

A Survey on Retention Practice among Orthodontists in Gujarat.

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Abstract

Objective: The aim of this study was to evaluate retention practices commonly employed by orthodontists. The objectives were to identify the types of retainer frequently used and to investigate the variations in retention practice.

Methods: A total of 100 orthodontists were randomly selected, and a questionnaire consisting of 10 multiple-choice questions sent to them by mail. Upon receiving of the completed questionnaires, the data were statistically analyzed.

Results: A total of 95 responses were received; among these, 59.4% of orthodontists' practiced is in a government setting and 40.6% were in private practice. A vacuum-formed retainer was the most commonly used removable retainer for both maxillary (46.9%) and mandibular (46.9%) arches, followed by a Hawley retainer (maxilla, 43.8%; mandible, 37.5%), and a fixed retainer (maxilla, 3.1%; mandible, 9.4%). Of the responding orthodontists, 78.1% prescribed full-time wear (more than 20 h per day) for a duration of 3–9 months for a maxillary arch, compared to 71.9% for the mandibular arch. Only 18.8% of the orthodontists prescribed part-time wear of the retainer for the maxillary arch, compared to 21.9% for the mandibular arch. The majority of orthodontists did not instruct their patients to stop wearing removable retainers (71.9%) or fixed retainers (66.8%) at any specific time and they preferred their patients to continue wearing retainers.

Conclusions: Vacuum-formed retainers are the most commonly used retainers among orthodontists. The majority of orthodontists prescribed full-time wear for more than 20 h per day with a duration of 3–9 months and preferred indefinite use of the retainer.

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I. Introduction

The goal of orthodontic retention is to increase the stability of the dentition after orthodontic treatment¹. To minimize or even prevent relapse, almost every patient who has had orthodontic treatment is given some type of retainer². Two surveys on the type of retainer used by orthodontists have been published (Keim *et al.* , 2002 ; Wong and Freer, 2004). The survey of Keim *et al.* (2002) among specialist practitioners in the United States of America (USA) 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 had retainers increased with nearly one-third of the clinicians using them routinely in the mandibular arch³. Compared with two prior surveys, conducted in 1990 and 1996, respectively, the respondents prescribed more permanent retention, 27 per cent in 2002 compared with 15 per cent in 1990 and 23 per cent in 1996 (Keim *et al.* , 2002)⁴. However, the response rate in that survey was only 9 per cent, so no conclusions could be drawn. The second survey was carried out in Australia and New Zealand (Wong and Freer, 2004).

The objectives of this study were to identify the types of retainers that are commonly used and to investigate the variations in retention practice among orthodontists in Malaysia. Currently, no research has been conducted on the retention practices among orthodontist in this country and in the Asian Pacific region, and it is not known whether the retention practices in this country are similar to those in other developed countries. The insights provided by this study allow for development of proper clinical guidelines regarding orthodontic retention protocols. Thus, it can be a standard reference and guideline for clinicians in order to reduce the patient's burden in wearing the retainer in order to combat relapse and enhance the stability after active orthodontic treatment.

II. Materials And Methods

This study was conducted via a questionnaire consisting of 14 multiple-choice questions modified from Pratt *et al.*⁶ and Valiathan and Hughes.⁷ The part gathered background data of the individual orthodontists. The consisted of questions involving the types of retainers that were commonly prescribed and retention practice, patient's compliance, and retention check-up. This questionnaire was first distributed to 10 randomly selected orthodontists for surface validation before conducting the final survey.

Full lists of the names and addresses of orthodontists were obtained from the Gujarat Association of Orthodontists website. In order to calculate the required sample size and power of the study, a formula based on a study by Kish⁸ was used (sample size calculation = $n / [1 - (n / \text{population})]$). Therefore, to obtain a sample of $n = 95$ responses with 95 confidence and accounting for a response rate, 100 samples were required for this survey. A simple random sampling method was used by drawing the name lots of the registered members. A total of 97 registered orthodontists were included in this study. The study participants were orthodontists registered with the Gujarat Association of Orthodontists who are currently practicing in this state, whereas expatriate orthodontists and general dental practitioners who practice as orthodontics were excluded. The questionnaire was sent to the selected orthodontists as hard copies along with a self-addressed stamped envelope in June 2014. The survey was concluded 2 months after the initial mailing, whereby any response after that period was not included. Confidentiality of the information provided was assured and participation was voluntary.

