INNOVATIVE
Indirect Bonding Approach to Lingual Fixed APPLIANCE THERAPY

This article will review the advantages of indirect bonding using a 2D lingual bracket system, as well as establish efficient and effective treatment protocols. Upon completion of this article the dental professional will be able to:

1. Understand the basic advantages of indirect bonding as well as lingual fixed orthodontics
2. Apply efficient/effective indirect bonding techniques
3. Meet the aesthetic concerns of patients by providing lingual fixed orthodontics as a viable treatment alternative

Introduction

Consistent with the aesthetic trends in society, “invisible” orthodontics is becoming more and more desired by both adult and adolescent patients. In contrast to aesthetic ceramic or plastic brackets, lingual orthodontics is completely invisible. Lingual braces deliver both patient satisfaction and a clinically excellent result.1

Although orthodontic therapy traditionally addresses long-term aesthetic concerns of the patient, aesthetic

Impairments such as sub-surface enamel lesions (white spot lesions) are common risks of fixed orthodontic treatment. Regardless of the preventive therapy efforts taken to reduce labial enamel decalcifications, such impairments are a common outcome of treatment and difficult to reverse with conservative measures. With lingual fixed orthodontic therapy, decalcifications have no negative aesthetic outcome.

In addition to providing an aesthetic alternative for fixed orthodontic treatment, lingual braces also offer a unique mechano-therapeutic advantage. Even though lingual orthodontics is particularly known as advantageous in expansion and bite opening cases, it is also effective in many other complex cases. Considering that a lingual archwire is approximately one-third the length of a labial archwire, in applying a linear stress/strain behavior model, it makes sense that a shorter wire is more compressed and can offer a greater corrective force.

Bite opening is another great advantage of utilizing lingual braces. While bite opening is rarely successful with a labial continuous archwire, lingual braces can open the bite immediately. The placement of the maxillary lingual brackets acts as a stop and opens the bite. The posterior open bite closes shortly after.

Just as traditional labial orthodontics require careful placement of the bracket, so does lingual orthodontics. More specifically, an engaged lingual bracket is typically closer to the center of resistance. It is therefore essential to consider the difference in moment force generated from lingual bracket placement versus labial placement.

There are many types of orthodontic brackets to choose from when using fixed orthodontic therapy. However, when you consider a cost-effective bracket that is easy to use and comfortable for the patient, many would agree that the Forestadent 2D Lingual system is a leading bracket. Due to its extremely flat and smooth profile, the Forestadent 2D Lingual bracket provides an excellent clinical result all while promoting patient compliance.

Although indirect bonding is a common technique used in lingual orthodontics, the new, innovative, indirect mold presented in this article possesses unique properties that help minimize bracket failure during clinical removal of the stent. In contrast to a more rigid traditional indirect stent, which might shear the bracket away during clinical removal, this new flexible mold can be inverted and peeled away without compromising the bracket bonding.

In conclusion, lingual brackets provide an entirely aesthetic alternative without compromising a lasting aesthetic impairment, such as labial decalcifications. By treating with an indirect bonding technique, the dental professional can ensure a more accurate bracket placement. Using indirect bonding is not only easier on the patient and the dental professional, but also facilitates a more efficient and effective treatment process.

Lingual Brackets – Indirect Bonding Protocol

Placing lingual brackets using indirect bonding techniques takes place in three stages:

1. Pre-Laboratory
   a. Take quality alginate impressions

2. Laboratory
   a. Prepare casts
   b. Place brackets
   c. Apply PVS
   d. Apply Thermo-Polymer
   e. Remove and trim indirect molds

3. Clinical
   a. Prepare patient
   b. Prepare teeth
   c. Prepare indirect mold
   d. Place indirect mold and light cure
   e. Remove indirect mold
   f. Remove flash
   g. Place archwires, ligatures, etc.

