A New Customized Lingual Indirect Bonding System

RYOON-KI HONG, DDS, PHD
YONG-HWA KIM, DDS
JE-YOUNG PARK

Most of the methods devised for lingual indirect bonding[1,2] have been variations on the technique originally proposed by Hoffman,[3] using a transfer tray fabricated on the working cast. Custom bracket positioning with these techniques requires transferring the brackets from the ideal setup back to the working cast, which makes the laboratory procedure more complex and expensive.

More recently, several indirect bonding procedures have been developed in which individual transfer trays are fabricated on the ideal setup.[4-6] Thus, the customized brackets are directly transferred from the ideal setup to the patient, and the model does not have to be duplicated several times.

In 1996, we introduced a lingual indirect bonding method that used a wire-resin assembly as the transfer tray.[4] We found, however, that the wire part of the transfer tray can be deformed during laboratory and clinical procedures. A new customized lingual indirect bonding system, presented in this article, avoids such deformation by

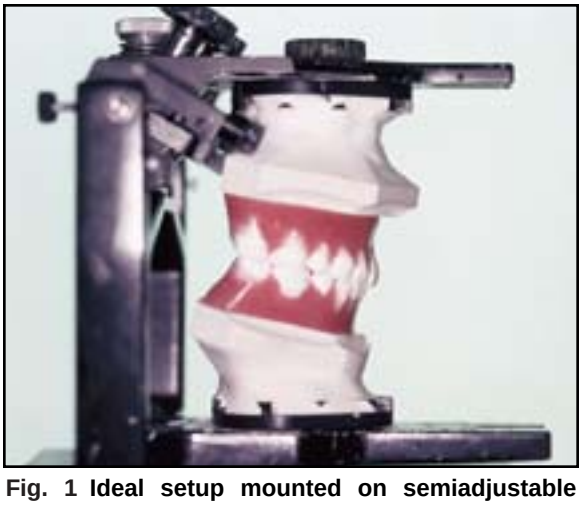

Fig. 1 Ideal setup mounted on semiadjustable articulator for indirect bonding.

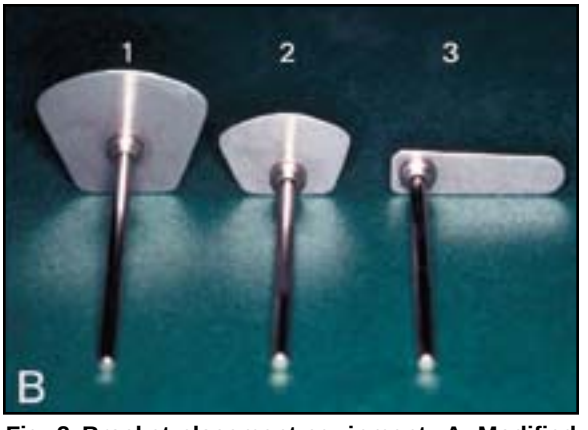

Fig. 2 Bracket-placement equipment. A. Modified surveyor. B. Slot levelers used to line up slots of maxillary anterior teeth (1), mandibular anterior teeth (2), and posterior teeth (3).

Dr. Hong is Chairman, Department of Orthodontics, Chong-A Dental Hospital, 648-22 Yoksam Dong, Kangnam Ku, Seoul 135-080, Korea; Clinical Professor, Department of Orthodontics, College of Dentistry, Seoul National University; Clinical Professor, Department of Orthodontics, College of Dentistry, Pusan National University; Clinical Professor, Division of Orthodontics, Department of Dentistry, Asan Medical Center, College of Medicine, Ulsan University; and Clinical Professor, Department of Orthodontics, College of Dentistry, Dankook University. Dr. Kim is a resident and Mr. Park is a technician, Department of Orthodontics, Chong-A Dental Hospital.

Dr. Hong

Dr. Kim

Mr. Park

using a resin-resin transfer tray instead of a wire-resin assembly.

Laboratory Procedure

1. Reproduce the ideal setup on a semiadjustable articulator, coordinating overall archform, occlusal plane dimensions, anterior tip and torque, overbite and overjet, and individual dental alignments (Fig. 1).

