

## A SIMPLIFIED TECHNIQUE FOR CHAIRSIDE BONDING OF LINGUAL RETAINER



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The purpose of this paper is to introduce a new simple technique of fixing a lingual bonded retainer in orthodontic finished cases. The aim of the technique is to simplify the clinical steps that orthodontist will go through and to reduce the chairside time. After ideal isolation of the teeth, an arch wire or a long stainless steel twisted ligature wire is placed using tooth separators (spacers) to stabilize the retainer wire during the bonding procedures using light-cured bonding agent to the lingual surfaces of either upper or lower anterior teeth to maintain the result. This technique is practical and effective for both upper and lower arches. It can be carried out at the chair during the debonding appointment without a need for laboratory intervention which will in turn reduce the orthodontist's chairside time.

**KEYWORDS:** lingual retainer, bounded retention, orthodontics, chairside bonding.

### INTRODUCTION

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

There are two types of retainers: a removable and a fixed retainer. They can further be classified into: temporary, semi-permanent and a permanent retainer. 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.<sup>4</sup> The retention phase is initiated after orthodontic treatment completion to prevent orthodontic relapse.<sup>4</sup>

In the last 20 years, two different techniques for bonding fixed retainers have evolved; direct and indirect techniques. Various diameter and alloys' wires are used for this purpose. Indirect method requires an elaborate laboratory procedure for holding the retainer wire on teeth surface for bonding. In the direct method, the retainer wire needs to be prefabricated for accurate fit on the lingual

surface of the teeth. These methods have certain shortcomings inherent in them. To overcome these problems, some new techniques have been developed.<sup>5</sup>

Recent reports have suggested that long-term retention may be required to prevent post-treatment changes and the bonded orthodontic retainer constructed from composite and multi-strand orthodontic wire provides an esthetic and efficient system for maintained retention.<sup>6,7</sup>

The bonded orthodontic retainer constructed from multi-strand wire and composite is an efficient esthetic retainer, which can be maintained long-term. Clinical failures of bonded orthodontic retainers, most commonly at the wire/composite interface, have been reported.<sup>8</sup>

The Hawley retainer is often prescribed by the practitioner for part-time wear during the retentive period subsequent to a program of active maxillary arch orthodontic therapy. The labial bow of this retainer, while engaged, may be subjected to contact forces from sources other than the maxillary anterior teeth. The bow also experiences small deformations during placement and removal of the appliance from the mouth. Potential failures of the bow are: 1) inelastic bending from individual masticatory actions that change its as-prepared shape; and 2) fracture due to fatigue arising from many cycles of removing and replacing the retainer.<sup>9</sup>

Bonded lingual retainers have been shown to be an effective means of retaining aligned anterior teeth in the post-treatment position in the long term. Two basic designs of lingual bonded retainers are currently in use.<sup>10</sup> Bonding of an upper or lower fixed lingual retainer using stainless steel wires of different sizes and shapes is a common orthodontic procedure. The retainer can be

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constructed in a dental laboratory, made at chair side, or it can be purchased in prefabricated form.<sup>11</sup> One of the problems that is encountered with the use of the fixed retainer is that it easily breaks and leads to accumulation of plaque and calculus. Results indicate that the bonded retainer has all the advantages of a fixed soldered retainer, in addition to being invisible. Patient acceptance is excellent, and the failure rate in terms of loose retainers is low. Also, due to retention problems, direct bonding with different types of lingual wire seems to open up a range of promising new possibilities.<sup>12,13</sup>

Orthodontists mostly use the lingual wire soldered to cuspid bands for the fixed lower retainer. With the advent of the new effective bonding materials, many orthodontists prefer to use cuspid-to-cuspid/biscuspid-to-biscuspid bonded retainers to obtain optimal retention of lower anterior teeth both functionally and esthetically. After experimenting with a variety of previous methods, such as the use cotton pliers, ligature wires and silastic trays for the accurate placement and immobilization of a lower lingual retainer during the bonding, it was found that the use of two 1 to 1 1/2 inch pieces of 0.016 inch wires tack welded to lingual wire give the best result. It is more accurate, simple, inexpensive and saves the orthodontist chair time.<sup>14,15</sup>