Ethical approval for the study was obtained from the Human Research Ethics Committee (USM/JEPeM/1405206).

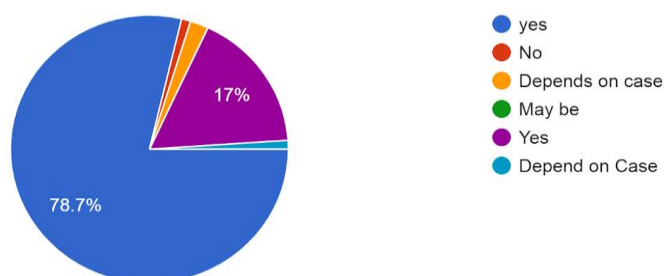
All statistical analyses were performed using google form. The items were all described in percentages.

III. Result

A total of 95 respondents sent completed questionnaires within 2 months after the initial mailing. This included 74 male and 21 female respondents. Most of the orthodontist to provide a retentions(78.7%)(**chart 1**), Bonded fixed(55.8%) retainers to give for extraction cases followed by removable(25.3%) and vaccum formed(12.6%)(**chart 2**), followed by , 1 year time duration of retainers for extraction cases(60%)(**chart 3**) and Bonded fixed(52.6%) retainers to give for non-extraction cases followed by removable(18.9%) and vaccum formed(24.2%)(**chart 4**) followed by , 6 month time duration of retainers for non-extraction cases(54.7%)(**chart 5**), bonded fixed retainer for maxillary(50.5%) followed by removable(20%) and vaccum formed(23.2%)(**chart 6**) and bonded fixed retainer for mandibular(72%) followed by removable(14%) and vaccum formed(9.7%)(**chart 7**), most of the orthodontist to consider special precaution while giving retention in lower anterior region,(**chart 8**), Bonded fixed retainers(56.8%) of choice in case in midline diastema.(**chart 10**). Most of the orthodontist to do cirumferential supracrestal fibrotomy(csf) to improves retentions.(**chart 11**). Soft tissue pressure(80.5%) is more responsible for relapse according to orthodontist (**chart 12**).

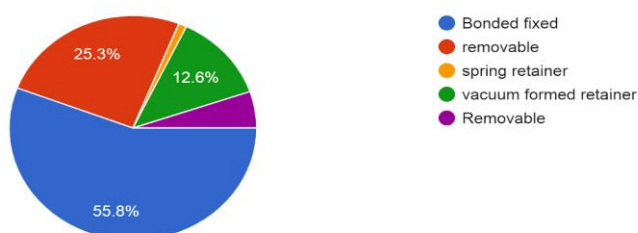
Have you provide Retentions?

94 responses



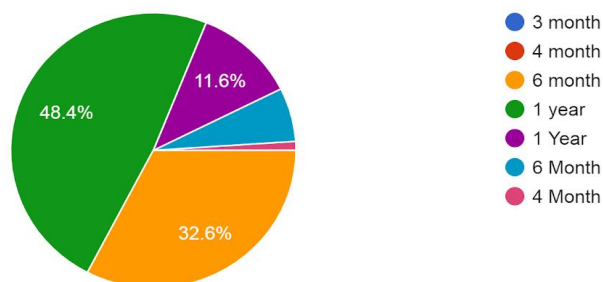
Types of retainers you give for extraction case?

95 responses



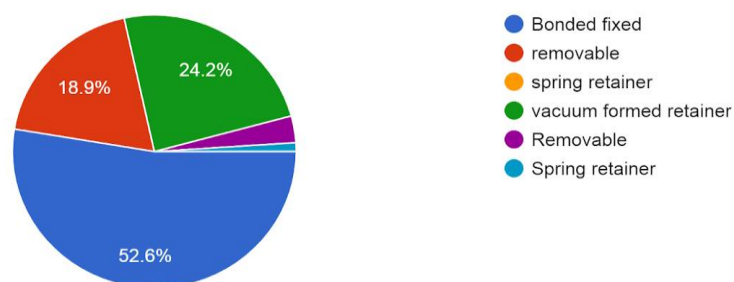
what should be the time duration of retainers for extraction cae?