2. Use the special bracket-placement equipment to establish an ideal vertical plane to which all brackets can be coordinated (Fig. 2). Bond the brackets to the ideal setup with a light-cured resin such as Transbond XT.* The slot levelers ensure that the bracket slots line up horizontally (Fig. 3).

3. The new transfer tray consists of bracket

*Trademark of 3M Unitek, 2724 S. Peck Road, Monrovia, CA 91016.

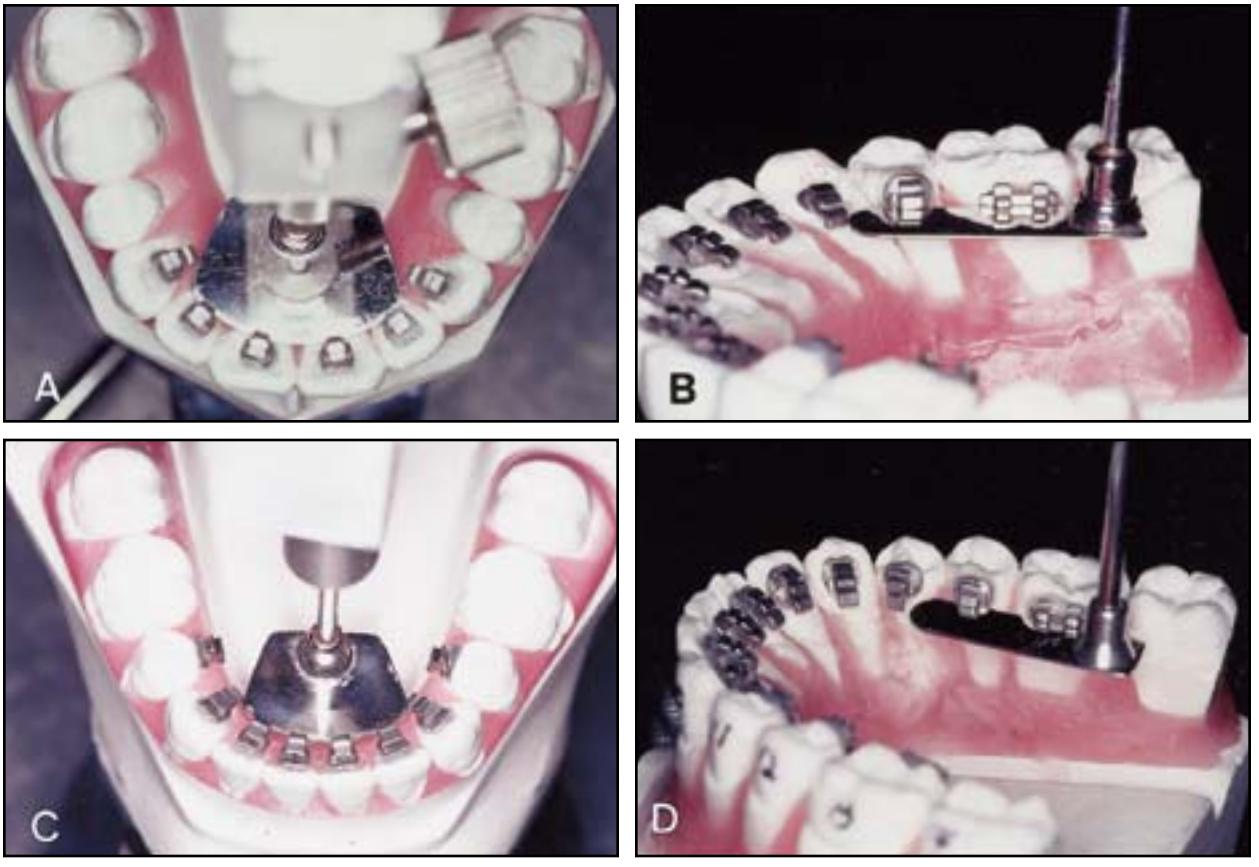

Fig. 3 Placement of lingual brackets on ideal setup, using appropriate slot leveler with modified surveyor. A. Maxillary anterior brackets. B. Maxillary posterior brackets. C. Mandibular anterior brackets. D. Mandibular posterior brackets.

