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RESEARCH ARTICLE

A SURVEY OF RETENTION PROTOCOLS AND TRENDS PRACTICED BY ORTHODONTISTS FROM CENTRAL INDIA: AN OBSERVATIONAL STUDY

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Abstract

Introduction: Retention is necessary following orthodontic treatment to prevent relapse of the final occlusal outcome. So the aim of the study is to evaluate retention procedures and protocols which are used by the Orthodontists from Central India.

Methodology: In this study a total of 128 Orthodontists practicing from Central India were sent questionnaire which consisted of questions regarding different types of conditions or orthodontic treatment and the choice of retainer they would prefer. The questions were so designed to know which retainer would they prefer among both the arch. Also to know which type of retainer (removable or fixed) they prefer for certain conditions.

Result: A combination of fixed and removable retainers were commonly used by Orthodontists in both the dental arches, except after expansion of the upper arch when removable retainer was preferably used, and after the correction of rotation of mandibular anterior teeth where in Orthodontists chose fixed retainer over removable. Hawley's retainer was most preferred for upper arch (71.9%), Vacuum formed retainer for the lower arch (49.2%). In the fixed retainer bonded to all the anteriors was most preferred (76.6%) in the lower arch while bonded to Central Incisors in the upper arch (80.5%).

Conclusion: The Hawley appliance was a predominant removable retainer. The bonded wire from canine to canine was the most frequent fixed retainer. Evidence-based guidelines are required for drawing a common retention protocol.

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Introduction:-

Orthodontic treatment has an ability to bring about a change in the dentofacial features of an individual, thus improving his functional occlusion, physical appearance leading to enhancement of self esteem, and behaviour of the patient ^[1].

A phase of retention is usually required after active orthodontic tooth movement to confine teeth in ideal aesthetic and functional relation and combat the inherent tendency of the teeth to return to their former positions ^[2].

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Maintenance of the orthodontic treatment result & prevention of relapse require the use of some type of retention appliances^[3].

Teeth have a tendency to return towards their initial positions due to tension in periodontal fibres, particularly those around the necks of the teeth (inter-dental and dento-gingival fibres)^[4].

To minimize or prevent a relapse, almost every patient who has had orthodontic treatment is given some type of retainers^[5].

Retention procedures are continually being refined with recognition that existing protocols are infallible^[6].

The common retention protocol is an attempt to systemize and standardize retention procedures which would be useful for orthodontists^[7].

However there are many newer forms of retention practice trending and studied on for better results and stability^[8, 9].

This study is intended to know about the recent trends that orthodontists are following for retention and to prevent relapse.

Material and Method:-

A cross sectional survey was carried out between March 2020 to June 2020 among 150 Orthodontists of which 128 Orthodontists replied back.

The sample size was determined using the response rate obtained in previous study done by Andriekute A. in 2017^[10].

Sampling Technique used for the study is Purposive convenient sampling where sample is collected according to the inclusion criteria.

Inclusion criteria was Orthodontists and Orthodontic resident doctors (Post Graduate students) practising in Central India.

Exclusion criteria were:

1. Orthodontists not practising in Central India.
2. Expatriate Orthodontists and General Dental Practitioners who practice Orthodontics.

A tabular form of questionnaire consisting of 24 multiple choice questions divided in 4 Tables was formed.

Table 1 and 2 consisted of different treatment modalities and for that which type of retainers they choose (Removable or fixed, both or none).

Table 3 comprised of which type of fixed retainer they prefer.

Table 4 contained of different types of removable retainer that they prefer.

Responders could tick one or more answers for single question.

Statistical analysis:

The data obtained was compiled using Microsoft excel and processed & analyzed using SPSS software. Responses obtained for each question was presented using descriptive statistics (frequency distribution).

Results:-

There was 85.3 % response rate from a sample of 150.

Selection of a retention system:

A combination of fixed and removable retainers were commonly used by Orthodontists in both the dental arches, except after expansion of the upper arch where removable retainer was preferably used, and after the correction of rotation of mandibular anterior teeth where in Orthodontists chose fixed retainer over removable. Table 1 and 2, Figure 1 and 2 shows the values obtained.

Fixed retainer:

The most preferred type of fixed retainer for mandibular arch was the bonded retainer to all the anterior teeth followed by premolar to premolar and lastly canine.

