ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4

Journal of Coastal Life Medicine

Assessment of Knowledge, Attitude and Execution of Retention and Relapse Protocols amongst Practicing Orthodontists of Vadodara – A Questionnaire Study

Received: 12 February 2023, **Revised:** 20 March 2023, **Accepted:** 24 April 2023

Dr. Romilkumar Shah
Professor and PG Guide K. M. Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Waghodia, Vadodara, Gujarat, India- 391760
Mail id.: drromilshah@yahoo.co.in

Dr. Helly Yogeshbhai Mehta
Part III Postgraduate Student K. M. Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Waghodia, Vadodara, Gujarat, India- 391760
Mail id.: mehtahelly5@gmail.com

Corresponding author: Dr. Helly Yogeshbhai Mehta,
Part III Postgraduate Student, K. M. Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Waghodia, Vadodara, Gujarat, India- 391760. Mail id.: mehtahelly5@gmail.com

Keywords
Retention, Relapse, Active Retainers, Vacuum Formed Essix Retainer, Fixed Lingual Bonded Retainer.

Abstract

Aim: To develop and validate a tool for assessing the Knowledge, Attitude and Execution of Retention and Relapse Protocols amongst Practicing Orthodontists of Vadodara.

Study Design: A questionnaire for assessing the Knowledge, Attitude and Execution of Retention and Relapse Protocols amongst Practicing Orthodontists of Vadodara was formed comprising of 18 questions. The content validity was undertaken by fourteen experts specialized in Orthodontics. The final developed questionnaire survey was run using Google form, participants included in the evaluation were 50. The participants were asked to complete the questionnaire at T1. The reliability of the Questionnaire was evaluated using test-retest reliability. After 7 days, participants were asked again to complete the same questionnaire with the questions arranged in another order compared to the previous one at T2. The first and second filled questionnaires were then assessed for test-retest reliability. Cronbach's alpha was computed to examine the internal consistency of the formulated questionnaire.

Results: Content Validity Index revealed major rating of 3 or 4 score. The result showed the Cronbach's alpha co-efficient for 14 items was 0.750, suggesting relatively high internal consistency and the questions are validated. Kappa (0.6-0.8) value revealed excellent reliability among all the tested 14 questions. ($p<0.001$). From the received data of this study found around 80% orthodontists feel that the most common factors that influenced the choice of retainer was Periodontal Status. The time period of fixed retainer was 18 – 24 months for 44%, and for removable retainer was 12 - 18 months for 50%. 76% of Orthodontists have faced breakage and 92% practitioners believe difficult hygiene maintenance with Fixed lingual Retainer. 54% have used Hawley's Retainer to treat Relapse.

Conclusion: The developed questionnaire can be effectively used for further studies as a tool to assess the Knowledge, Attitude and Execution of Retention and Relapse Protocols. The retention protocols are strictly based personal modifications of based on experience.

1. Introduction

Orthodontics is a dental faculty dealing with the correction of malaligned teeth, correction of the smile and establishing various facial proportions of the face in order to achieve an esthetically pleasing and socially acceptable facial profile. Orthodontic treatment aims at complete restoration of Orofacial health in terms of "physical, mental and social well-being" as defined by WHO.[1]

Orthodontic treatment` has two phases, active phase and retentive phase. T. M. Graber defines retention as "holding of the teeth in optimal esthetic and

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

functional positions". Retentive phase aims to preserve corrections that are achieved by the active phase. Retainers are the devices that help maintain the corrections achieved by active orthodontic treatment. Retainers can be broadly classified as Removable and Fixed.[2]

Norman Kingsley was one of the pioneers who noticed that orthodontically corrected teeth positions were frequently unstable.[3] Teeth after orthodontic treatment have affinity to return to their initial positions in the alveolar bone. This phenomenon is termed as Relapse. Relapse in orthodontics can be due to many reasons, the primary being tension in periodontal fibers that are stretched during the tooth movement in the active phase of orthodontic treatment. Another cause for relapse is any irregularity or prematurity in the final occlusion. Age related changes in the bone can also lead to relapse.[4]

Retention Phase in fixed orthodontic treatment is equally important as Active Phase. The teeth when placed in the corrected positions tend to return back to their original positions.[4] The main function of any retainer is to hold the teeth in their corrected positions until the surrounding periodontal ligament fibers and other soft tissues adapt themselves to the new teeth positions. There are many methods of retention proposed in orthodontics. Examples of removable retainers include Hawley's retainer, Begg's wrap-around retainer, Vacuum Formed Retainers (VFR) etc. Fixed lingual retainer is a piece of wire usually made up of stainless steel that is bonded onto the lingual surfaces of the anterior teeth. Hence till date, achieving post-treatment stability is considered to be a prime concern for orthodontists.[5,6]

There are different opinions based on each individual Orthodontists experience regarding reasons for the choice of retainer, the post debonding follow-up protocol, treatment of relapse cases.