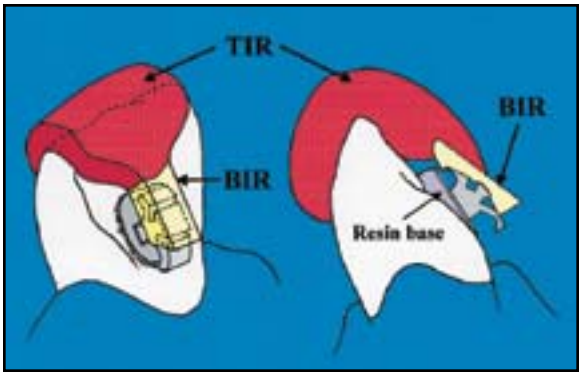

Fig. 4 Components of transfer tray: bracket index resin (BIR) and tooth index resin (TIR).

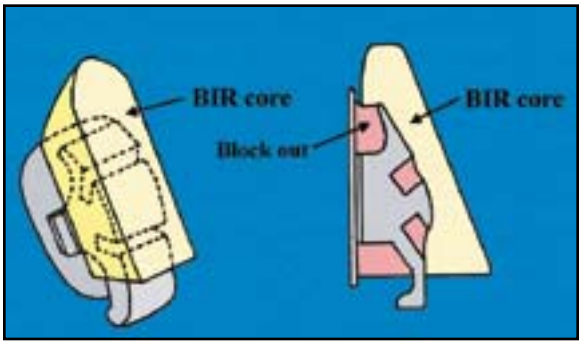

Fig. 5 BIR core formed by adding quick-curing acrylic resin over bracket, after blocking out bracket undercut and slot with plaster.

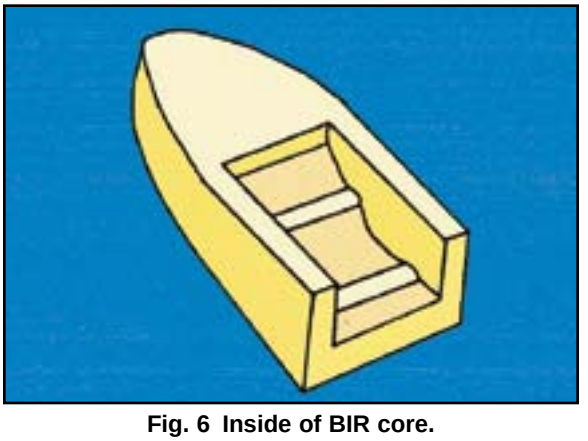

Fig. 6 Inside of BIR core.

index resin (BIR) and tooth index resin (TIR) (Fig. 4). Fabrication of the BIR is the key to this indirect bonding system. First, block out the bracket undercuts and slots with plaster, taking

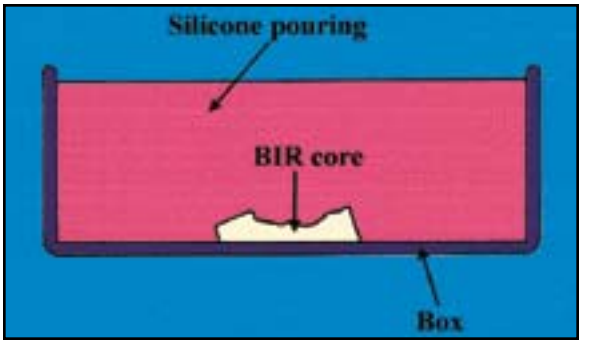

Fig. 7 Box filled with silicone after affixing BIR core to bottom.

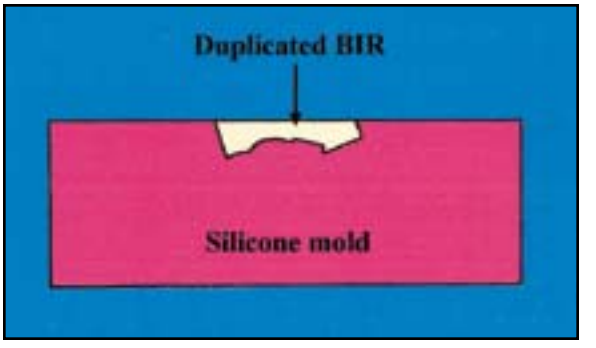

Fig. 8 BIR duplicated and preformed by injecting quick-curing acrylic resin into silicone mold.

care not to block out so much that the resin will slip off the brackets too easily. Remove any excess plaster. Coat the blocked-out bracket with a resin separator, and cover it with a quick-curing acrylic resin (Unifast,** Fig. 5). When the resin has set, remove it from the bracket, and trim away any excess acrylic (Fig. 6).