95 responses



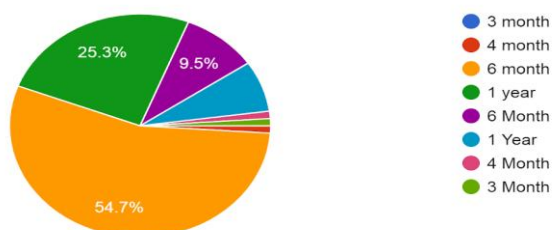
Types of retainers you give for non-extraction case?

95 responses



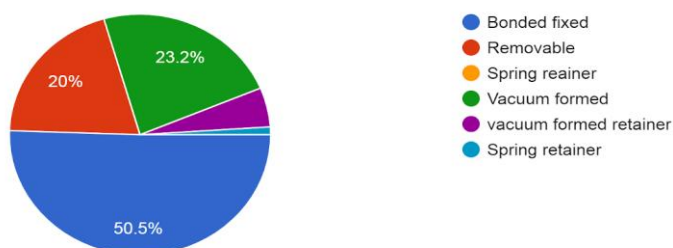
what should be the time duration of retainers for non-extraction case?

95 responses



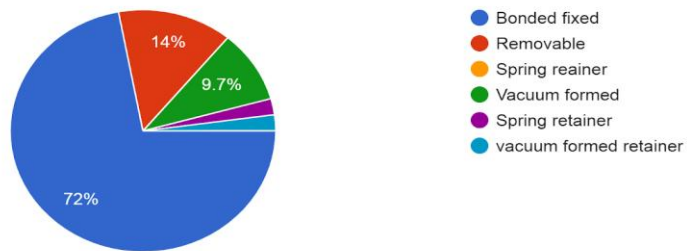
For maxillary arch which type of retainer you provide?

95 responses



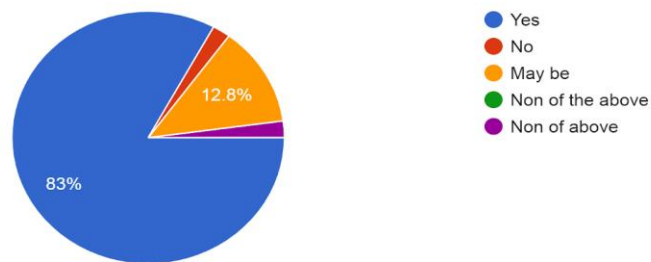
For mandibular arch which type of retainer you provide?

93 responses



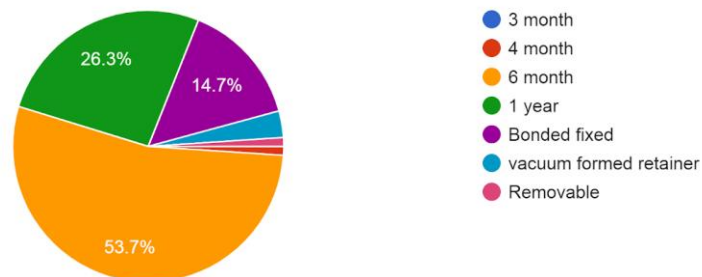
Have you consider any special precaution while giving retention in lower anterior region?

94 responses



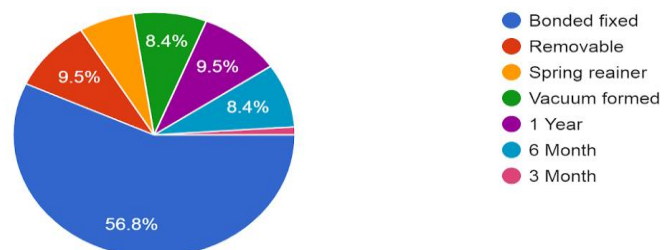
Duration of Retention period?

95 responses



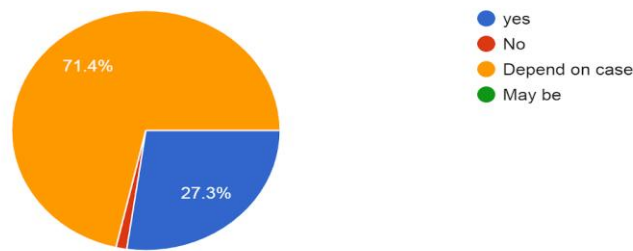
your appliance of choice in case with midline diastema?