So to overcome the dilemma regarding appropriate retainer in day to day clinical practice in individual cases this study will help assess what kind of retainer is used by practicing orthodontists actively in Vadodara.

Aim

To assess the Knowledge, Attitude and Execution of Retention and Relapse Protocols amongst Practicing Orthodontists of Vadodara.

Objectives

- ✓ To assess the Knowledge of Retention and Relapse protocols amongst practicing Orthodontists of Vadodara.
- ✓ To assess the Attitude of Retention and Relapse protocols amongst practicing Orthodontists of Vadodara.
- ✓ To assess the Execution of Retention and Relapse protocols amongst practicing Orthodontists of Vadodara.

2. Material and Methodology

A. Study Design:-

1. **Place of the study**: Department of Orthodontics and Dentofacial Orthopaedics, K M Shah Dental College and Hospital, Sumandeep Vidyapeeth.

2. **Source of data**:

1. For Content Validity: Fourteen Orthodontists from Vadodara

2. For Study: Practising Orthodontists of Vadodara

3. Sample description:

- Content validity is usually undertaken by minimum seven experts (Lynn MR 1986)[7]. Hence, fourteen orthodontists were included.
- Sample size: After calculating 10% dropout ratio; final sample size was calculated to include forty-five practicing orthodontists of Vadodara.

4. **Time scale of the study:** Study was started after SVIEC approval and was completed within seven months from SVIEC approval.

5. **Selection criteria :**

(A) Inclusion criteria:

1. Fourteen Orthodontists from Vadodara.

2. Practising IOS Certified Orthodontists of Vadodara.

3. Orthodontists willing to participate in the study

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

(B) Exclusion criteria:

1. Non-IOS Certified Orthodontists
2. General Dentists practicing Orthodontics.

B. Methodology:-

- **Formulation of Questionnaire**: The questionnaire was first designed by the principle and co- investigator and was subjected to further modifications by content validity.
- **Content Validity:** The formulated questionnaire was given to the fourteen Faculties in Department of Orthodontics and Dentofacial Orthopedics, K. M. Shah Dental College and Hospital, SVDU for the content validity. Each reviewer independently rated the relevance of each question using a 4-point Likert scale (1 = not relevant, 2 = somewhat relevant, 3 = relevant, 4 = very relevant). The Content Validity Index (CVI) developed by Mary R Lynn (1986)[7] were used to estimate the validity of the items. A rating of three or four indicates the content is valid and consistent. Further, suggestions for improvement of questions with rating one or two were rejected. The suggestions provided for further improvement were incorporated by the Principal Investigator.
- **Test-Retest Reliability:** After seven days, eight participants (20%) were asked again to fill the same questionnaire with the questions arranged in altered order than previous one. The first and second filled questionnaire was assessed for test-retest reliability.
- **Internal consistency:** The responses of the questionnaire were accepted till one month period from the date of receipt of the Google link via WhatsApp message. A maximum of 3 reminders were sent to all the non-responding participants keeping five days interval to achieve desired sample size. Cronbach's alpha was computed to examine the internal consistency of the formulated questionnaire.
- **Construct validity:** It refers to the degree to which the items on an instrument relate to the relevant theoretical construct. It is a quantitative distinction between 'valid' and 'invalid'. The Construct validity was determined using exploratory factor analysis (EFA) by Principal Investigator.

The final modified questionnaire was circulated amongst all the participants as a Google Form Link via WhatsApp Message. The Responses were further analysed statistically to conclude the result.