4. Affix the BIR core to the bottom of a box, and pour silicone*** over it until the box is filled (Fig. 7). After the silicone has fully set, separate the silicone mold from the box.

5. Duplicate and preform each BIR by injecting Curefast† composite (clear ivory) into the silicone mold (Fig. 8).

6. After positioning the brackets as desired on the setup cast (Fig. 9A), place a preformed BIR

**GC America, Inc., 3737 W. 127th St., Alsip, IL 60803.

***Shin-Etsu Chemical Co., Ltd., 2-6-1 Ohtemachi, Chiyoda-ku, Tokyo, 100, Japan.

†Tokuyama Corp., 3-3-1 Shibuya, Shibuya-ku, Tokyo 150, Japan.

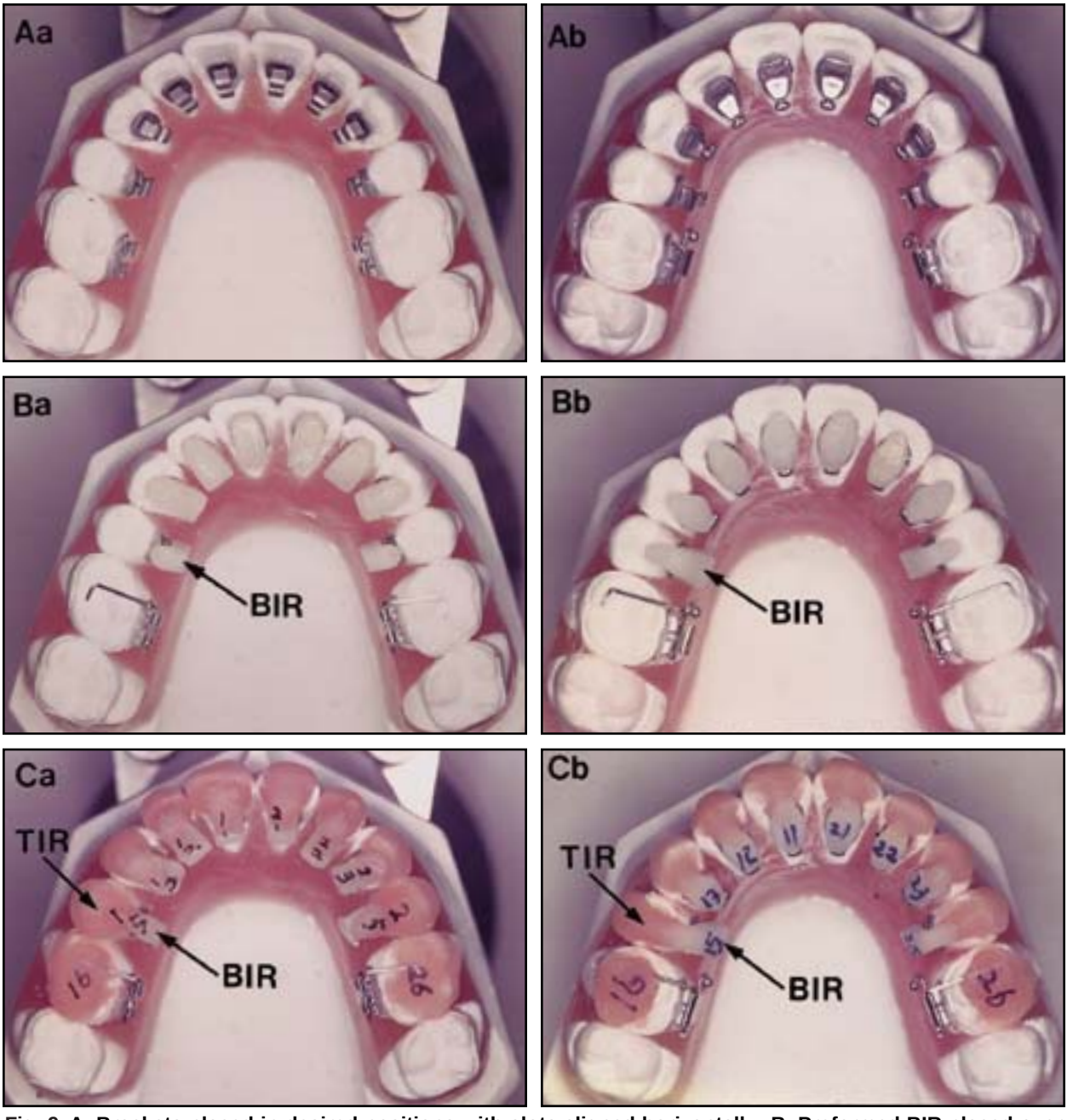

Fig. 9 A. Brackets placed in desired positions with slots aligned horizontally. B. Preformed BIR placed over each customized bracket. C. TIR used to index each BIR to tooth (a = Fujita lingual bracket; b = Kurz lingual bracket).

over each bracket (Fig. 9B). Adapt Curefast composite (live pink) over the occlusal end of each BIR to index it to the tooth (Fig. 9C). Each resin-resin assembly then becomes a transfer tray.

Clinical Procedure

