LABIAL / BUCCAL INDIRECT BONDING:
A NEW MANUAL METHOD

ABSTRACT:

With the advent of more and more CAD / CAM techniques and ever increasing costs for the Orthodontist, we at ‘Precise Indirect Bonding Systems’ and the Torque Angulation Lab have been using our instruments to transfer our knowledge and ‘in-tendo” techniques to Labial IDB. Using the T.A.D and B.P.D instruments we are able to do a manual IDB technique which can customize Tip and Torque via the composite pads (with relation to the crown morphology), so any bracket system can be used and customized to the patients requirements.

KEY WORDS:
Labial Orthodontics, Indirect Bonding. HOL, Morphology, Tip and Torque, Angulation and Brackets

Labial indirect bonding has been around for a long time. Some people love it and some hate it. Some Orthodontists still have difficulties with it or find it unreliable especially with brackets coming off the teeth at the most inconvenient times. The challenge has been not just to get the brackets in the right position, but also been the transfer of the brackets to the mouth. With the introduction of new adhesives this is now much easier and demand for labial indirect bonding is on the increase.

The old laboratory technique known as by “Eye and Hand” is the one generally used by technicians when setting up brackets on plaster models. The doctor or technician marks the long axis lines on the model, and then using a ‘Bracket-positioning Gauge’, marks the height bisecting the axis line for each tooth. The height depends on that required for the individual treatment plan, or follows a recommended bracket positioning chart such as the one by Andrews / MBT, etc. Using the boon gauge reduces errors in vertical positioning to a certain degree.

The Brackets are then positioned using tweezers so the bracket wings are parallel to the long axis of the tooth. Depending on the method required the brackets are adhered to the model using a water-soluble adhesive, denture wax or a composite resin. If wax is used it should be as thin as possible, but this can be removed easily removed by placing the tray in warm water and then using steam to clean away all residue.

The height is re-checked using the Bracket Positioning Gauge. When all the brackets have been placed on the model a separating medium painted onto the occlusal and lingual surface of the teeth in preparation for the transfer tray, this can be pressure formed or various types of silicones can be used.

The New Technique, Using the TAD and the BPD technology for improved accuracy.
The difference being with the “In-tendo” technique is that precision instruments are used to determine accurately the position of the slot with relation to the tooth. Using direct bonding or indirect via “eye and hand” lab techniques, we cannot be sure that the bracket we have placed will be delivering the required slot values stated on the prescribed system. For example an MBT 17 degree Torque and 4 degree Tip, could well be at different angles because we just cannot really check such a small slot with our eyes. There have been studies to show that the Torque can be up to 20 degrees out on Central incisors due to the morphology of the teeth. Torque errors will cause height errors to varying degrees depending on the amount.

Using the TAD (Torque and Angulation Device) and the BPD (Bracket Positioning Device) we can eliminate these errors and place the bracket at the values we would like, including any compensation values.

If the right pre-programmed brackets are selected then the amount of composite to customize the built in tip and torque in base is minimal. This will be discussed later.

The step by step techniques:

1. Prepare the models in exactly the same way, but for increased precision check the HOL using the adjustable survey base and the BPD. The Horizontal Occlusal Line as described by Andrews or HOL for short hand, is the imaginary occlusal plane achieved by taking three reference points. Because we often deal with gross malocclusions it is often difficult to get the model base parallel with the Occlusal plane by using the model trimmer. It is helpful then to measure the first two molars for crown height and bisect this value from the occlusal edge with a mark. Do the same for the two centrals and then get the average of the two. This gives us three reference points with which to balance on a survey table to the same level. Either scribing a line around the model base and grinding back on the trimmer, or using a jig to hold the model whilst a new plaster base is made that is parallel to the HOL, thus having a good reference point for the bracket positioning procedure.

2. Once the HOL is determined you can use a jig to make a new plaster base which is parallel to the HOL. Then all of the FA points are marked for teeth to be bonded, so the TAD is referenced to the same point for each tooth thus eliminating errors in torque due to morphology.

3. Using the TAD and the adjustable survey base we align each tooth according to the prescription for torque and angulation. This is exactly the same method as used in the lingual technique.

4. Once the tooth to be bonded has been set in the desired position with relation to torque and angulation and the HOL, then we can transfer over to the BPD for bracket positioning using the horizontal or vertical slot bracket holders to the prescribed height.

   ** The accuracy of the BPD is 0.01mm and will not move more than 0.02mm whilst bonding the bracket to the model. It will hold the brackets exactly perpendicular to the setting of the TAD **

5. The bracket is placed in the sprung jaws of the holder and offered up to the model to check the positioning before fixing in place with light cured resin such as ‘Tansbond XT’ from 3M.