3. Observations and Results

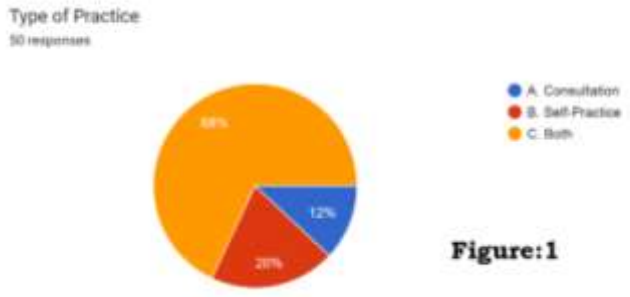

Figure:1

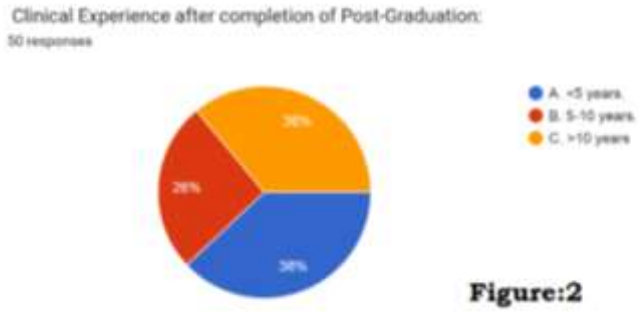

Figure:2

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

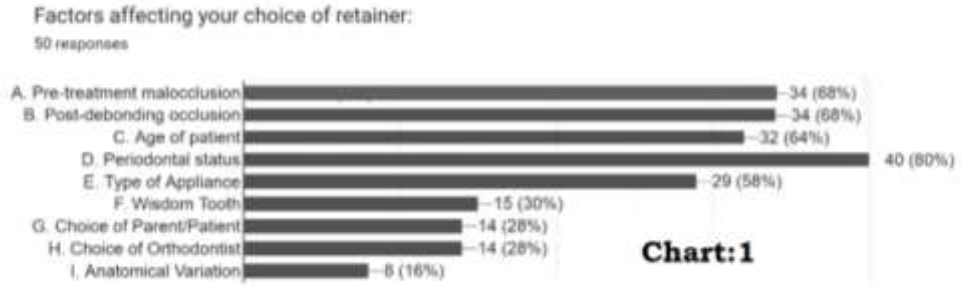

Chart:1

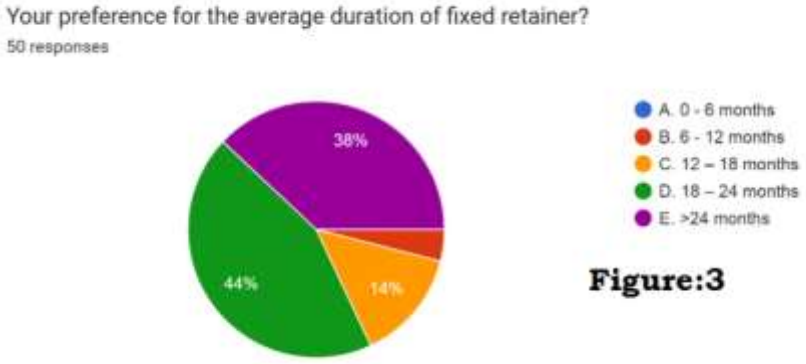

Figure:3

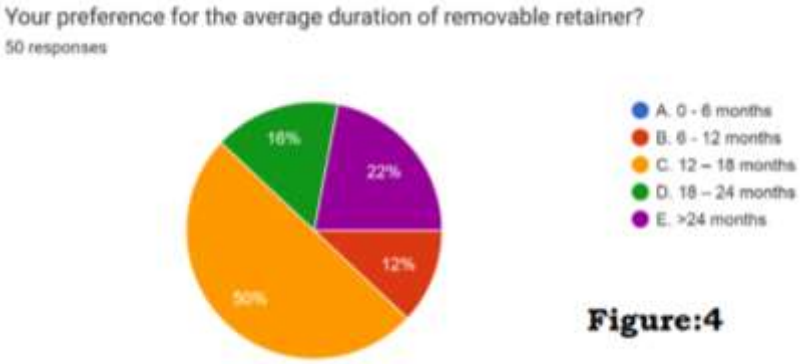

Figure:4

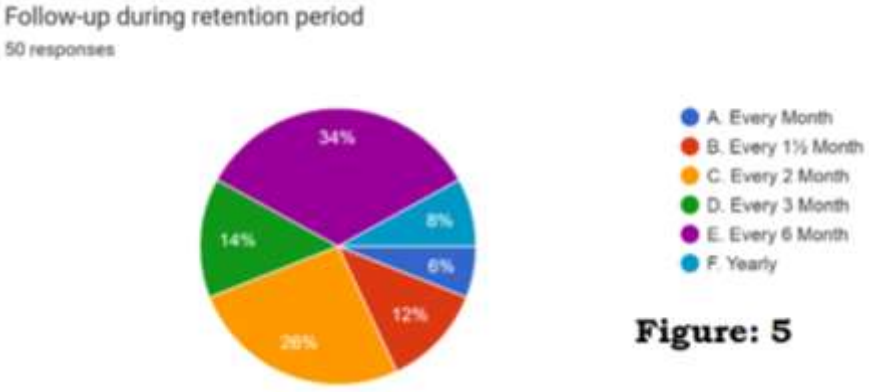

Figure: 5

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

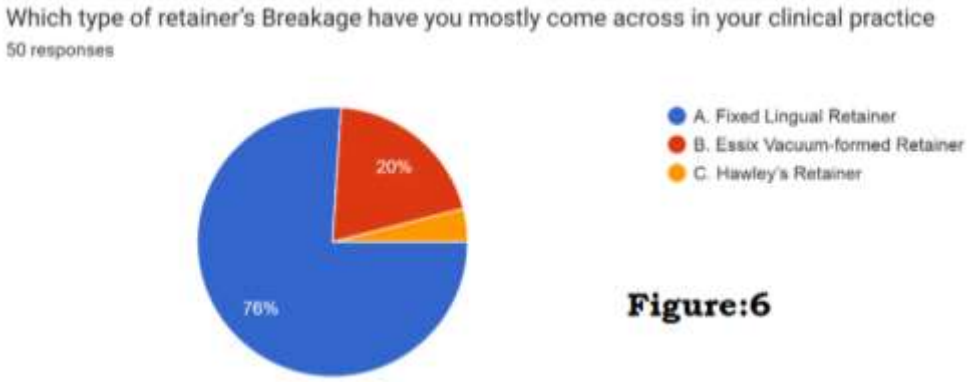

Figure:6

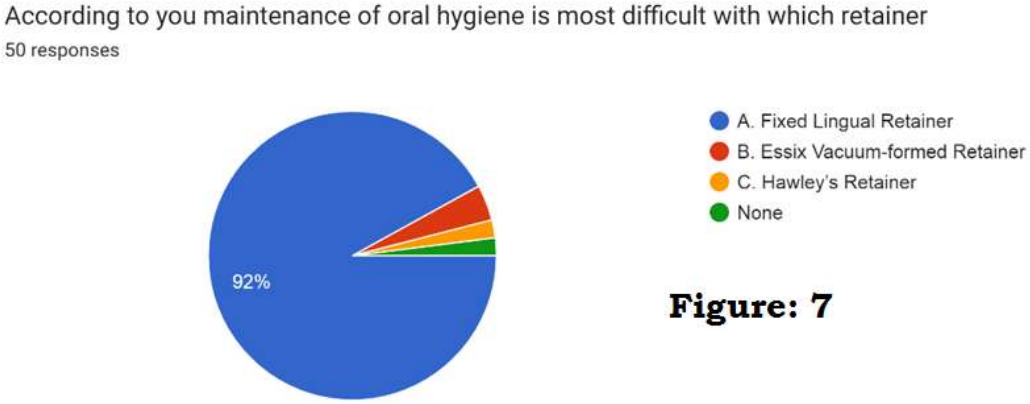

Figure: 7

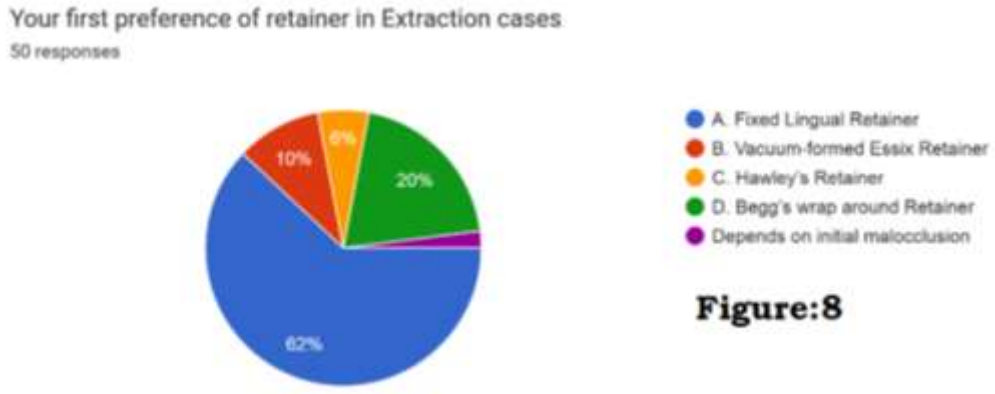

Figure:8

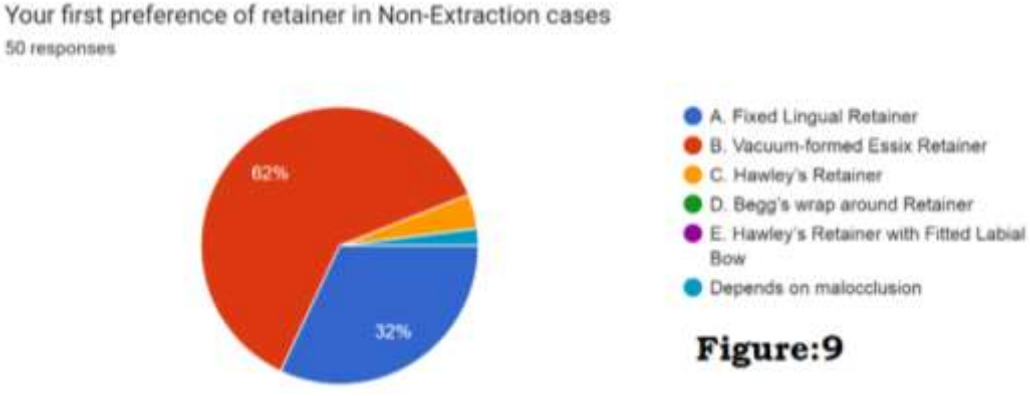

Figure:9

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

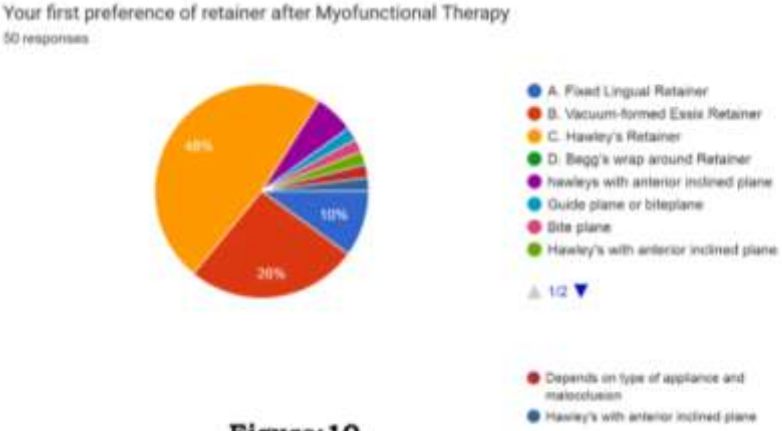

Figure:10

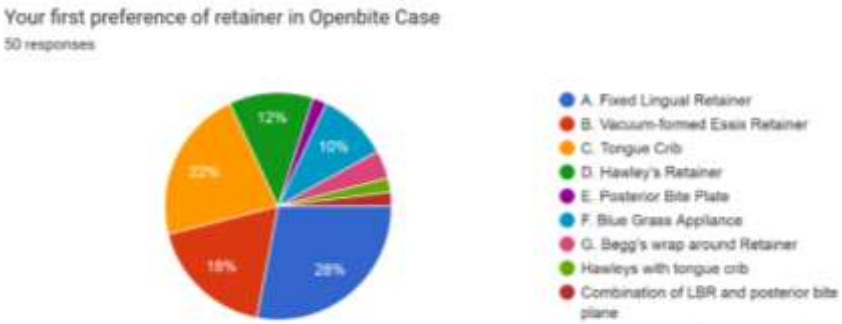

Figure:11

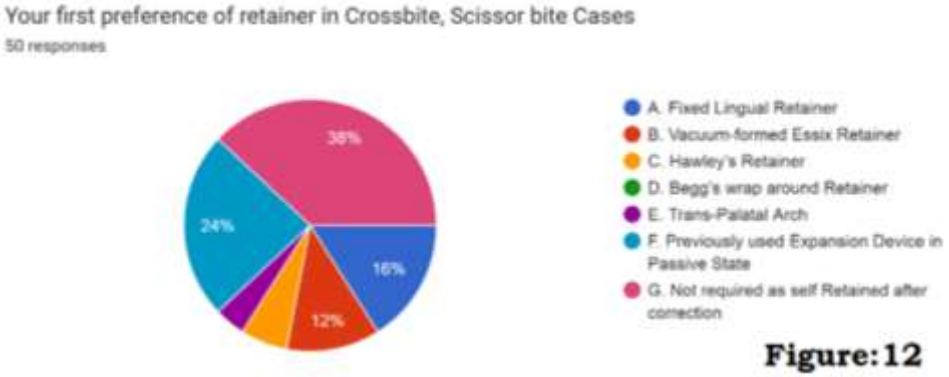

Figure:12

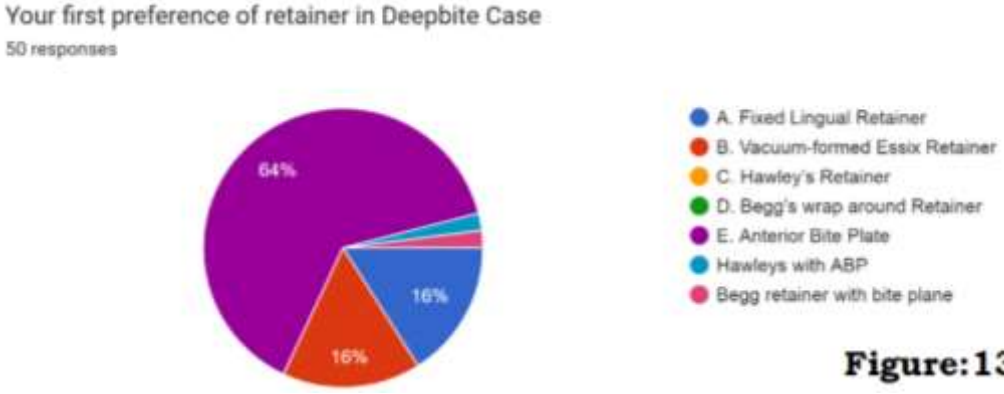

Figure:13

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

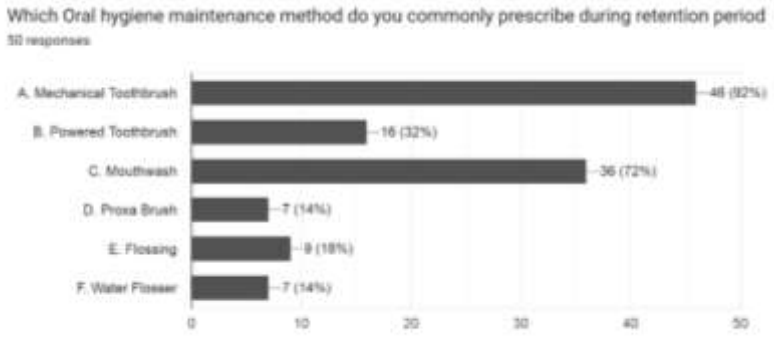

Chart:2

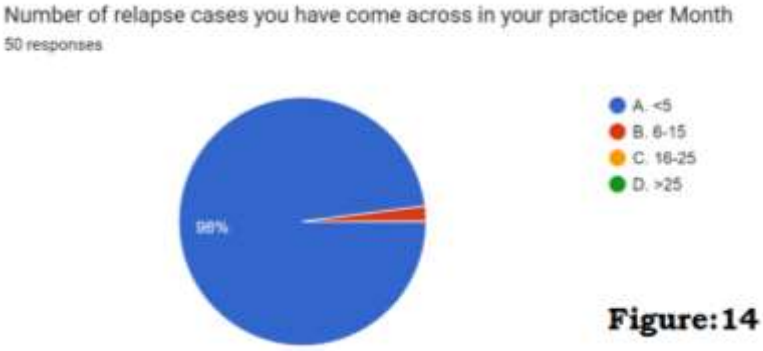

Figure:14

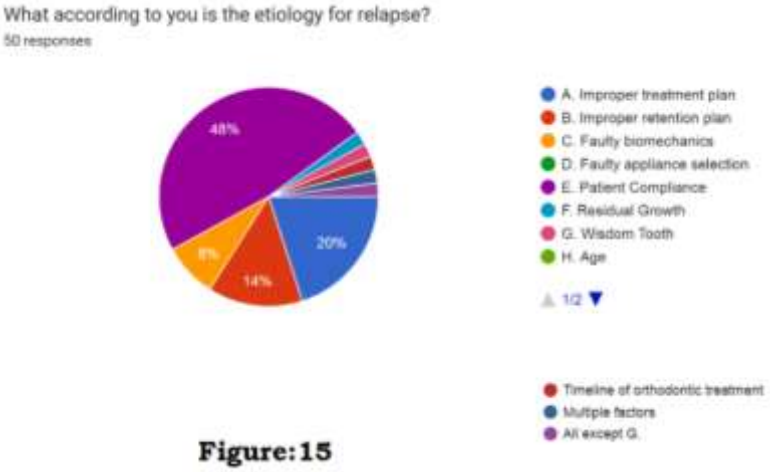

Figure:15

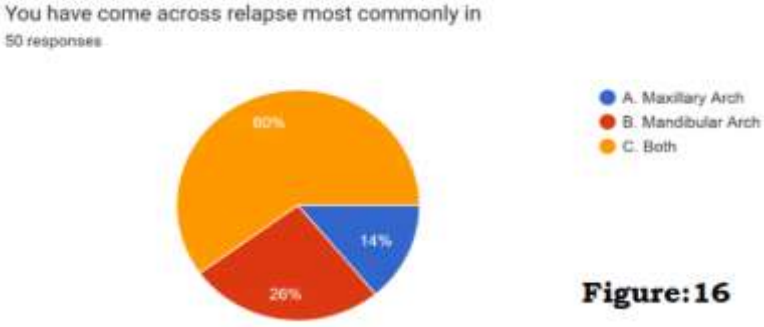

Figure:16

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

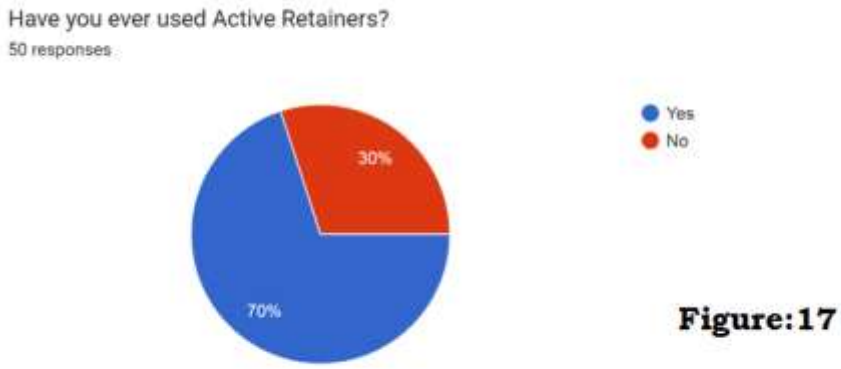