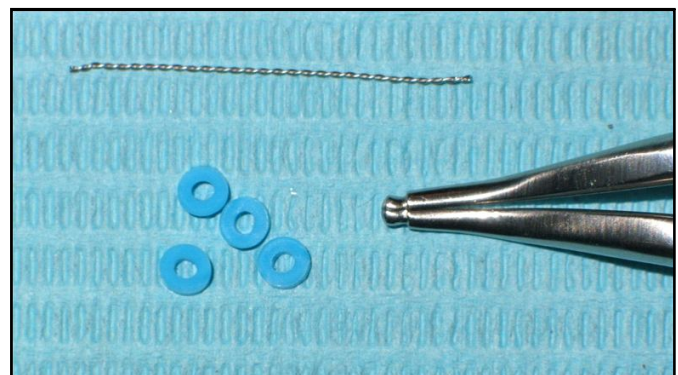
A lingual retainer or splint is noninvasive to dental tissue and is reversible. Wire breakage does not appear to occur, and the slightly elastic properties of the wire allow a physiologic mobility of the teeth, which is of advantage in the periodontal patients.<sup>16,17</sup> Another study to present a simple technique for stabilizing a lingual fixed retainer wire in place with good adaptation to the teeth surfaces and checking for occlusal interferences prior to the bonding procedure was conducted by Al-Emran.<sup>11</sup> The lingual fixed retainer was fabricated using three pieces of .010" steel ligature wire which were twisted into a single strand wire. Another four to five 0.010" pieces of steel ligature wires were twisted in the same way to serve as an anchor wire from the labial side of the teeth. The retainer wire was bonded using the flowable composite.

The technique presented here for stabilizing the retainer wire prior to bonding provides good stabilization, adaptation, and proper positioning of the retainer wire while eliminating contamination of etched surfaces which might occur during wire positioning before bonding. This technique also allows the clinician an opportunity to check the occlusion and adjust the retainer wire to avoid occlusal interference prior to bonding maxillary retainers. This same clinical strategy can be used to stabilize wires for splinting periodontally affected teeth and traumatized teeth.<sup>11</sup>

The purpose of this paper is to introduce a new technique of fixing the lingual bonded retainer at the chairside without the need for laboratory procedures or prefabricated wires. The technique describes step-wise placement of a lower bonded retainer. A Few minutes' procedure will be better accepted by the patient in comparison to a fixed appliance bonding. This is also preferable to spending 30 or 40 minutes on an old bonding technique.

## MATERIALS AND METHODS

To construct the retainer, the following material and instruments are required (Fig. 1):



**Figure 1.** Orthodontic Materials Used for Bonding.

1. 0.0175 Respond® arch wire or long stainless steel ligature wire
2. Band separators
3. Light-cure bonding kit
4. Ligature cutter
5. Non cutting edge fissure bur
6. Finishing bur
7. Amalgam condenser

## Chairside Steps of Retainer Construction

1. To prepare the ligature wire, hold two or three strands of 0.010 (3M Unitek Inc, USA) stainless steel ligature wire together at both ends with mosquito forceps or use 0.0175 Respond® (Ormco, USA) arch wire. Then twist the strands into a single wire and bend the wire into a gentle curve and cut the desired length (Fig. 1).
2. Isolate the arch using cotton rolls and slow salivary ejectors and retract the lips using a lip retractor (Amercian Orthdotnics, USA)
3. Clean the lingual surfaces of the teeth with pumice (Reliance Orthodontics Inc, USA), rinse

- with water and dry it.
- Pass the band separators through the contact points between the canines and between the lateral incisors and the central incisors (Fig. 2).



**Figure 2.** Band Separatos Placed Through The Contact Points.

- Pass and adapt the measured wire, above the cingula, between the band separators and the lingual surface of each tooth (Fig.3).