The most widely used type of fixed retainer for maxillary arch was the bonded to Central Incisor followed by all incisor teeth. Table, Figure 3 shows all the values.

Removable retainer:

When choosing the removable retainer most of the Orthodontists selected Hawley’s retainer (71.9%) for the upper arch. The Damon split, Positioner retainer, Begg’s retainer and vaccum formed retainer were selected in the descending order. Table 4, Figure 4 gives the detailed information. Whereas for the lower arch Vaccum formed retainer was highly selected (49.2%).

Table 1:- Orthodontists responses of a retention system for Maxillary arch.

Condition/treatment	Fixed	Removable	Both	None
Extractions	11(8.6%)	45(35.2%)	70(54.7%)	2(1.6%)
Closure of diastema	24(18.8%)	10(7.8%)	92(71.9%)	1(0.8%)
Dentoalveolar Expansion	18(14.1%)	69(53.9%)	40(31.3%)	1(0.8%)
Anterior teeth Crowding	22(17.2%)	40(31.3%)	66(51.6%)	0(0%)
Anterior Impacted teeth	13(10.2%)	38(29.7%)	74(57.8%)	3(2.3%)
Anterior teeth Intrusion	14(10.9%)	44(34.4%)	69(53.9%)	1(0.8%)
Anterior teeth Extrusion	5(3.9%)	50(39.1%)	72(56.3%)	1(0.8%)
Rotations of the anterior teeth	28(21.9%)	35(27.3%)	65(50.8%)	0(0%)
Anterior open bite	10(7.8%)	43(33.6%)	57(44.5%)	0(0%)
Retaining overjet	5(3.9%)	36(28.1%)	87(68%)	0(0%)
Anterior teeth Root resorption	15(11.7%)	28(21.9%)	80(62.5%)	5(3.9%)
Previous orthodontic treatment	7(5.5%)	44(34.4%)	76(59.4%)	1(0.8%)
Adult patient	10(7.8%)	33(25.8%)	83(64.8%)	2(1.6%)

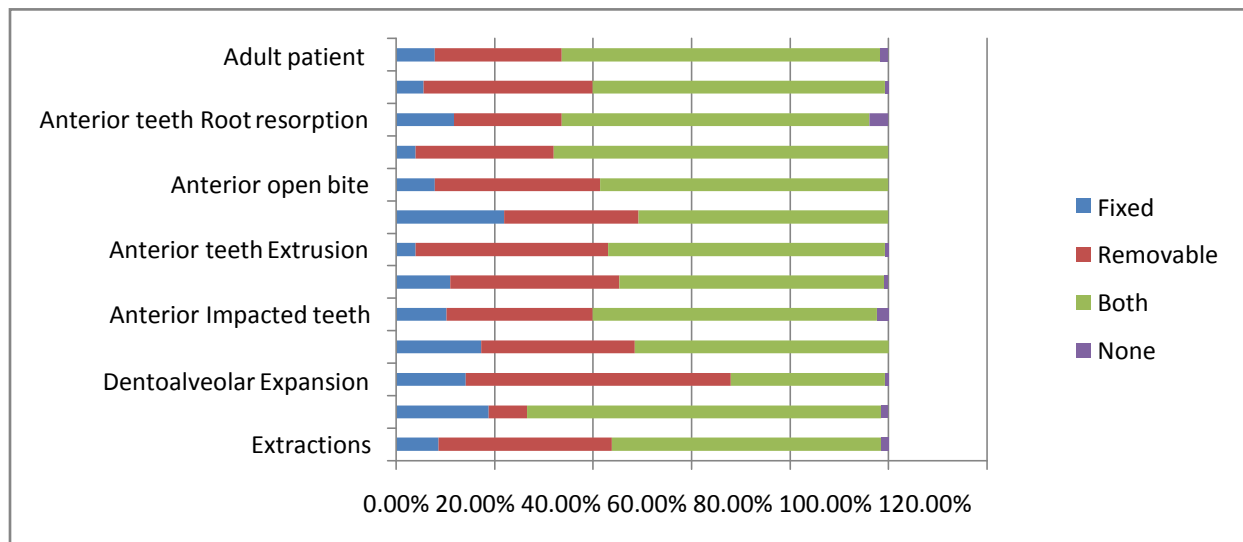


Fig 1:- Orthodontists responses records in percentage of a retention system for Maxillary arch.

Table 2:- Orthodontists responses of a retention system for Mandibular arch.