Figure:17

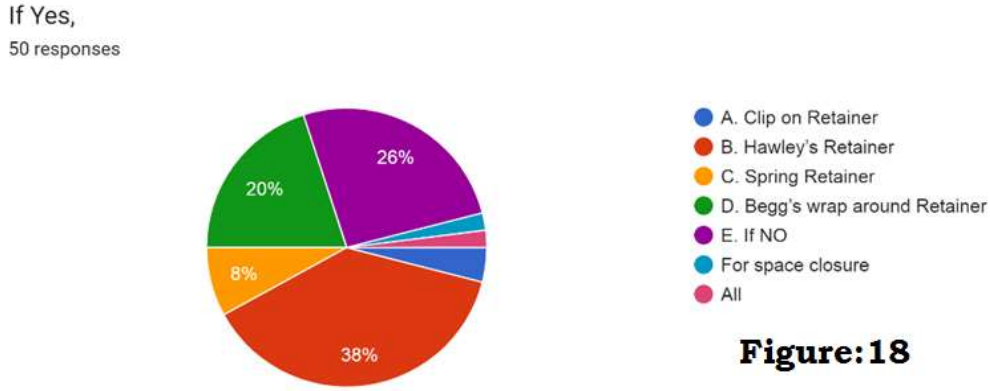

Figure:18

The individuals who participated in this study consisted of 68% Orthodontists involved in mixed practice, 12% Orthodontists were purely involved in consultations and 20% were having a strict self-practice (**Figure: 1**). 38% had <5 years, 26% had an average of 5-10 years and 36% had >10 years of clinical experience after completion of Postgraduation (**Figure: 2**).

The most common factors that influenced the choice of retainer were Periodontal Status (80%), Pretreatment Malocclusion (68%) & Post-debonding occlusion (68%) (**Graph: 1**).

The time period of fixed retainer was 18 – 24 months for 44% while >24 months for 38 % of the Orthodontists who took the survey (**Figure: 3**). The time period of removable retainer was 12 - 18 months for 50% while >24 months for 22 % of the Orthodontists who took the survey (**Figure: 4**).

A majority with 34 % of the participating Orthodontists practiced a 6 monthly, and 26% Orthodontists followed a 2 monthly follow-up in the retention phase (**Figure: 5**). 76% of Orthodontists have faced breakage and 92% practitioners believe difficult hygiene maintenance with Fixed lingual Retainer (**Figure: 6 & 7**).