6. Using the light-curing unit, the bracket is fixed and then the procedure repeated for every tooth.

   ** The advantages of using a light cured resin pad are mainly that the programming is set into the pad and therefore the accuracy of the slot with regards to the axis can be better controlled, and the Orthodontist does not need to use so much bonding material, thus saving time and money!**

Sometimes with under erupted teeth and badly inclined it can be difficult or impossible to use the TAD and BPD (such as last molars) and it is recommended to use the jig system and/or judgment of the technician.

7. The transfer tray system is done as described in the pictures using a hard resin key and Memosil silicone.

There are advantages of system over that over vacuum or pressure forming for the following reasons:

There seems to be less risk of moving the bracket positions whilst the tray is formed.

Also the tray is more stable with its hard resin locator keys for accurate positioning and especially when it is sectioned.

It can be sectioned down to individual units with ease using a scalpel blade, so therefore re-bonding is easy. Clear vision and numbered teeth all help for ease of placement.
Also for teeth that will need the brackets re-setting such as palatally placed laterals, we can place the first brackets with negative crown torque to move the roots out and then have the final brackets prepared in individual transfer trays with our desired torque, angulation and height for the final alignment, thus removing some of the ‘guess work’.

The use of the TAD and the BPD make labial indirect bonding easier and far more accurate than the traditional method and is a great way to learn bracket placement.

Torque and Angulation using TAD. Exact readout via digital display.

Lines are drawn on model as described.

Alternate view of TAD

Torque and Angulation are referenced with the Torque and angulation Device. TAD

Transfer of Torque and Angulation to the Bracket placement Device. BPD
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Using the Bracket Placement Device BPD to position Brackets.

Using the BPD for the bicuspid.

Close-up of BPD

Close-up of bracket position test.

Brackets are accurately placed using BPD

Adding light cure custom base material to bracket.
(Transbond)
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Clean up the custom base.

Completed bracket placement.

Using hand held light to cure.

Area marked for Light Cured Blockout

Bracket in Place.

Paint on separator
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Apply light Curing LC- Blockout (Ultradent)

Adding mechanical retention.

Blockout to cover incisal edge and occlusal surfaces.

With hand held light while adding retention.

Add tooth number identification.

Light cure hard key gives stability to transfer tray.
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Memosil Clear Silicone

Fabrication of silicone transfer tray with Heraeus Memosil.

Leave for about 10-15 Minutes then rinse with cool water.

Use compressed air to ease from model.

Use a small amount of washing liquid and work with fingers. This prevents the Memosil from sticking to your fingers.

Trim tray
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Posterior

Gently prise from model.

Trim Lingual

Removed from the model.

Trimmed transfer tray.

Light cure again from the inside.
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This is I believe the aim of the new CAD / CAM systems such as Insignia, from Ormco, Harmony from American Orthodontics, and was the basis for the famous lingual technique called Incognito.

However all of these systems increase the total price of the treatment plan by high lab prices.

How do we determine the values we might need, such as central torque? Can we measure the teeth for real values with regards to the occlusal plane (OP) or HOL?

Yes with the TAD or Ray-Set we can get a pretty good idea and then measure the values of the finished set-ups, to compare movements required.

Another good reason for a diagnostic set-up is so we determine what is possible and what is not. We can do IPR on the model to see the outcome of centre line, OJ and OB, not to mention aesthetics with regards to shape and contact points, then you can present your goal to the patient.

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Discussion:
Question: If the right brackets are selected? This is the big question for many orthodontists as there are many bracket systems out there and in the words of a prominent Indian Orthodontist…”the salesmen are becoming the gurus of orthodontics”.

Sometimes we just need to return to basics and the mechanics that were, and are taught in many faculties around the world. In fact there is a returning trend on the “return to basics” ideas and many orthodontists, including lecturers are going off for courses to refresh. It’s a bit like engineering in the mouth and that’s maybe why I seem to pick up quickly the ideas of; forces, levers, tip, torque, etc. This combined with the dental knowledge learned at dental school should give most orthodontists the tools to evaluate cases and pick brackets not according to their name, but rather the values and efficiency built into them. So base to slot angles depending on amount of torque needed AND the tooth morphologies. Slot types and sizes depending on the mechanics used, self-ligating, low friction, etc… but remember when a tooth is tipped it will have a friction with the wire at some point no matter if the corners of the slot are angled, it just depends on the amount of tip!

This brings me to another point: If the patients are all individuals and the teeth are all different how can one system and set of values work for all? Surely the only way to get the correct bonding values is to do a diagnostic set-up and then base the slot values on the values of the set-up, with allowances for over corrections, tip backs, torque loss, etc.