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Abstract: In orthodontic treatment, the stability of the final occlusion is as important as the correction achieved especially in mandibular anteriors. Fixed retainers have been recommended after correction of rotated or tipped incisors and for maintenance of increased intercanine width. A variety of methods have been suggested for fabrication and bonding of fixed retainers. This article depicts techniques for fabrication of lingual retainers with less chair-side time & less effort and with more clinical efficiency.

Keywords: Direct and indirect bonded lingual retainer, Magnets, Duralay Transfer tray

INTRODUCTION AND LITERATURE REVIEW:

In the late 1970s and early 1980, Zachrisson published several papers elucidating the application of bonded lingual retainers. Since then, the use of lingual retainers has steadily grown, and several methods for delivering fixed lingual retainers have been introduced.

Tirk has said “The result of Orthodontic therapy – good, bad or indifferent is only evident many years out of retention” Mandibular anterior region is the most common area for post-treatment relapse and crowding. The development of incisor crowding is highly variable and unpredictable. It has not been possible to find clinical predictors to decide whether a patient needs long-term retention or not. Several orthodontists advocate long term retention of the lower anterior teeth, and many different removable and fixed retainers have been advocated. Following the introduction of the acid etch technique, a variety of methods have been suggested for fabrication and bonding of fixed retainers to the lingual surface of lower canines or to the lingual surface of all lower anterior teeth. However, the accurate and passive placement of the retainer has always been a matter of concern. Elastics, dental floss or ligature wires, magnets help in securing the retainer in place but cannot ‘precisely’ position the retainer. Holding the retainer wire with a plier or finger pressure is especially risky as any movement during curing can weaken the bond. A silicone transfer tray is time-consuming to fabricate and trimming, and can become deformed during the bonding procedure. Vacuum-formed locating splints can provide accurate positioning, but require an indirect technique and additional chair time for removal of excess composite. Hence All these methods have certain shortcomings inherent in them. To overcome these problems this article describes a new concept for long term retention of the lower anterior teeth, based on new modifications of lingual retention without increasing the risk to the patients of developing periodontal disease or caries (figure1)

TWO TECHNIQUES OF ITS FABRICATION:

Direct technique.
Indirect technique.

(I) DIRECT TECHNIQUE

1. Take an impression of the arch and prepare a working model.
2. The twisted 0.010" ligature wire or multistrand wire is adapted on the working model along the lingual surface of the teeth to be stabilized.
3. Pumice and polish the lingual surface of teeth on which retainer is to be bonded.
4. Check the position of retainer wire (twisted 0.010" ligature wire or multistrand wire) in mouth and adjust if necessary.
5. Prepare labial wire assembly with 0.8- to 0.9-mm-hard round stainless-steel wire with helices distal to canine at both ends and long ligature wire (0.010") attached at one end.
end. This assembly should be prefabricated on the working model. (figure 2)

6. Etch the enamel surfaces with 37% phosphoric acid for 30 seconds. Wash and blow dry. Apply a coat of primer (self-etching primer or moisture insensitive primer also can be used).

7. Lingual retainer is held in place by ligating it to the labial arch. Ligation of the labial arch is the unique feature of this method for effectiveness. Pass the ligature wire from buccal to lingual side below the contact point and lingual retainer between canine and premolar, and it is then passed on buccal side from above the same contact point and retainer wire. The ligature wire, which is buccal to labial arch now, is passed lingually below the next contact point and retainer wire. The retainer wire is fixed with the help of labial wire. (figure 3, 4, 5, 6).

8. Retainer wire is then tacked with adequate amount of adhesive.

9. Check with a mouth mirror that enough adhesive is used. Light curing for 20 seconds mesially and 20 seconds distally is done.

10. Cut the ligature wires and disengage the labial arch. Instruct the patient to maintain the oral hygiene. (figure 7)

(II) INDIRECT TECHNIQUE:

1) Take an impression of the arch and prepare a working model.

2) Gently bend the retainer on the cast, following the contours of the lingual papillae in a “V” or “U” configuration. An .024” stainless steel wire will have greater resistance to fracture than multistranded wires and is smoother to the tongue. Extend the wire distally to the first premolars on both sides. Apply a separating medium to the occlusal and lingual surfaces of the first premolars on the cast. (figure 8)

3) Form the transfer tray from Dura Lay, an acrylic that is easy to manipulate, requires little polymerization time, and has good dimensional stability. Attach each end of the retainer wire to the cast with DuraLay. Passive contact with all the lingual surfaces of the anterior teeth is critical, because any tension in the wire may lead to its failure. (figure 9)

4) Cover the areas that will not be bonded—the V-bends contacting the papillae—with utility wax. Sandblast the exposed wire surfaces with aluminum oxide to improve micro retention and thus prevent bond failures within the adhesive and at the wire-adhesive interfaces. (figure 10)

5) Remove the retainer wire and transfer tray from the cast. (figure 11)

6) Prophy the lingual surfaces of the anterior teeth to be bonded. After etching the enamel and applying a liquid resin, position the retainer in the mouth, holding the DuraLay transfer tray in place with utility wax over the premolar brackets. (figure 12)
7) Cover the lingual surfaces and the sandblasted portions of the retainer wire with composite resin, taking care not to invade the papillae or the interproximal contact points. For optimum strength and patient comfort, the composite coverage should be at least 1mm wherever possible. (figure 13)

8) Once the composite has polymerized, cut the distal wire extensions at the premolars, being careful not to damage the enamel. Add composite to the distal ends of the retainer wire in the canine regions.

9) Remove the brackets and polish the buccal surfaces of the teeth only after the retainer is completely stable. Use dental floss to check the retainer height and the interproximal spaces. (figure 14)

DISCUSSION:
The technique described above eliminates difficulties involved in bonding retainers. According to Zachrisson, the primary causes of fixed retainer bond failure can be attributed to:

- some degree of distortion during setting of adhesive
- Use of little adhesive
- Direct trauma to retainer
- Abrasion of composite was implicated as the primary reason for bond failure in a study by Artun and Orbye. Few advantages of using fixed lingual retainer are as following:
  - improve aesthetics;
  - increase patient comfort;
  - reduce the laboratory work and chair time;
  - reduce the risk of accidental breakage;
  - facilitate repair

Few of the conditions were fixed lingual retainers cannot be used:
1. Not indicated in patients with poor oral hygiene and caries.
2. Metals used in retainers can produce artifacts in CT scans & MRI.

CONCLUSION:
Retention is a necessary stage of the successful long-term management of most orthodontic patients. Precision infabrication, accuracy during placement on the teeth, and avoidance of any irritation to the gingiva are necessary requirements for a lingual fixed retention. The method described in this article seems to fulfill all of these prerequisites and gives significant chairtime advantages.

REFERENCES:
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