ADVANCED TECHNOLOGY USED FOR STABILISATION OF BONDED LINGUAL RETAINER

Dental Science

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ABSTRACT

Retention has been a major challenge in the field of Orthodontics with multiple techniques developed over the years to prevent relapse of treatment results. 3D printing has revolutionized dentistry and introduced high accuracy and a custom fit manufacturing process. In this article, an innovative technique using 3D printing has been used for stabilisation of fixed lingual retainers making the entire process simple, efficient and precise.

KEYWORDS

Retention, retainer, 3D printing

INTRODUCTION

The success of orthodontic treatment is its ability to retain the results achieved. Bonded lingual retainers provides better retention and stability in cases of rotations and alignment of maxillary anterior teeth compared to conventional retainers¹. And in some cases like midline diastema, bonded retainers are the only choice to provide permanent retention². There are various techniques for the placement of bonded lingual retainers which have come up over the years. Using the recent advancements and technology, we have fabricated a 3D printed model for stabilizing bonded lingual retainer. This new design using modern technology makes placement of bonded lingual retainers simple, efficient and also helps to save time.

TECHNIQUE AND DESIGN

- The 3D model was designed in computer with the help of software 3D builder or tinkercad (Figure 1). This STL file was send to the 3D printer to print the 3D model. (Figure 3)
- Polypropylene which is biocompatible and flexible was the filament used for 3D printing
- The printed model is cut into desired size and is used for stabilizing the fixed lingual retainer. (Figure 4). Three different sizes were printed (small, medium and large) so that this can be used effectively for teeth with varying anatomy.
- We have designed the model in such a way that it resembles the cross section of the teeth. (Figure 1)
- On the lingual side of the model gentle curvature was given so that it will smoothly adapt to the palatal aspect of the teeth and grips are given in the design to prevent the wire from slipping and also help you to place the wire in any height level. (Figure 3).
- Labial surface of the model was designed in a way that it will fit along the contours of the teeth on the labial side and towards the end slight projection was given so that it can be engaged in the embrasure area making the model along with the retainer wire stable and tight. The cross section of the model is designed in such a way that it adapt efficiently in the interdental area. (Figure 2, 3 and 5)

Figure 1: 3D model designed using tinkercad software.

Figure 2: cross sectional view of the design.

Figure 3: 3D printed model

Figure 4 : retainer stabilised using 3D printed model (occlusal view)

Figure 5: fit of the model on the embrasure area (labial view)

SCOPE

3D printing these models for every patient is a time consuming process, hence the models have to be prefabricated in three different sizes namely, small medium and large for its use in patients with different dental anatomy. Also because of its flexible property it cannot be manufactured using an autoclavable material. Hence the prefabricated form of these models have to discarded after its use.

CONCLUSION

Fixed lingual retainers have become a very important retention appliance in orthodontic treatment because they are considered reliable, independent of patient cooperation, highly efficient, and that bonded retainers are applicable for both mandibular and maxillary anterior teeth. This 3D model for stabilizing the retainer wire makes the entire process of bonding lingual retainer simple, precise and less time consuming.

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