**Figure 3.** Adapted Wire Placed Above the Cingula, Between The Separators and The Lingual Surface of each Tooth

- Acid-etch (Etchant Gel, Reliance Orthodontics Inc, USA) the lingual surfaces that are to be bonded for one minute. Rinse and air-dry them until they appear chalky.
- Apply a light-cured bonding agent (Maximum Cure Sealant, Reliance Orthodontics Inc, USA) to the lingual surfaces and activate it with a light source.
- Add the light-cured flowable composite (Flow Tain, Reliance Orthodontics Inc, USA) to the retainer wire and tooth surfaces. A small amount of the flowable composite needs to be placed on the lingual surface of lower canines and subsequently cured. The amount of the flowable composite should be enough to cover the wire only in the middle of the crown and not all the way

- along the crown surface
- Light-cure each tooth for 40 seconds to achieve a final set of the composite (Fig.4).
- Remove the band separators.
- Polish the retainer wire and remove the excess adhesive with the non-cutting edge fissure bur (Brasseler Inc, USA); smoothen the surfaces with the finishing bur (Brasseler Inc, USA) (Fig.4).



**Figure 4.** Finished Procedure After Bonding of the Wire

#### Post Debonding Instructions

- Instruct the patient to avoid biting on hard foods with the incisor teeth during the first three month of retainer fixation.
- Maintain good oral hygiene in the lingual surfaces around the retainer.
- Patient should report to the clinic immediately if the retainer gets loose.

#### DISCUSSION

A successful retainer is one which 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.<sup>12</sup> A retainer bonded to the lingual surfaces of the mandibular canines (3-3 retainer) is a widely used type of retention. The 3-3 mandibular lingual stainless steel retainer (bonded to the canines only) is effective in preventing relapse in the mandibular anterior region in most patients, but a relatively high percentage will experience a small to moderate increase in mandibular incisor irregularity.<sup>18</sup>

Most orthodontists placed a bonded retainer in the upper and lower arch, except when the upper arch was expanded during treatment or when extractions were performed in the upper arch, in which case they placed a removable retainer. Opinions varied with regard to how many hours the removable retainers should be worn and the duration of the retention phase. Contraindications for bonded retainers were given by 96% of the orthodontists, with

poor oral hygiene being the most commonly mentioned. As far as bonded retainers were concerned, 84% of the orthodontists preferred permanent retention. Fifty-nine per cent of the orthodontists believed that a practice guideline for retention after orthodontic treatment needs to be developed, which was confirmed by the varied responses in this survey.<sup>19</sup>

Bonded retainers have become a very important retention appliance in orthodontic treatment. They are popular because they are considered reliable, independent of patient cooperation, highly efficient, easy to fabricate, and almost invisible, and that bonded retainers are applicable for both mandibular and maxillary anterior teeth. Reliability is of prime importance among all these advantages. In a clinical study; a total of 549 patients with retainers were analyzed with regard to wearing time, extension of the retainer, mean time between failures, operator, and age of patient. The average frequency of breakage or loss was 0.55 per retainer per year. This frequency was dependent primarily on the operator who bonded the retainer and on the extent of the retainer. If the upper canines were involved, reliability was lower. The majority of failures occurred during the first 3 to 6 months. The study showed that bonded retainers represent a highly efficient and reliable retention appliance suited to long-term use.<sup>20</sup>

No studies have shown any adverse dental health effects from the long-term placement of lingual bonded retainers.<sup>6</sup> Long -term clinical evaluation of this type of retainer is needed in order to know its positive and negative aspects. The lower fixed bonded retainer require regular annual check-ups. This responsibility can often be passed on to general dentists to look after the bonded retainers.

The possible advantages of the new suggested technique of fixing the bonded retainer are:

1. It does not require any laboratory procedures, and is a total chair-side procedure
2. It is painless, so patient cooperation is likely to be high.
3. It is time-efficient
4. It is low-cost

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