment are the very important factors
Choice of retainer for maxilla and mandible	Same type of retainer for maxilla and mandible is chosen by maximum
Which is common method of retention when giving same retainer in both arches	Fixed lingual retainer with thermoplastic vacuum formed
If not same then most common used retainer in maxilla	Fixed lingual retainer with thermoplastic vacuum formed
If not same then most common used retainer in mandible	Fixed lingual retainer for mandibular arch
Adjunctive procedure	Frenectomy followed supracrestal fibrotomy (CSF)

Table 3: Summary of fixed retainers

Question	Response
Which wire is used for fixed lingual retainer	Twisted ligature wire
Thickness of wire used	0.010" ligature wire
Where it is prepared	Prepare fixed lingual retainer on the patient
Extent of bonded retainer in non- extraction cases	3-3 extent of bonded lingual retainer in maxillary and mandibular arch
Extent of bonded retainer in extraction cases	4-4 extent in maxillary and mandibular arch

Table 4: Summary of removable retainers

Where it is prepared	prepared by commercial lab
Thickness of thermoplastic vacuum formed retainer	1mm thickness

Table 5: Summary of duration of the retention period

Removable retainer wear duration	19-24 hours per day
Removable retainer wear duration	1-2 year
Fixed retainer wear duration	life time wear is advised

Table 6: Summary of supervision of the retainers

Retainer delivery	Same day
1st post retention check-up appointment	0-3 months
1st post retention check-up appointment	6-10 minutes
1st post retention check-up appointment	Cost was included
Patients coming for follow up	0-25% patients
Breakage of the retainer	Once in 6 months
Breakage of the retainer	Fixed retainers
Breakage of the retainer	Maxillary arch
Patients more complaint with	Thermoplastic vacuum formed retainers
Factors influencing retainer compliance	Comfort, age, explanation by doctor, design of retainer, pre-treatment malocclusion, post treatment satisfaction

Table 7: Summary of instruction for patients

Includes retention aspect in consent form	Majority
Instructions of patient	Verbal instructions to the patient at the time of delivery of retainer
Oral hygiene recommendation	Personally adapted cleaning instructions
Percentage of patient following the instruction	51-75% patients follow the instructions

4. Discussion

Currently various varieties of removable and fixed retainers are available with varying retention protocols. It is not clear which retainers are the best and for what duration they should be worn.⁵ This study looked into the existing retention protocols used by the Indian orthodontists. A survey which involves all the licensed Indian orthodontists was conducted, and data is obtained to represent the opinions of the specialists on the retention protocols and retention appliance. Majority of Indian orthodontist used same type of retainer for maxilla and mandible with maximum number of them using (combination retainer) fixed lingual retainer with removable retainer which was in agreement with surveys performed in Norway^{8,9} and Lithuania.⁵ Surveys performed in European^{10,11,12}, Saudi Arabia¹³, Switzerland^{7,14}, Australia¹⁵, Netherland¹⁶, Iraq¹⁷, Turkey^{4,10} revealed, except in Ireland^{17,18} commonly used. There were several maxillary; Switzerland^{7,14} and Netherland¹⁶ fixed retainers were most commonly chosen, in USA^{11,12} and in UK⁶, Ireland¹⁷, and Malaysia¹⁸ vacuum-formed retainers are chosen frequently.

Interestingly, this survey showed that orthodontists below 40 years preferred fixed lingual bonded retainer for mandible and thermoplastic vacuum formed retainer for maxilla whereas orthodontists above 40 years preferred fixed lingual bonded retainer for mandible and removable acrylic retainer for maxilla (Figures 1 and 2). Even though the stability after orthodontic treatment can be improved by adjuvant applications for retention it was observed that maximum number of orthodontists uses adjunctive procedures which was in favor with the survey done by Turkish⁴ orthodontist.