95 responses



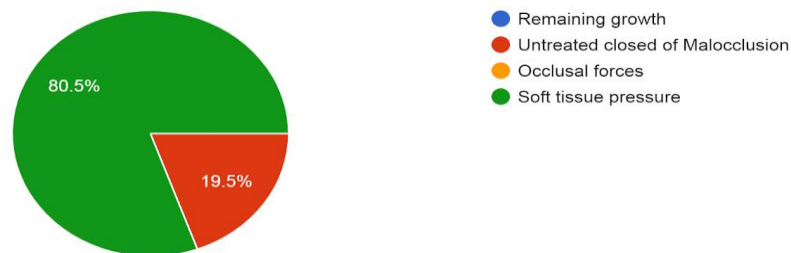
Do you feel circumferential supracrestal fibrotomy improves retentions?

77 responses



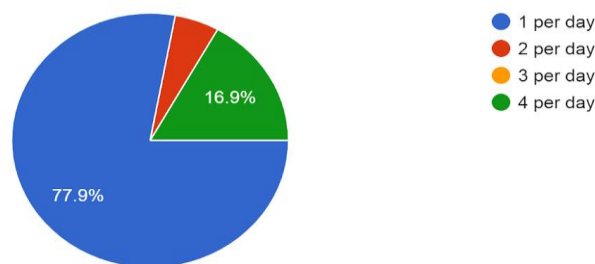
Which condition is more responsible for relapse according to you?

77 responses



How often do you keep your pt appointment for retainer check up?

77 responses



IV. Discussion

Only about one-third (33%) of the randomly selected orthodontists responded to the questionnaire. This resulted in a confidence level of only 90%, instead of 99% as originally targeted. The response rate in this study was similar to the study by Valiathan and Hughes in 2010.⁷ That survey was based on a study aimed at identifying common retention practices in the United States, in which an overall response rate of 32.9% was achieved. The response rate in this present study was markedly better than that in a study conducted by Pratt et al.⁶ whose objective was to evaluate protocols and trends in orthodontic retention involving practicing members of the American Association of Orthodontists in the United States. In that study, the response rate obtained was 18%, which was lower than our response rate. However, when compared to other related studies, the overall response rate (ranging from 61% to 91%)^{2,9-12} was higher than that in our study. The reason for the poor response from the orthodontists in our study could be they were not keen to take part in research due to their busy schedule, not receiving the questionnaire because they had moved to new offices, or the allocation of only two months for the completion of this survey. The results of this study showed that vacuum-formed retainers were the most commonly prescribed maxillary and mandibular retainers. This finding was in agreement with the recent study conducted by Meade and Millett.¹⁰ That study aimed to evaluate retention protocols and the use of vacuum-formed retainers among specialist orthodontists in the Republic of Ireland, which involved 123 eligible Members of the Dental Council of Ireland Specialist Register of Orthodontists and/or the Orthodontic Society of

Ireland. They found that vacuum-formed retainers were the most commonly chosen retainers, prescribed by 53% of respondents for the maxilla and 33% for the mandible. Moreover, our study findings were also in line with those of a study conducted by Singh et al.⁹ in 2009 on the orthodontic retention pattern in the United Kingdom, which showed that vacuum-formed retainers were the most commonly used in the National Health Services and hospital practice. However, our results were in contrast to those obtained in other studies conducted in the Netherlands,² Australia,⁵ New Zealand,⁵ Norway,¹¹ and Switzerland.¹² In

Netherlands and Switzerland, the most commonly used retainers for both types of arches were bonded retainers. Maxillary invisible retainers and mandibular canine-to-canine bonded retainers were the retainer of choice of orthodontists in Australia and New Zealand. Norwegian orthodontists preferred to use a combination of fixed and removable retainers (clear thermoplastic retainer) for the maxillary arch and fixed retainers for the mandibular arch during the retention phase after active orthodontic treatment. It is worth mentioning that the results we obtained showed that the prescription of the Hawley retainer did not differ much from that of the vacuum-formed retainer. We found that the use of the Hawley retainer was the second most popular among orthodontists in this country. Based on a survey done by Keim et al.⁴ in the United States of America, the Hawley retainer remained the most commonly used retainer, although

