

REVIEW ARTICLE***INDIRECT BONDING - The Ultimate Technique, A Review.***Yukti Raj¹, Pradeep Tandon², Gyan P Singh³, Abhay K Das⁴**Abstract:**

Newman, an orthodontist from New Jersey introduced bonding of brackets to enamel in orthodontics. Correct bracket positioning will lead to correct final tooth positioning. Bonding can be done in two ways - Direct and Indirect. Indirect bonding was first introduced by Silverman and Cohen in 1972. The soul of indirect bonding is correct bracket position and tray fabrication. While the bracket positioning is in our hand, the tray material which is available in the market are either too costly or not that easily available. So, to fulfill this purpose thermal glue is used to fabricate the tray for indirect bonding. Bonding can be done in a single go with a single tray for the whole arch(mild crowding or non-crowded) or can be done in sections by making 3 trays for an arch(moderate to severe crowding). This technique can also be used for lingual orthodontics.

Key words: Indirect bonding, sectional tray, precision bonding, ultimate bonding, sectional bonding.

Introduction

It is a technique in which orthodontic brackets or other attachments are transferred from working models and bonded onto the dentition using a transfer device.¹ It was first introduced by Silverman and Cohen in 1972 while direct bonding was introduced for bonding of orthodontic attachments in 1965 by Newman.² The limitations of direct bonding technique made clinicians to think of the other way.

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Limitations Of Direct Bonding

1. Limited access to the surfaces of malaligned teeth.
2. Increased doctor chair time.
3. Greater possibility of moisture contamination.
4. Poor visualization of posteriors.

By Indirect bonding, clinicians had many **advantages**³ like –

1. Enhanced chair time savings.
2. Better use of office time.
3. Bands on posterior teeth not required.
4. Improved ability to bond the posteriors.
5. Resin thickness between bracket and tooth better controlled – better expression of built-in prescription.
6. Better visualization.
7. Improved patient comfort and hygiene.
8. Less stressful.

There are many methods for Indirect bonding, amongst which SONDHI METHOD⁴ being the most popular. Indirect bonding is also made easy through CBCT scanning.⁵ This article will be describing a newer and simplified approach for indirect bonding, which is named as THE

ULTIMATE TECHNIQUE

It is divided into following-

- a) Lab procedure
- b) Chairside procedure

Tray Material

Most of the Indirect bonding techniques that have been developed, included opaque silicone (Exaflex Very High Viscosity Putty), translucent silicone (Memosil), and thermoplastic materials (Bioplast, Bioplast and Biocryl)⁶. White⁷ proposed the use of an inexpensive thermal glue to create the matrix of the transfer tray. The tray material (fig-1) used is a form of thermoplastic adhesive (FDA approved) that is commonly supplied in solid cylindrical sticks of various diameters, designed to be melted in an electric hot glue gun.



Fig -1 ; Glue gun with Glue stick

Lab Procedure (Fig-2, 3,4)

It involves 3 steps –

1. Cast preparation and bonding
2. Wax-up
3. Tray build-up

1. Cast Preparation and Bonding (fig 2)-

The model obtained after impression should be free of any porosity. The following steps are followed-

- a. The model is marked according to the prescription planned .
- b. A uniform layer of cold mould seal is applied and allowed to dry.
- c. Minimal amount of composite on the bracket base is put with the help of reverse twizzer. Excess flash if present, is removed with explorer.

- d. The brackets are cured for 10 seconds with LED curing light.



Fig-2; Cast Preparation and Bonding

1. Wax-Up (fig 3)

According to the requirement of the clinician- single tray for an arch or a sectional technique involving at least three trays for an arch should be planned. For the sectional technique, steps are as follows-

- a. A thin layer of a wax roll is prepared which is about 3mm thick and is made to stick on the model such that half of the bracket is in the wax and the other half is free. This should be done carefully and uniformly throughout, till the last bracket or buccal tube.
- b. A thin layer of the wax roll is put between canine and 1st premolar bracket bilaterally extending at least 4-5 mm lingually as we tend to make 3 trays for an arch.

If we are making a single tray then this step (b) is omitted.