There was no agreement among Indian orthodontists regarding the duration of retention. Removable retention period of less than 2 years was followed by maximum number of the orthodontics in the present study, which was similar to results with Turkish⁴ orthodontists, whereas United States^{11,12} and Ireland¹⁷ orthodontist advised lifetime wear. A lifetime period of fixed retainer was advised by maximum number of Indian orthodontists, our results are compatible with Dutch¹⁹, Swiss^{7,14}, America^{11,12}, Irish¹⁵, Iraq¹⁷, Saudi⁴ and British^{11,12} consultants where maximum orthodontists recommended permanent retention. Lifetime retention is supported by literature indicating that some relapse will occur even after years of orthodontic treatment.⁴ In cases of tongue thrust and diastema lifelong retainer is advised by Indian orthodontist. In this study, maximum number of orthodontists prescribed fulltime removable retainer wear. Similarly, Valiathan and Hughes¹¹, Turkish⁴ and Dutch¹⁹ orthodontists prescribed fulltime wear for 6-9 months. As yet, considering the most recent literature, part-time wear was found to be as effective as full-time wear. Hence

in order to increase patient cooperation, a reduction in wear time can be suggested with only the night-time wear regimen.⁴ At the start of treatment almost every respondent informed the patients about the retainers and its need. More than half of the respondents give preference to patient's choice of retainer. Since extraction is part of treatment in 50% of cases, maximum number of orthodontists feels that extraction influences the types of retainers to be given. Almost 50% of Indian orthodontists get their removable appliance prepared from the commercial lab whereas almost all Indian orthodontist prepare fixed lingual retainer on the patient directly. In cases of fixed lingual bonded retainer, 80% Indian orthodontists preferred 3-3 extent in non-extraction cases and 4-4 extent in extraction cases. Majority of Indian orthodontists uses 0.010" and 0.009" twisted ligature wire as fixed lingual retainer followed by many using multistranded round stainless-steel wire. 42% Indian orthodontists use 1mm thickness of thermoplastic vacuum formed retainer. 70% of Indian orthodontist on an average debond 0-5 cases per month. Following debonding, retainer was delivered on the same day by majority of orthodontists with remaining orthodontists delivering retainer with next 2 days. Most orthodontists scheduled the first retention check-up appointment in first 3 months. This finding was similar to the Arnold et al.⁷ and Pasaoglu et al.⁴ which reported scheduling the first check-up with in the first 3 months after debonding. The months for breakage of retainer, with maximum breakage in fixed retainer, and in maxillary arch. Majority of patients are compliant with thermoplastic vacuum formed retainer.,⁷ 82% Indian orthodontist includes retention aspect in their consent form and almost every respondent gives instructions to the patient at the time of delivery of retainer with few of them giving written instructions 78% Indian orthodontists recommend personally adapted cleaning instructions; others recommend mouth wash, interdental brush and dental floss. According to this survey, about 25-75% patients follow the instructions given to them and retainer compliance was mainly dependent on the end result, retainer design, comfort and age and doctors explanation.

This study had some limitations: (1) All survey-based studies suffer from a nonresponse error; (2) A few IOS members might not have received this survey if they do not have e-mail or do not use the e-mail address that they gave to the IOS; (3) We did not ask whether previous and future changes in protocols would differ between the mandibular and maxillary arches.

5. Conclusion

1. The most commonly used retention protocol among Indian orthodontists is fixed lingual bonded retainer with thermoplastic vacuum formed and extraction largely influences the choice of retainer to be given in a case.