For Extraction Cases the Fixed Lingual Retainers were the retainer of choice for 62% Orthodontists while second majority was for Begg's wrap around Retainer by 20% of the participating Orthodontists of Vadodara (**Figure: 8**).

For Non-extraction Cases the Vacuum-formed Essix Retainer were the retainer of choice for 62% Orthodontists while second majority was for Fixed Lingual Retainer by 32% of the participating Orthodontists of Vadodara (**Figure: 9**).

After Myo-Functional Therapy only 12% of the Orthodontists who participated in the study chose the textbook retainer "Hawley's with Anterior Inclined Plane" or "Guiding Plane" (**Figure: 10**).

The first preference of retainer for Open Bite cases is Fixed Lingual Retainer for 28%, tongue crib for 24% while Vacuum Formed Essix Retainer for 18% of the participating Orthodontists (**Figure: 11**).

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

For Cross Bite or Scissor Bite cases 38% of the participants did not prefer giving any extra measure for the retention as they believe it is self-retained after correction, while 24% participants preferred using the previously used Expansion Device in a passive state (**Figure: 12**).

The first preference of retainer for Deep Bite cases was Anterior Bite Plane for 68% individuals probably owing to high relapse rates of Anterior Deep Bite (**Figure: 13**).

92% of the Orthodontists who participated in this survey prescribed the use of mechanical toothbrush. 60% prescribed the combined use of mechanical toothbrush and mouthwash while 12% prescribed a combination of powered tooth brush and mouthwash (**Chart: 2**).

Almost all participating Orthodontists (98%) have come across relapse cases in their clinical practice, their frequency is <5 a month (**Figure: 14**). The most common etiology of relapse according to 48% participants is patient's compliance, improper treatment plan for 20% and improper retention plan for 14% of the orthodontist who took this survey (**Figure: 15**).

Majority (60%) participants have seen relapses commonly in both the arches while 26% participants have seen relapses more often in Mandibular Arch (**Figure: 16**).

70% orthodontists have used Active retainers (**Figure: 17**). Of these 70%, 54% have used Hawley's Retainer to treat Relapse. Other active retainers that are used by the participating Orthodontist are Beggs Wrap around Retainer, Spring Retainer, etc (**Figure: 18**).

4. Discussion

Stability post orthodontic therapy is an essential objective for orthodontists. This concern has been consequential in orthodontics, so its improvement and satisfaction calls for continual scrutiny. Retention and management of relapse cases varies on treating orthodontist, the theoretical knowledge learnt, modifications from the clinical experience, type of malocclusion, patient's attitude, compliance, periodontal status, treatment mechanics used and various other factors. The present study was thus conducted to assess what retention and relapse protocols are commonly executed in the city of Vadodara. The present study was conducted to assess the knowledge, attitude and execution of retention and relapse protocols amongst practicing orthodontists of Vadodara through a questionnaire.

For the participants included in the present study the factors that influenced the choice of retainer were Periodontal Status (80%), Pretreatment Malocclusion (68%) & Post-debonding occlusion (68%). This was in similarity with studies conducted by **Alvyda Andriekute et al**[6] (pre-treatment 87.7%, post-treatment 80.2% & periodontal status 53.1%), **Mahmoud Kanan Mohsin et al**[8] (post-treatment 65.71%, periodontal status & pre-treatment 37.14%), **Radha S R et al**[9] (for Maxilla post treatment 28.3% and user friendly 23.7%) (for mandible post treatment 28% and user friendly 24.6%).