Condition/treatment	Fixed	Removable	Both	None
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Extractions	29(22.7%)	20(15.6%)	79(61.7%)	0(0%)
Closure of diastema	50(39.1%)	10(7.8%)	64(50%)	4(3.1%)
Dentoalveolar Expansion	10(7.8%)	54(42.2%)	63(49.2%)	1(0.8%)
Anterior teeth Crowding	52(40.6%)	10(7.8%)	66(51.6%)	0(0%)
Anterior Impacted teeth	40(31.3%)	25(19.5%)	61(47.7%)	2(1.6%)
Anterior teeth Intrusion	11(8.6%)	46(35.9%)	68(53.1%)	3(2.3%)
Anterior teeth Extrusion	14(10.9%)	52(40.6%)	57(44.5%)	5(3.9%)
Rotations of the anterior teeth	64(50%)	6(4.7%)	58(45.3%)	0(0%)
Anterior open bite	41(32%)	15(11.7%)	72(56.3%)	0(0%)
Retaining overjet	31(24.2%)	19(14.8%)	78(60.9%)	0(0%)
Anterior teeth Root resorption	23(18%)	40(31.3%)	62(48.4%)	3(2.3%)
Previous orthodontic treatment	42(32.8%)	11(8.6%)	75(58.6%)	0(0%)
Adult patient	38(29.7%)	11(8.6%)	79(61.7%)	0(0%)

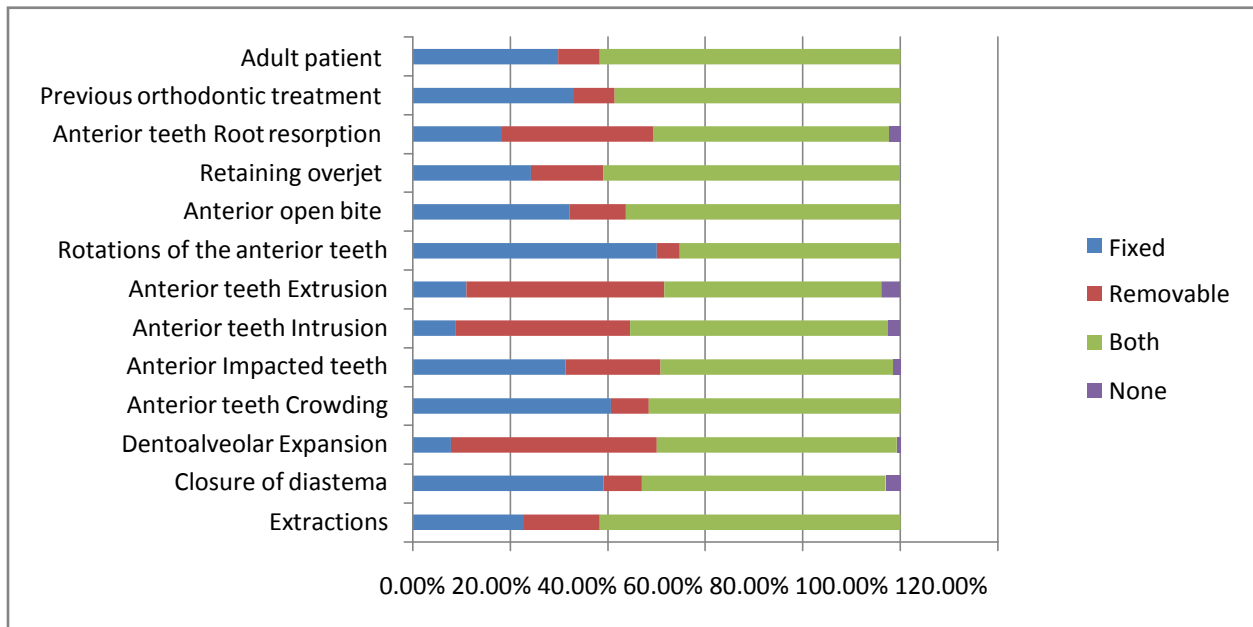


Fig 2:- Responses recorded in percentage for Mandibular arch.

Table 3:- Orthodontists responses for fixed retainers.