1. Prepare the lingual tooth surfaces for bonding as usual.

Fig. 10 Light-curing of adhesive primer beneath bracket.

2. Clean and lightly abrade each bracket base with a Microetcher.‡
3. Paint the etched and dried enamel surfaces and the bracket resin bases with the light-cured adhesive primer.
4. Firmly seat each transfer tray on the appropriate tooth. Cure the adhesive primer beneath each bracket for 40 seconds (Fig. 10).
5. Since the adhesive is fully polymerized by the light-curing, an initial archwire can be engaged immediately (Fig. 11).

‡Trademark of Danville Engineering, 1901 San Ramon Valley Blvd., San Ramon, CA 94583.

Conclusion

We have found this lingual indirect bonding system to be highly precise and reproducible, thanks to the stability of the resin-resin transfer trays. The preformed bracket index resin reduces both laboratory time and chairtime.

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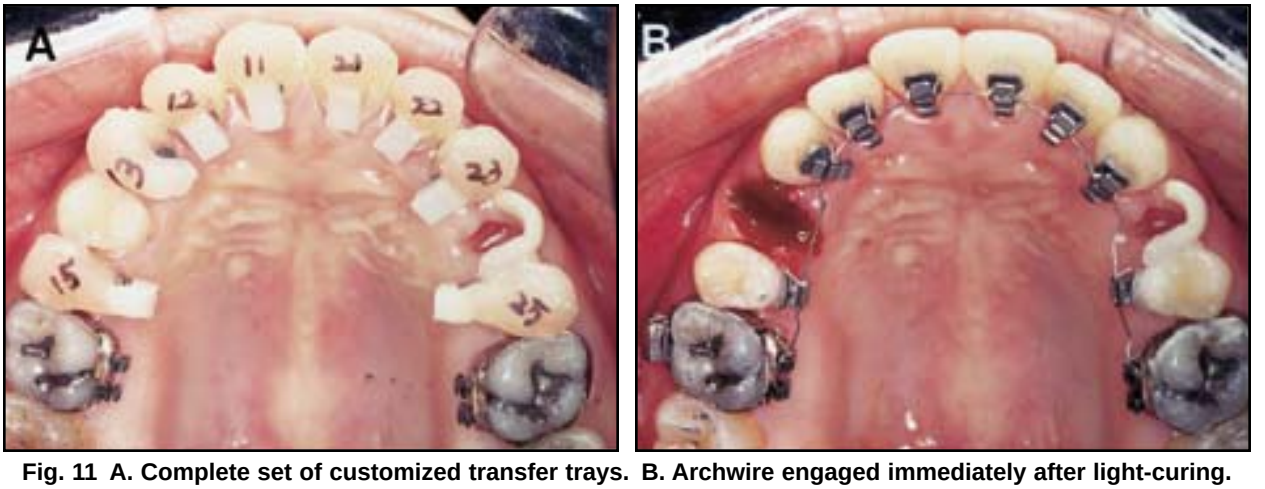

Fig. 11 A. Complete set of customized transfer trays. B. Archwire engaged immediately after light-curing.