the Journal of CONTEMPORARY DENTAL PRACTICE at www.thejcdp.com
Volume 7 Number 2 May 1, 2006

The Reinforced Removable Retainer

Salman AL-Suliaman; Hayder A. Hashim, BDS, MSc; Jelly L. Cordovez

Abstract

The aim of this paper is to present a new type of orthodontic removable retainer, which is of great help to the orthodontist as well as to the patient. The procedures of fabrication are described. The Reinforced Removable Retainer (Triple “R” Retainer) is well tolerated, adaptable, and easy to fit and remove. Its main advantage is that it is not easy to break, less bulky, and very retentive.

Keywords: Reinforced removable retainer, orthodontic retainer

Citation: AL-Suliaman S, Hashim HA, Cordovez JL. The Reinforced Removable Retainer. J Contemp Dent Pract 2006 May;(7)2:145-152.

Introduction

Retention is defined as "maintaining the newly moved teeth in position long enough to aid in stabilizing their correction."[1] It is considered as a major step in stabilizing the results accomplished through active orthodontic treatment.[2] Dental repositioning leads to potential occlusal instability as teeth naturally tend to drift at least partially towards their original position.[2] This is because the gingival and periodontal tissue are affected by the orthodontic tooth movement. Therefore, a period of a few months is required in order to permit reorganization of the alveolar bone as well as the periodontium to their normal health.[3] To achieve this, a retainer appliance is needed.

There are two types of retainers: removable and fixed. Further, the retainer can also be classified as: temporary, semi-permanent, or permanent. The retainer should be well tolerated by the patient with minimal negative effects on speech, mastication, oral hygiene, comfort, and the general health of the oral tissue.[4] The most common type of removable retainer is the Hawley retainer and its many known modifications.[5,6]

A significant problem encountered with the usage of the removable retainer is it is vulnerable to fracture. Hence, the purpose of this paper is to introduce a new type of removable retainer to overcome this problem.

Methods and Materials

Materials

To construct the retainer, the following instruments are required (Figure 1):

1. Bird peak plier
2. Heavy duty cutter
3. Wax knife
4. 0.7 mm stainless steel wire
5. Acrylic powder and monomer
6. Hydro-flask
7. Stainless steel prosthetic wire netting, medium size (Produits Dentaires SA, Vevey (Suisse), Switzerland (fine/ medium/coarse)
8. Marking pencil
9. Scissors

Methods

Working Cast Preparation: The impression is cast in stone or hard plaster so it can be retained after the appliance has been fitted. This is useful if the appliance later has to be repaired or modified.

Clasp Construction: Size 0.7 mm stainless steel wire is used to prepare two Adams' clasps on the molars, two Ball clasps between the first and second premolars, and a labial bow from canine to canine (3-3) in non-extraction cases.

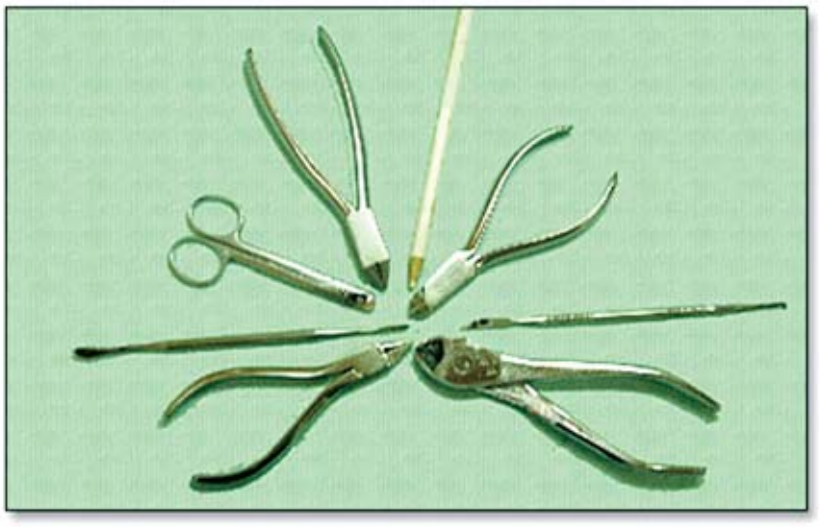

Figure 1. Instruments used.

Figure 2. A. Pencil outline of area of concern. **B.** Transfer of the outline onto metallic mesh material.

The Base-plate Fabrication Procedure: The baseplate is made with cold-cure acrylic material. It serves as the supportive component of the appliance.

1. The cast is soaked in water for ten minutes to eliminate the air bubbles.

2. Using a marking pencil, the outline area of interest is drawn on the cast and then transferred onto medium metallic mesh (Figures 2a and 2b).