2. The bonded lingual wire from canine to canine is the most frequent fixed retainer in non-extraction cases and from premolar to premolar is most frequent retainer in extraction cases.
3. For removable retainer fulltime wear with retention period of less than 2 years is largely followed and 1mm thickness of thermoplastic vacuum formed retainer is used by majority.
4. Lifetime period of fixed retainer is advised by maximum and most commonly used wire for fixed bonded retainer is 0.010" twisted ligature which is directly prepared in patients mouth by majority.
5. Orthodontists below 40 years preferred fixed lingual bonded retainer for mandible and thermoplastic vacuum formed retainer for maxilla whereas orthodontists above 40 years preferred fixed lingual bonded retainer for mandible and removable acrylic retainer for maxilla.
6. Factors influencing retainer compliance are comfort, age, explanation by doctor, design of retainer, pre-treatment malocclusion, and post treatment satisfaction.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Melrose C, Millett DT. Toward a perspective on orthodontic retention? *Am J Orthod Dentofac Orthop.* 1998;113(5):507–21. doi:10.1016/s0889-5406(98)70261-6.
2. Padmos J, Mei L, Wouters C. Orthodontic retention procedures in New Zealand: A survey to benefit clinical practice guideline development. *J World Fed Orthod.* 2019;8(1):24–30. doi:10.1016/j.ejwf.2018.12.003.
3. Littlewood SJ, Millett DT, Doubleday B. Retention procedures for stabilising tooth position after treatment with orthodontic braces. *Cochrane Database Syst Rev.* 2016;2004(1):2283. doi:10.1002/14651858.CD002283.pub2.
4. Paşaoğlu A, Aras I, Mert A. Survey on Retention Protocols Among Turkish Orthodontists. *Turk J Orthod.* 2016;29(3):51–8. doi:10.5152/TurkOrthod.2016.06.
5. Andriekute A, Vasiliaskas A, Sidlauskas A. A survey of protocols and trends in orthodontic retention. *Prog Orthod.* 2017;18(1):31. doi:10.1186/s40510-017-0185-x.
6. Valiathan M, Hughes E. Results of a survey-based study to identify common retention practices in the United States. *Am J Orthod Dentofac Orthop.* 2010;137(2):170–7. doi:10.1016/j.ajodo.2008.03.023.
7. Pratt MC, Kluemper GT, Hartsfield JK. Evaluation of retention protocols among members of the American Association of Orthodontists in the United States. *Am J Orthod Dentofac Orthop.* 2011;140(4):520–6. doi:10.1016/j.ajodo.2010.10.023.
8. Wong PM, Freer TJ. A comprehensive survey of retention procedures in Australia and New Zealand. *Aust Orthod J.* 2004;20(2):99–106.
9. Arnold SN, Pandis N, Patcas R. Factors influencing fixed retention practices in German-speaking Switzerland: A survey. *J Orofac Orthop.* 2014;75(6):446–58. doi:10.1007/s00056-014-0239-3.

10. Meade M, Dreyer C. A survey of retention and retainer practices of orthodontists in Australia. *Australas Orthod J.* 2019;35(2):174–83. doi:10.21307/aoj-2020-047.
11. Radunovic VV, Espeland L, Stenvik A. Retention: type, duration and need for common guidelines. A survey of Norwegian orthodontists. *Orthodontics.* 2013;14(1):110–7. doi:10.11607/ortho.964.
12. Hamidaddin AJT, Alotaibi MA. Retention practices and factors affecting retainer choice among orthodontists in Saudi Arabia. *Saudi Med J.* 2016;37(8):895–901. doi:10.15537/smj.2016.8.14570.
13. Habegger M, Renkema AM, Bronkhorst E. A survey of general dentists regarding orthodontic retention procedures. *Eur J Orthod.* 2017;39(1):69–75. doi:10.1093/ejo/cjw011.
14. Lai CS, Gossen JM, Renkema AM. Orthodontic retention procedures in Switzerland. *Swiss Dent J.* 2014;124(6):655–61.
15. Attar HJ. Comprehensive Survey on Orthodontic Retention Protocols Among Iraqi Orthodontists. *Iraqi Assoc J Oral Dent Res.* 2019;6(1):1–6. doi:10.4103/jpbs.JPBS_615_20.
16. Rahman N, Low TF, Idris NS. A survey on retention practice among orthodontists in Malaysia. *Korean J Orthod.* 2016;46(1):36–41. doi:10.4041/kjod.2016.46.1.36.
17. Singh P, Grammati S, Kirschen R. Orthodontic retention patterns in the United Kingdom. *J Orthod.* 2009;36(2):115–36. doi:10.1179/14653120723040.
18. Meade MJ, Millett D. Retention protocols and use of vacuum-formed retainers among specialist orthodontists. *J Orthod.* 2013;40(4):318–43. doi:10.1179/1465313313Y.0000000066.
19. Padmos JAD, Fudalej PS, Renkema AM. Epidemiologic study of orthodontic retention procedures. *Am J Orthod Dentofac Orthop.* 2018;153(4):496–504. doi:10.1016/j.ajodo.2017.08.013.

Author biography

Renuka Bamal, Lecturer

Anup K Holla, Professor and Head

Divyaroop Rai, Professor

Akanksha Jaswal, Orthodontics and Dentofacial Orthopaedics

Lucky Yadav, Senior Resident

Cite this article: Bamal R, Holla AK, Rai D, Jaswal A, Yadav L. Orthodontic retention protocols—A survey among Indian practitioners. *J Contemp Orthod* 2022;6(2):43-47.