the trend was decreasing. Another survey by Pratt et al.⁶ also showed that for the maxillary arch, the Hawley retainer was most frequently used (47%), followed closely by the vacuum-formed retainer (41%). Valiathan and Hughes⁷ also concluded that the Hawley retainer is the most commonly retainer used for the upper arch. A very small number of orthodontists still used fixed retainers in their practice and the use of a mandibular fixed retainer⁴ was higher than for a maxillary fixed retainer. A survey carried out by Wong and Freer⁵ showed that the fixed retainer was used by a small number of orthodontists (maxillary, 3.1%; mandibular, 9.4%), which was similar to the results of the present study. However, fixed retainers (42%) were used most frequently for the mandibular arch, followed by the Hawley retainer (29%), and the vacuum-formed retainer (29%).⁶ The findings from the studies by Keim et al.⁴ and Pratt et al.⁶ were in contrast to the results obtained in this study, indicating that there was a variation in the use of the retention appliances in different countries. The choice of retention appliances used by orthodontists may be based on the ease of fabrication, aesthetics, pattern of extractions, oral hygiene,² compliance of the

patient, durability, pre-treatment occlusion, or situation,^{2,10} post-treatment occlusion,² orthodontists personal preference,^{5,12} clinical experiences,¹¹ specialist status,^{13,14} as well as the cost, rather than popularity. Orthodontists in the Netherlands differed in their opinions on the length of time that retainers should be worn and on the duration of the retention phase.² Patients were advised to wear the removable retainers for an average of 18 h per day, 7 days a week, after which part-time wear was advised for 9–16 h a day. Similar to their first retention phase, we found that two-thirds of the orthodontists prescribed full-time maxillary retainer wear, for more than 20 h per day, for at least 3–9 months. The majority of orthodontists in this country practiced a retention period of 6 years and more, and generally preferred their patients to wear the retainers for a lifetime. This was in agreement with the recent study by Meade and Millett¹⁰ who found that lifetime wear of retainers was advised by 67–78% of orthodontists in Ireland. Only a small percentage of Malaysian orthodontists (15.6%) told their patients that they could stop wearing removable retainers 2–5 years after debonding. Overall, most of the orthodontists scheduled the first retention appointment at 1–3 months after debonding and followed their patients closely for a maximum of 2–4 years. The timing of the scheduled retention appointments varied among clinicians, and depended on their number of years in practice, the volume of patients debonded, and the type of retainer prescribed.⁷

Histological studies have shown that reorganization of the periodontal ligament occurs over a 3–4-month

period after cessation of orthodontic tooth movement, reorganization of the gingival tissue occurs over a 5-month post-treatment period, and the gingival collagen fiber network typically takes 4–6 months to remodel while the supracrestal periodontal fibers remained stretched and displaced for more than 232 days after cessation of orthodontic tooth movement.^{14,15} This suggests that the retention period should generally last at least 7 months.¹ In this respect, results from our study showed that the retention practice among orthodontists in this country was in line with the suggestion by Johnston et al.,¹ in order to minimize relapse and to enhance stability. The limitation of this study was that the respondents were not classified into subgroups when data was analyzed. Classification of the respondents by parameters such

as gender, age, year of graduation, clinician preference, and others may have provided a clearer picture. However, the current findings can act as a primary guideline to orthodontists in this country for patient management after active orthodontic treatment in their clinical setting. Considering the cost of orthodontics treatment and the typically long waiting list for orthodontic treatment in most governmental settings, retreatment of cases is not likely to be feasible. Further research into the long-term effectiveness of individual retention protocols is needed.

V. Conclusion

This survey provides insight into the retention practice among orthodontists in Gujarat. Within the limitations of the present study, the following conclusions can be drawn:

- Bonded fixed retainers are the most commonly used retainer among orthodontists in Gujarat, followed by the Hawley and Vacuum formed retainers.
- Most orthodontists prescribed full-time wear of more than 20 h per day for a duration of 3–9 months and none of the orthodontists allowed the patient to decide the length of time the retainer should be worn.
- Orthodontists in Gujarat practiced a retention period of 5 years and more, and preferred that the retainer to be worn indefinitely.
- Most of the patients returned for retainer-checking appointments for up to 4 per day.

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