Bonding types of fixed retainers	Maxillary retainer	Mandibular retainer
Bonded to the canines only	44(34.4%)	84(65.6%)
Bonded to all anterior teeth	30(23.4%)	98(76.6%)
Bonded to central incisors	103(80.5%)	25(19.5%)
Bonded to all incisor teeth	75(58.6%)	53(41.4%)
Bonded to all teeth from the first premolar to the first premolar	40(31.3%)	88(68.8%)

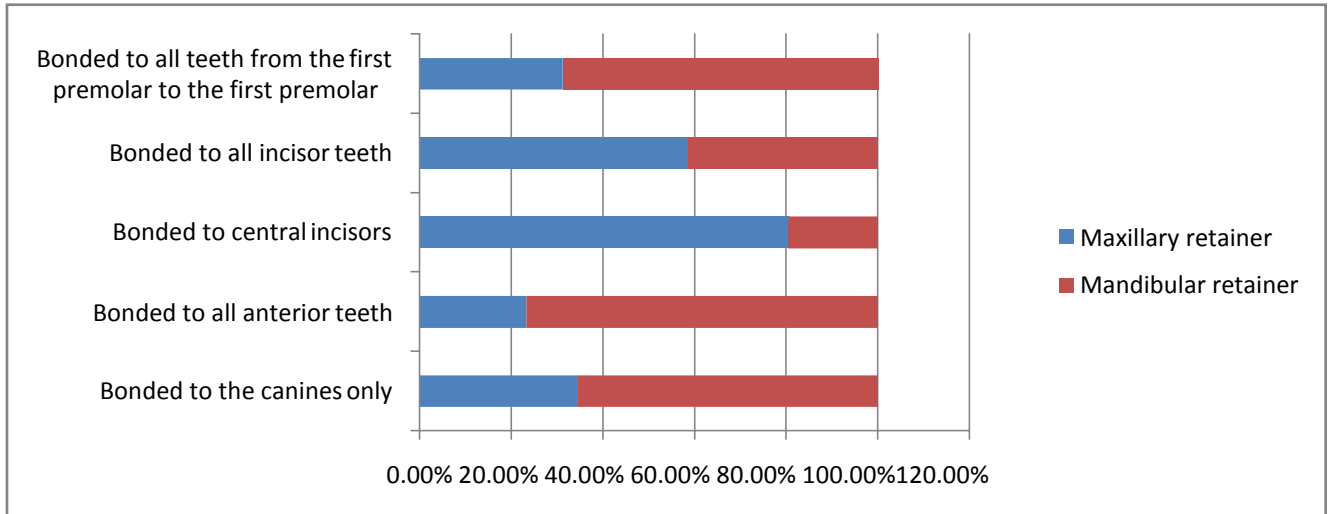


Fig 3:- Responses in percentage obtained for fixed retention system.

Table 4:- Orthodontists responses for removable retainers.

Removable retainers	Upper arch	Lower arch
Hawley retainer	92(71.9%)	36(28.1%)
Vacuum-formed retainer	65(50.8%)	63(49.2%)
Positioner retainer	74(57.8%)	54(42.2%)
Begg's retainer	71(55.5%)	57(44.5%)
The Damon Splint	100(78.1%)	28(21.9%)
Others	64(50%)	64(50%)

