ORTHODONTIC SPECIAL CASES BEST TREATED WITH SIMPLE INDIRECT BONDING PROTOCOL

Shazia Naser-ud-Din PhD, MSc, BDS, DPHDent, FICCDE, DCPSP-HPE
Brisbane School of Dentistry

Orthodontic treatment methodology has evolved considerably in the past few decades and much of technological advances are definitely improving the efficiency and delivery of orthodontic treatment, but come at a higher cost. One such example is the commercial indirect bonding.

Indirect bonding (IDB) even though has been introduced for over 3 decades is underutilized\(^1\). It has several benefits however the added cost and time to deliver the transfer trays has deterred many Orthodontists to establish it as a routine in practice. Commercial costs are generally excessive and cost benefit ratios low for the clinic. However, many Orthodontists are devising simple clinic procedures that would allow easy application of indirect bonding\(^2\).

Most important aspect of IDB is for those who benefit from less chair time such as medically compromised cases like ADHD (Attention Deficient Hyperactivity Disorder), Cerebral Palsy, CLP (Cleft Lip and Palate) and sailorrhoea cases to name just a few. New techniques for IDB are continuously evolving. Numerous methodologies have been cited. Historical methodologies cited in the literature are the Thomas\(^3\) and Hickham\(^4\) techniques, the flexible undertray by Moskowitz et al\(^5\) and the contemporary Sondhi technique using 3M-Unitek APC brackets\(^6\) and adhesives which need to be chemically cured and have a relatively short working time.

In this paper a clinical case that was treated with IDB from the protocol adopted at the Brisbane school of Dentistry is show cased for efficiency of treatment and minimal finishing requirements due to precision of bracket positioning by indirect bonding method. Secondly, IDB protocol is discussed in detail for interested readers to apply in their own clinical set up.

DISUSSION

A young male patient aged 12 years was referred by a school dentist due to insufficient space for the eruption of 13, 23. He also had ADHD diagnosed since the age of four, and was on regular medications (Retalin\(^*\) daily) and the mother reported low pain threshold. Habit of nail biting was evident too.

As he suffered from ADHD (Attention Deficit Hyperactive Disorder) was anxious in the chair and did
not like sitting still for too long. This affected the initial consult (hence poor quality intra oral photographs). However, over a period of time he did acclimatize to us and was very friendly and open. Special precautions were made such as first appointments in the session so that there was no waiting period that could aggravate the anxiousness. Secondly indirect bonding (Brisbane Orthodontics protocol) was done to reduce the chair side time at the bond up appointment. Such measures not only enhanced patient cooperation but ensure efficient treatment due to less wire bending in finishing stages.

He had mild skeletal II base with average facial proportions. At the time of examination presented in late mixed dentition with moderate maxillary and mandibular crowding and Class I molar relationship bilaterally. On expressive smiling 1mm of gingival show with upper midline 1mm to the right and lower 2mm to the left due to labially excluded 33 in the mandibular arch. Radiographic examination revealed potentially impacted 13 in sector 1 and 23 in sector 3 placed within the line of the arch. 27 eruption was obstructed by a developing tooth follicle - which could be odontome or the ectopic 28.

The aim was to keep the treatment time to the minimum with least number of visits. Hence, non-extraction treatment with 0.022x0.028” slot MBT (Victory Brackets) were placed by Indirect bonding protocol to save chairside time and alleviate anxiety in the patient.

On previous appointment, impressions with molar bands in situ were taken for fabrication of TPA (Trans Palatal Arch). Total treatment time was 18 months, primarily due to the delayed eruption of bilateral upper permanent canines. Number of visits and summary is provided in the table.

The pretreatment weighted PAR was 28 and post treatment 0, with 100% improvement. Both patient and mother were thoroughly satisfied with the treatment. It was indeed gratifying to see him settle well into our clinic through the treatment duration.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 March 2011</td>
<td>Impression for IDB and TPA</td>
</tr>
<tr>
<td>2 April 2011</td>
<td>0.016”NiTi lower &amp; 0.018” NiTi upper lace back all 4 quadrants. OHI given.</td>
</tr>
<tr>
<td>3 July 2011</td>
<td>0.020” SS upper with activated compression coils and lig ties on 14,24. Lower 0.016x.022” CuNiTi. NV 0.017 x0.025S/S lower and commence bite opening waiting for upper 13, 23 to erupt. Good progress OH improved.</td>
</tr>
<tr>
<td>4 Oct 2011</td>
<td>Increased curve of spe in lower 0.017x0.025”SS and undertied 3-3. Continued upper archwire with compression coils maintaining space for upper permanent canines.</td>
</tr>
<tr>
<td>5 Dec 2011</td>
<td>Rebonded 35, and bonded 13. 0.018NiTi upper and 0.017 x0.025”TMA lower.</td>
</tr>
<tr>
<td>6 Jan 2012</td>
<td>OH had gone down again OHI given. 0.017x0.025” CuNiTi upper and lower with compression coil for 23.</td>
</tr>
<tr>
<td>7 March 2012</td>
<td>OH improved placed 0.019x0.025”SS lower and 0.018x 0.025”CuNiTi upper with soft sleeve.</td>
</tr>
<tr>
<td>8 April 2012</td>
<td>Bonded 23 and 0.016”NiTi upper and lower religated the 0.019x0.025”SS.</td>
</tr>
<tr>
<td>9 June 2012</td>
<td>Good progress placed 0.017x0.017” CuNiTi upper</td>
</tr>
<tr>
<td>10 Aug 2012</td>
<td>Removed the TPA and commenced finishing. Oral surgeons opinion sought for the 27 possible impaction. To keep under observation.</td>
</tr>
<tr>
<td>11 Sep 2012</td>
<td>Placed 0.016”SS upper with finishing bends distal root rotations for 22 &amp;23 with extrusion for 23 and intrusion for 14. Class II elastics 1/4” 4.5oz (ORANGE) all time.</td>
</tr>
<tr>
<td>12 Oct 2012</td>
<td>Debond, scale and clean with lower bonded retainer canine to canine and upper and lower Hawley retainers.</td>
</tr>
</tbody>
</table>