3. The metallic mesh is cut to match to the outlined area of interest (Figure 3).

   The Adams' clasps and Ball-clasps are prepared and inserted in their respective positions (Figure 4).

4 Separating medium is applied to the working cast.

5. Acrylic powder and liquid are applied alternately (sprinkle-on technique) to form a thin layer of acrylic.

Figure 3. Cutting the metallic mesh to match the outline.

Figure 4. A. The prepared mesh. **B.** The mesh, Adams' clasps on molars, and Ball-clasps on premolars.

6. The metallic mesh is then placed on top of the thin layer of the acrylic.

7. More powder and liquid is applied alternately until the required thickness of acrylic has been built up to create a horseshoe shape.

8. The cast is then placed in warm water in a hydro-flask which is raised to a pressure of

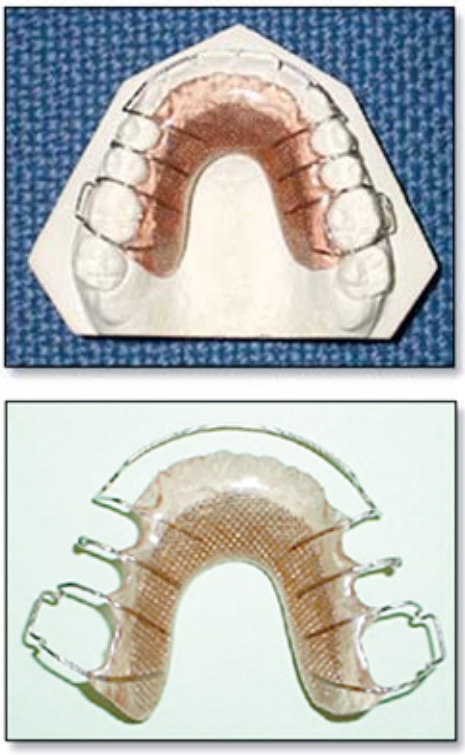

Figure 5. **A.** Maxillary removable retainer on the cast. **B.** Retainer off the cast.

2-3 Kg per cm^2 by compressed air or pump for ten minutes to cure.[7]

9. The appliance is carefully removed from the cast, trimmed, and polished (Figures 5 and 6).

10. The same procedures are followed during the fabrication of the lower retainer.

Maxillary and mandibular appliances are shown on the models in Figure 7.

Discussion

A successful retainer maintains the position of the teeth and assists in achieving a balance between the muscular forces of the lips, cheeks, or tongue and the forces of occlusion.[4]

The Reinforced Removable Retainer (Triple "R" Retainer) presented in this paper overcomes the fracture problem often encountered with the use of non-reinforced removable retainers. Such appliances are weak and readily broken or damaged if they are not worn.[7] Further, fracture is one of the main disadvantages of a cold-cure