Stage One, Pre-Laboratory

Take quality alginate impressions and prepare armamentarium. Although two items (*) are relatively expensive, a very small amount of the material is used. This is an extremely cost-effective method.5

Armamentarium (Fig. 1):
- Gloves
- Pencil
- Bracket gauge
- Separating medium
- Dappen dish
- Brushes
- Instruments (bracket tweezers, explorer and scissors)
- Forestadent 2D Lingual brackets
- Bracket composite
- Composite gun
- Curing light
- PVS material (clear)*
- PVS gun
- PVS adhesive
- Thermo gun
- Glue sticks
- #15 scalpel
- FlowTain*

Stage Two, Laboratory

Prepare Casts:

Placing lines along the long axis of the tooth will help with accurate bracket placement. It is helpful to continue the lines along the soft tissue aspect of the cast. Next, using a bracket gauge, mark the appropriate inciso-gingival distance per figure 2. After the lines are drawn on the cast, apply a thin layer of Liquid Foil Separator to the lingual aspect of the casts (Fig. 3).5

Apply composite and place brackets in appropriate positions on the lingual aspect of the casts. Remove excess

Bracket Placement: (as measured from incisal/occlusal edges)

| Upper CI: 4.0mm |
| Upper LI: 3.5mm |
| Upper CA: 4.5mm |
| Upper premolars and molars: height of marginal ridges |
| Lower CI: 4.0mm |
| Lower LI: 4.0mm |
| Lower CA: 4.5mm |
| Lower premolars and molars: height of marginal ridges |
Stage Three, Clinical

Prepare the patient, indirect mold and teeth; light cure, remove mold and flash.

Organize required armamentarium:

- Gloves
- Indirect molds
- Etch
- Bond
- Brushes
- Dri-Angles
- Composite gun
- Bracket composite
- Curing light
- Scissors
- Basic instrument kit
- Pumice
- Cheek retractors
- Floss

First, prepare the indirect mold by wiping the bonding surface with acetone. Note that there is no need to micro-etch or sandblast the brackets. Once the indirect mold is ready, prepare the patient. Place Dri-Angles adjacent to parotid duct in buccal vestibules to decrease contamination via saliva. Next, place check retractors in the patient’s mouth to increase the working field. In order to minimize saliva contamination, it is important to prepare only one arch at a time. Place etch on one
arch following manufacturers guidelines. Next, rinse and dry. Apply bonding agent to arch following manufacturer’s guidelines. Air thin and cure bonding agent for 10 seconds. With the indirect mold bonding surface already wiped with acetone, working quickly, place a small amount of FlowTain (flowable). Do not use regular composite as it will lead to excess flash (Fig. 7).  

Carefully place the mold in the patient’s mouth. Do not press hard on the lingual surface while adapting the mold intra-orally. The mold should fit perfectly onto the teeth. Light cure for four minutes with the mold in place. Be sure to light cure from both positive and negative angles. After ensuring placement of the lingual V-notch, gently remove the mold from the labial aspect of the teeth by inverting the mold “inside-out” (Fig. 9). After the labial side is inverted, peel away mesially or distally the lingual aspect.  

If this technique is applied, bracket failures during clinical removal of the stent should be minimal to none. Light cure the brackets again to ensure complete bonding. With the lingual brackets now firmly positioned, it is possible to remove any excess flash that might be present around the brackets. Using the Transbond LV allows for minimal to no flash (Fig. 8).  

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**Author’s Bio**

Dr. Marco Pinto, a native of South America, moved to the U.S. to attend college, dental school and to specialize in orthodontics and dentofacial orthopedics. The focus of his practice is the application and advanced study of lingual braces. Dr. Pinto has held teaching positions at University of Kentucky College of Dentistry and the Orthodontic Graduate Program at The Arizona School of Dentistry. He is Director of the Pre-Doctoral Orthodontic Curriculum and the Orthodontic Rotation Program. With an outstanding commitment to community, he founded the Hispanic Dental Student Association (Bluegrass Chapter) and is currently working with the YMCA on a mentorship program for minority students. Contact Dr. Pinto at marcopinto77@gmail.com.