Impacted canines need attention as when space is deficient it retards the eruption or completely prevents it. In the latter case it may lead to cystic changes over a period of time. With growth potential on our side.
resulting in shorter treatment time. Non-extraction treatment was possible as the patient was in active pubertal growth spurt.

Although there was crowding, extractions of upper first premolars would provide the space for upper canines. However, that would lead to excessive space with anchorage burning and Class II molar relationship not the ideal scenario. Not to mention it would prolong the treatment time and every effort was made to keep the treatment time shortest possible and least complicated treatment methodology (medical history).

Generally assisting impacted canines into the arch is anchorage demanding. Simple TPA would reinforce the anteroposterior anchorage to maintain class I molar relationship. TPA was removed after alignment of 13, 23. TPA is more user friendly as compared to Nance button or the head gear in the experience of the author.

**IDB Brisbane Orthodontics Protocol**

Indirect Bonding (IDB) Brisbane Orthodontics Protocol has fewer steps with cost effective materials. Low failure rate leads to predictable results. Steps to be followed to ensure success are as follows:

1. Use high quality recent alginate impressions of upper and lower arches poured immediately in cast plaster stone (colour contrast preferred for aesthetic brackets). The casts should be free of voids and bubbles. Use brackets of choice onto the plaster model with UHU stick (GmbH&Co, Bühl, Germany). Apply sparingly on the base and attach to the predetermined long axis position at the centre of the clinical crown (Fig 3). Let it dry for couple of hours. The UHU adhesive is viscous and allows for placement of the bracket with no drift.

2. Clear PVS (PolyVinylSilicate)-Memosil* is applied evenly over the model (Fig 4). The PVS should extend for a few millimetres all around the brackets and conformed into a transfer tray. Memosil* has a relatively short working time which can be extended by refrigerating prior to use. Fingers dipped into soapy water allow the tacky material to be molded over the arch easily. Let the tray set for 5 minutes. Soak in lukewarm water for 5 minutes to soften the adhesive. Peel it off like a banana peel from one end of the arch to the other with gentle pressure. Follow the path of least resistance and ensure that all brackets have successfully been transferred onto the tray. Immerse in warm water (Fig 5) for couple of minutes and wash off the UHU under running warm water or use a triplex to clear away any remaining glue. The bracket bases should now appear free of any residue.

3. Dry the tray and bracket bases thoroughly prior to bonding. Application of the composite adhesive is a “critical technique”. It is easy to apply excessive amounts of composite and be faced with a lengthy cleanup which is counter productive. Train your supporting staff for the protocol prior to the procedure. Firstly, apply a flowable bonding agent onto the bracket bases. Use Ortho Solo** as it has highest viscosity due to its increased filler content. Recent studies indicate that it produces high bond strength. A small amount of bonding adhesive (Transbond ™) is applied to the bracket base (Fig 6). Minimal adhesive is required. The Transbond™ is then lightly pressed onto the bracket with a microbrush dipped into Ortho Solo™ to ensure the bracket base is well covered and...
that the mesh base is engaged by the adhesive.

4. Pumice, etch, wash and isolate the teeth. Place the tray avoiding excessive force as it may distort the tray and lead to inaccurate bracket placement. Immediately light cure (Ortholux LED ****) for 12 seconds in the left and right posterior sections and in the mid anterior section (Fig 7). Three point curing assists in stabilizing the tray after which the individual brackets can be cured for 12 seconds each without supporting the tray to ensure thorough curing. Peel off with similar maneuvers as on model (Fig 8) or use periodontal scaler to lift it off. If severe undercuts or rotations present, the tray can be sectioned in-situ to remove it with ease.

5. Ensure no bonding has occurred interdentally by floss check. Excess bond may occasionally appear that can be removed with tungsten bur at chairside.

*MemoSil™, Heraeus Kulzer GmbH, 300 Heraeus Way, South Bend, IN 46614; www.heraeus-dental.de.
**Ortho Solo™ (Ormco, Sybron Dental Specialties, Orange, CA).
*** Transbond XT™ 3M ESPE, St Paul, Minn USA.
**** Ortholux™ Luminous curing light (3M Unitek, 2724 South Peck Road, Monrovia, CA 91016 USA).

CONCLUSIONS

The Brisbane Orthodontics IDB protocol has been used successfully at the Postgraduate program at UQ since 2010. It allows a novice operator to be confident especially in the initial set ups. Hence, it is a vital teaching methodology where the operator can get a supervisor to correct bracket positions prior to placement in-situ. Among other advantages such as efficiency of time, cost effectiveness and reduced chairside time, the author has found its major utility with special need cases where bonding stage can be laborious and unpleasant experience for the patient. With University of Queensland tertiary care clinic special cases are seen more often and hence IDB has been valuable in treating such cases. The method is certainly technique sensitive and proper coordination with staff is essential for predictable successful results.

ACKNOWLEDGEMENTS

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REFERENCES

3. Thomas RG. Indirect bonding: simplicity in action.