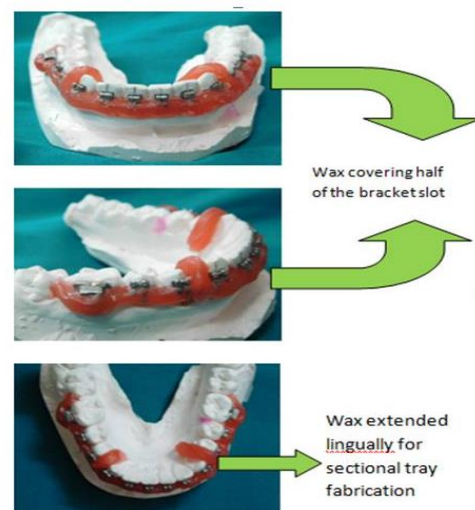
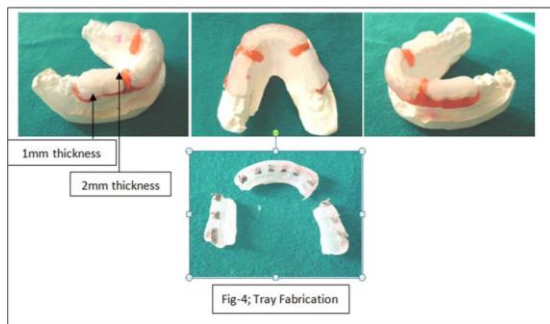


Fig-3; Wax Up

2. TRAY FABRICATION(Fig 4)

Before moving further, the glue gun is preheated for about 5 min. Once heated,

- Very gently, we have to apply a uniform layer of glue all over the model, which is above the wax roll. The thickness in this area should not be more than 1mm(just enough to engage the brackets).
- The glue is further applied incisally or occlusally. The thickness of this glue should be around 2mm.
- The tray is extended lingually 2-3mm in the incisal region.



After the tray is fabricated it is made to cool down for about 2-5 min. Once cooled, the tray will become a little opaque (crystal clear when hot). The model is then dipped in cold water for easy retrieval of the tray from the model. The tray is lifted away from the model starting from one end with the help of a sharp instrument (e.g. explorer). The tray will lift smoothly along with the brackets. The tray is then cleaned by removing any wax traces from the bracket's free end with the help of explorer. Once cleaned, the bracket base area is acetone treated and pumiced very carefully, the tray is ready for bonding.

Modifications

If we need to raise the bite in cases of deep bite then while tray fabrication we can raise the bite with the required thickness of wax over the occlusal surface (covering 2/3rd of the occlusal surface, freeing the buccal cusp area) and then fabricate the tray in the usual manner. Wax extension needs to be removed, and then that trough is filled with composite while bonding.

Chairside Procedure (Fig 5)

- The regular etching procedure is followed.
- Bonding agent is applied all over the etched area and is cured.
- Flowable composite is applied over the bracket base in sufficient amount and brushed and smoothed with bonding agent.
- Once, applied over all the brackets on the tray, the tray is put over on the respective region.
- By applying the LED light from below the brackets (the half of the bracket which is free of the tray material), curing is done. Sufficient curing should be done for about 15-20 sec.
- Once cured, the tray is carefully removed by first loosening the tray with explorer from the gingival aspect. This is done to reduce the grip of the tray from brackets and then the tray is lifted away.
- After removal of the tray, curing is done for 10 more sec.
- The flash, which gets cured, should be removed with the help of a fine tapered fissure bur.

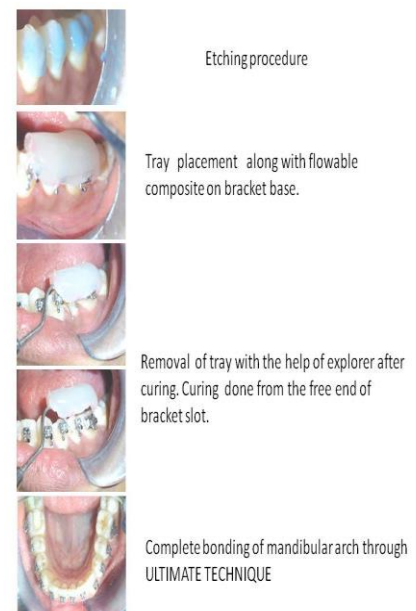


Fig-5; Chairside procedure for Indirect Bonding (ULTIMATE TECHNIQUE)

Full arch tray, reduces chairside time but is difficult to remove while Sectional tray, needs comparatively more time but offers easy removal and more accuracy.

DISCUSSION

ULTIMATE TECHNIQUE offers several advantages over others given in Table below.

<u>OTHER TECHNIQUE</u>	<u>ULTIMATE TECHNIQUE</u>
More complex and technique sensitive	Relatively simple, requires less amamentarium.
Cost of the tray material is high	Most economical.
Material not easily available	Very common and easily available.
Might need two tray material(soft and hard covering)	No hard external covering required.
Adhesives required	No water soluble adhesive required.

CONCLUSION

Indirect bonding is the need of today's practice as it saves chairside time. Also, sometimes it becomes a necessity (lingual orthodontics). With this technique, we tried to make it simpler as it is not that randomly practiced as direct bonding in clinical practice.

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