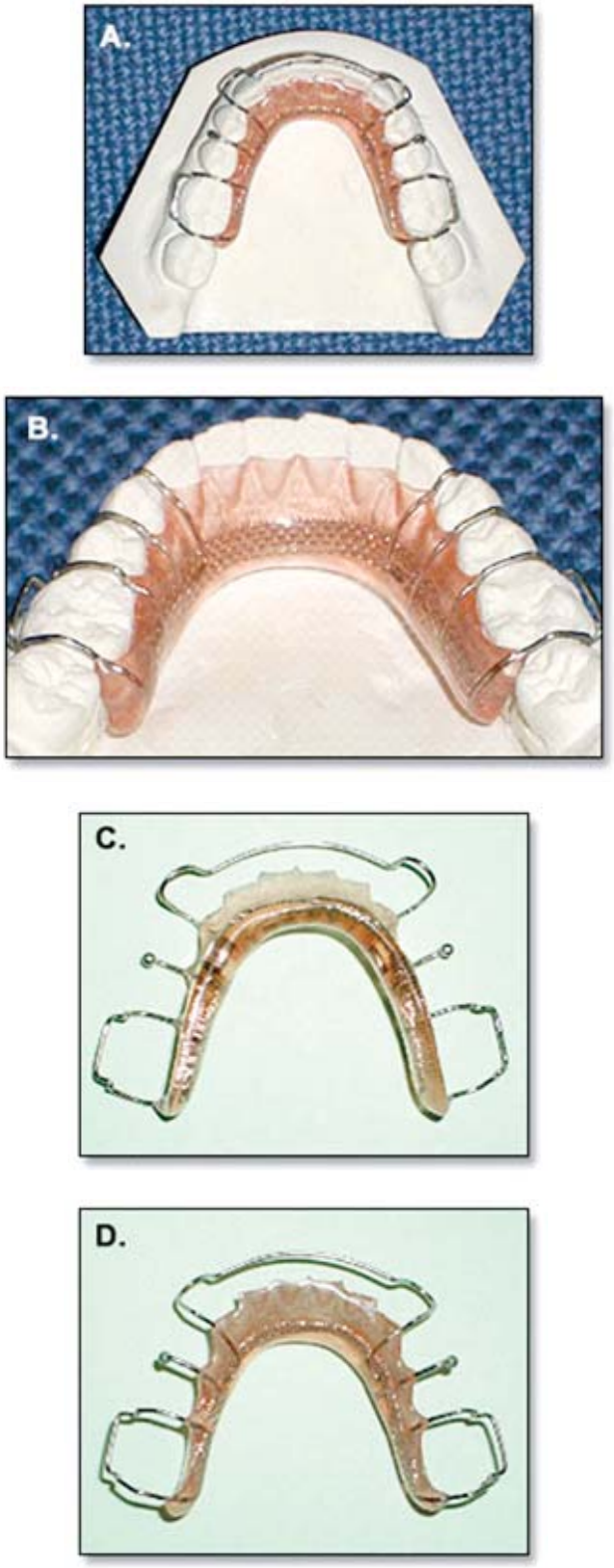

Figure 6. Mandibular removable retainer. **A.** Occlusal view. **B.** Posterior view. **C.** Fitting surface. **D.** Occlusal view.

Figure 7. Maxillary and mandibular appliances (anterior view).

acrylic removable retainer. However, this problem can be minimized by increasing the thickness of the base-plate in highly stressed areas. In the Triple "R" Retainer, the addition of the metallic mesh (medium type) to the acrylic base-plate in these highly stressed areas strengthens the appliance and also reduces or prevents its breakage. Furthermore, if the appliance breaks, the metallic mesh will hold the appliance in place until a repair or replacement can be accomplished. Continued use of the broken appliance will help prevent relapse to occur in recently de-bonded cases.

The addition of the metallic mesh does not interfere with the oral hygiene or cause tissue irritation. This is because the mesh is embedded (sandwiched) between the two acrylic layers. Furthermore, the appliance is a comfortable design because it is light in weight in spite of the addition of the metallic mesh and very retentive due to the presence of two Adams' and two Ball clasps. On the other hand, the fine mesh can also be used instead of the medium type with the advantage that it is easy to adapt and manipulate during the fabrication of the retainer.

Ideally, the use of retainers should be started on the day the brackets are removed because connective tissue fibers remain under tension for considerable periods of time. The residual tension in these fiber systems may contribute to relapse following orthodontic treatment.[8] Therefore, it is very important to explain fully the importance of retainers and of proper handling and regular checkups to patients.[7] Patients need to be recalled one week after appliance delivery in order to adjust or remove any irritating areas.

Conclusion

The Triple "R" Retainer is well tolerated, adaptable, and easy to fit and remove. Its main advantage is it is not easy to break, less bulky, and very retentive. Long-term clinical evaluation of this type of retainer is needed in order to know its positive and negative aspects.

References

1. Moyer RE. Text book of orthodontics. 4th edition. Chicago. Year book medical publisher Inc. 1988. 326-27.
2. Giuseppe Scuzzo and Koyoto Takemoto. In visible orthodontics, current concepts and solutions in lingual orthodontics. Quintessenz Verlags- Gmb it. 2003.
3. Profitt WR. Contemporary Orthodontics. St. Louis CV, Mosby Co.1986.455-70.
4. Balkhi K. A non-acrylic removable cast retainer (AL-Balkhi type) Saudi Dent. J. 1993; 5,1:2-6.
5. Hawley CA. A removable retainer. Int. J. Orthodot. Oral Surg. 1919,;2:291-98.
6. Nikolai RI, Horner KD, Blackwell DA, Carr RJ. On the design of looped orthodontic retainer wires. Angle Orthod. 1991; 61:211-20.
7. Housten WJB, Isaacson KG. Orthodontic treatment with removable appliances. 2nd Edition. Bristol, John Wright & Sons Limited.1980, 152-62.
8. Reitan K. Clinical and histologic observations on tooth movement during and after orthodontic treatment. Am. J. Orthod;1967, 53: 721-45.

About the Authors

Salman AL-Sullaman

Mr. AL-Sullaman is a dental laboratory technician in the Laboratory Division of the Department of Dentistry at the AL-Nakheil Medical Center in Riyadh, Saudi Arabia.

Hayder A. Hashim, BDS, Msc

Dr. Hashim is a Professor in the Division of Orthodontics of the Department of Preventive Dental Sciences of the College of Dentistry at King Saud University in Riyadh, Saudi Arabia.

e-mail: haider@ksu.edu.sa

Jelly L. Cordovez

Mr. Cordovez is a dental laboratory technician in the College of Dentistry at King Saud University in Riyadh, Saudi Arabia.