The duration of wear of removable retainer in our study was 12 - 18 months for 50% participants. While **Jens A Padmos et al**[10] concluded that wear of removable retainer is temporary for maxilla (77.6%) and mandible (71.2%), **Mahmoud Kanan Mohsin et al**[8] recommends 0-6 months of full time wear by 77.14%, **Radha S R et al**[9] recommends a duration of 10 months to 2 years for maxilla (47.7%) and for mandible (43.6%) and **Rahman et al**[11] recommends a lifetime wear of removable retainers by 71.9% orthodontists.

The duration of fixed retainers in our study was 18 – 24 months for 44% participants. While **Jens A Padmos et al**[10] concluded that its is permanent/lifetime for maxilla (89.5%) and mandible (92.0%), **Radha S R et al**[9] recommends that it is permanent (56.8%) and **Rahman et al**[11] recommends a lifetime bonding of permanent retainers by 68.8% orthodontists.

The most common removable retainer is thermoplastic retainer for maxilla for 39.4% and the most common bonded retainer is the fixed lingual retainer for 38.5% according to **Mahmoud Kanan Mohsin et al**[8]**.**

Majority orthodontists considered having follow-up post debonding every 6 months. **Jens A. D. Padmos et al**[10] concluded that several orthodontists state that the times between successive retention follow-up

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

appointments were getting longer i.e. 6 weeks, 3 months, 6 months and 1 year. **Maurice J. Meade and Craig W. Dreyer**[12] state that follow-up was made till 2 years after bands off by 46.9% orthodontists on removable retainers and 48% orthodontists on bonded retainers. **Maciej Jedlinski et al**[13] state that for 44.2% orthodontist gave a follow up with the following schedule; after 1 month, 3 months and the every 6 months. **Radha SR et al**[9] in their study concluded that the follow-up's are scheduled at 1 month, 3 months and then every 3 months, they also concluded that <25% patients turn up for follow-up.

Our study shows that 92% practitioners believe difficult hygiene maintenance with Fixed lingual Retainer.

No study in the reviewed literature show studies that have questions regarding retainer choice in individual malocclusions or show the use of active retainers.

5. Conclusion

The study concludes that:

1. The type of retainer most preferred is removable retainer for both the arches.
2. With majority opinion, maintaining oral hygiene was difficult with Fixed Lingual Retainer and they prescribed Mechanical Tooth brushing & Mouthwash during the Retention Phase.
3. Majority orthodontists have seen <5 relapse cases, majority of which are in maxilla.
4. The active retainers that are most commonly used are the Hawley's Retainer and the Beggs Wrap around Retainer.

References

[1] World Health Organization. Constitution de l'OMS. Organisation mondiale de la Santé; 1985

[2] Al-Moghrabi D, Pandis N, Fleming PS. The effects of fixed and removable orthodontic retainers: a systematic review. Prog Orthod. 2016 17(1):24

[3] Angell D. Treatment of irregularity of the permanent or adult teeth.

[4] Johnston CD, Littlewood SJ. Retention in orthodontics. Br Dent J 2015;218(3):119–22

[5] Gunay F, Oz AA. Clinical effectiveness of 2 orthodontic retainer wires on mandibular arch retention. Am J Orthod Dentofacial Orthop 2018;153(2):232–8.

[6] Andriekute A, Vasiliauskas A, Sidlauskas A. A survey of protocols and trends in orthodontic retention. Progress in orthodontics. 2017 Dec;18(1):1-8.

[7] Lynn MR. Determination and quantification of content validity. Nurs Res 1986;35(6):382–5

[8] Mohsin M, Omer Z, Amin R. Orthodontic retention protocol among Kurdistan Region of Iraq orthodontists. Erbil dent j 2020 ;3(1):40–6.

[9] Sr R, Singaraju GS, Mandava P, Ganugapanta VR, Bapireddy H, Pilli LN. A survey of retention practices and protocols followed among orthodontists in India. J Pharm Bioallied Sci 2021;13(1):S149–56.

[10] Padmos JAD, Fudalej PS, Renkema AM. Epidemiologic study of orthodontic retention procedures. Am J Orthod Dentofacial Orthop 2018 ;153(4):496–504.

[11] Ab Rahman N, Low TF, Idris NS. A survey on retention practice among orthodontists in Malaysia. The Korean Journal of Orthodontics. 2016 Jan 1;46(1):36-41.

[12] Meade MJ, Dreyer CW. A survey of retention and retainer practices of orthodontists in Australia. Australasian Orthodontic Journal. 2019 Nov 1;35(2):174-83.

[13] Jedliński M, Mazur M, Schmeidl K, Grocholewicz K, Ardan R, Janiszewska-Olszowska J. Orthodontic Retention—Protocols and Materials—A Questionnaire Pilot Study among Polish Practitioners. Materials. 2022 Jan 16;15(2):666.