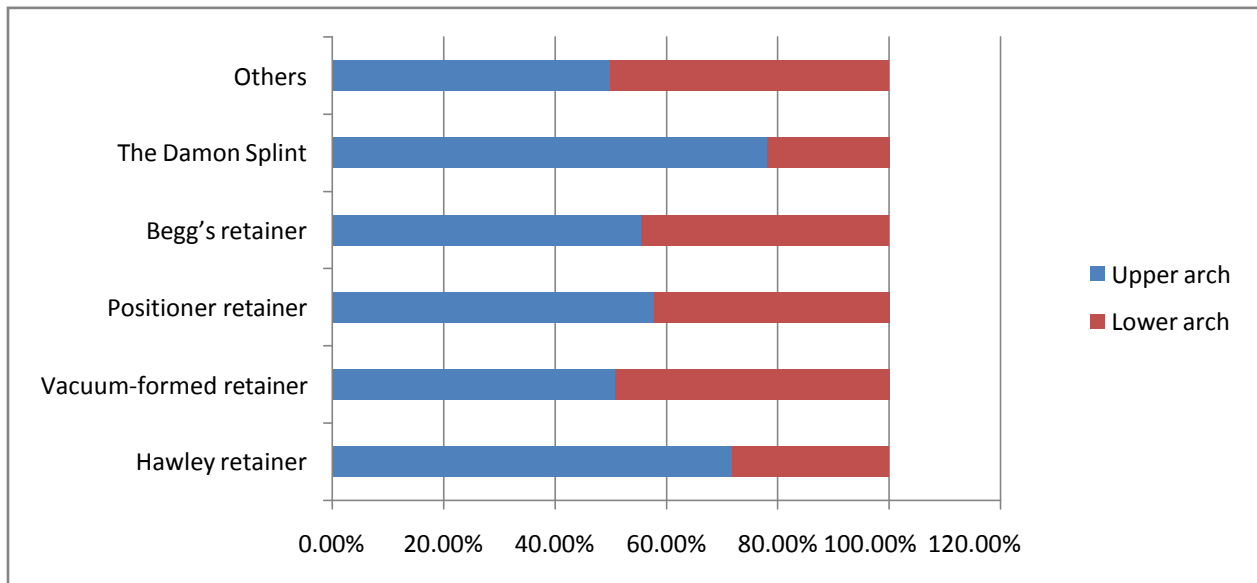


Fig 4:- Responses in percentage obtained for removable retention system.

Discussion:-

In the present scenario, there are multiple removable and fixed retainers but it is still unclear which retainers are best suited in particular conditions. There are currently many different types of the removable and fixed retainers, and it is unclear which retainers are the best and how long they should be used. This study investigated the existing retention protocols used by the Orthodontists in Central India.

A survey involving all 128 licensed Central Indian Orthodontists was conducted, and the obtained data represented the opinions of the specialists on the retention procedures.

It showed that this study was relevant to the interests of the Orthodontists. On the other hand, some Orthodontists noted that the questionnaire was too long and it took a lot of time. Previous surveys conducted in certain countries have raised the main questions related to the selection of a retainer and the duration for wearing a retainer.

Although the Orthodontists chose different retainers for different orthodontic situations, some peculiar trends were observed. Surveys performed in the other European countries^[11, 12], USA^[14], and Saudi Arabia^[7], showed that fixed retainers for a lower dental arch were dominant, except in Ireland^[13] and Malaysia^[15], where vacuum-formed retainers were the most popular choice. The opinions regarding an orthodontic retention in the upper dental arch were various: fixed retainers were most often chosen in Switzerland^[14] and the Netherlands^[11], Hawley retainers in the USA^[14] and Saudi Arabia^[7], and vacuum-formed retainers in the UK^[12], Ireland^[13], and Malaysia^[15]. A combination of a fixed and removable retainer (a vacuum-formed retainer) was the most commonly used in Norway^[3], and this was in agreement with our study; however, the orthodontists in Lithuania^[10] gave priority to the Hawley retainers.

Central Indian orthodontists preferred a combination of a fixed and removable retainer in the upper and lower arches, except after an expansion of the maxillary dental arch or correcting any rotations of the mandibular anterior teeth. The reason for a “double” retention might be that the orthodontists were worried about the relapse tendency and about the patients who might forget to wear their removable retainer as specified.

Additionally, the findings of the study by Atack et al.^[16] showed similar results between fixed and removable retainers and confirmed that a relapse in the lower front teeth can occur with both types of retainers.

More than 70% of the orthodontists in Lithuania preferred retainers to be fixed to all six anterior teeth, and this way of fixation was dominant in upper and lower arches. In that aspect, our results were in line with a study conducted by Andriekute et al.^[4], which showed that fixed retainers bonded to all anterior teeth (3–3) particularly in the mandibular arch which were in the ascendant. Orthodontic canine-to-canine retainers were considered to be effective^[17] and invisible^[18] and could ensure permanent retention and alignment of the anterior teeth^[19, 20]. Other advantages were mentioned by the researchers: good patient acceptance^[18] and low failure rate^[18, 19].

Nevertheless, fixed retainers could cause difficulties for patients to reach areas with a toothbrush or a dental floss, increase plaque accumulation, and influence periodontal health^[21]. However, another study showed that fixed retainers allow patients to maintain good hygiene and periodontal status^[19].

Conclusion:-

A combination of fixed and removable retainers was the most often used in the orthodontic retention. The Hawley appliance was a predominant removable retainer. The bonded wire from canine to canine was the most frequent fixed retainer. Evidence-based guidelines are required for drawing a common retention protocol which will benefit all the practicing Orthodontists.

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