

Bonding with a Plasma-Arc Curing Light and Resin-Modified Glass Ionomer

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We have used Fuji Ortho LC,* a resin-modified glass ionomer bonding adhesive,¹⁻⁸ exclusively for bonding new cases since 1993.⁹ A new generation of high-intensity curing lights now makes it possible to complete a full bonding much more quickly and efficiently.

In May 1999, we began curing Fuji Ortho LC with the Apollo 95 E** plasma-arc light (Fig. 1). Compared to the conventional light's curing time of 40 seconds per tooth, the plasma arc cures each tooth in only three seconds. Total curing time for a 6-6 bonding in both arches is only one minute, 12 seconds, compared to 16 minutes with a conventional light. Equally important, the immediate bond strength appears to be higher.

In four months, we bonded a total of 1,480 brackets*** (including molars) on 124 patients in two offices. Patients were seen every three

weeks after the initial bonding. During this period, only 12 bonds failed—an amazingly low rate of .8%.

Some brackets were intentionally removed to determine whether debonding would cause any enamel damage. No problems were encountered. On final removal of the brackets from completed cases, however, we noticed a marked increase in bond strength with the new combination, compared to cases using the self-curing adhesive or a conventional curing light.

Technique

1. Clean the teeth to be bonded with plain pumice and water. Although the manufacturer recommends treating the enamel surfaces for 20 seconds with its conditioner (10% polyacrylic acid), we perform no further enamel pretreatment.
2. Insert a cheek retractor.
3. Obtain a glass slab from the refrigerator, place it on a nearby counter, and cover it with a single sheet of paper from a mixing pad (Fig. 2).

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Fig. 1 Apollo 95 E plasma-arc curing light.



Fig. 2 Sheet of mixing paper placed on refrigerated glass slab.



Fig. 3 Fuji Ortho LC premeasured capsules.



Fig. 4 Adhesive mixed for 10 seconds in capsule mixer.

4. Activate the premeasured adhesive capsule (Fig. 3) by pressing the activator button. Mix the capsule for 10 seconds at high speed in a capsule

mixer or amalgamator (Fig. 4). Load the capsule on the applicator.

5. Extrude the adhesive onto the chilled mixing sheet in a thin line, not in a glob (Fig. 5).

6. Using a round toothpick, coat the bonding surface of each bracket with adhesive (Fig. 6). Position the brackets on the teeth, then remove any excess adhesive.

7. Cure the adhesive on each bracket for three seconds with the plasma-arc light. We prefer to remove the cheek retractor before bonding the molar tubes. Access is easier if the fingers are used to pull back each cheek.

8. Place .016" nickel titanium archwires.

Discussion

Keeping both the mixing slabs and the adhesive capsules refrigerated will extend the working time enough to bond both arches with just one capsule. Together with the reduced chairtime, this makes the encapsulated resin-modified glass ionomer extremely cost-effective.

The light emitted from the plasma-arc device is so powerful that both the operator and the assistant should wear the protective glasses that are included in each kit. Parents or other observers should be instructed not to look toward the patient's mouth during the light-curing procedure.

If rebonding is necessary, it can easily be accomplished by mixing the Fuji Ortho LC powder and liquid and applying the adhesive to the cleaned bracket base. Once the correct bracket position is verified, the adhesive is cured for three seconds with the Apollo light, and the bracket is retied to the archwire.

The combination of the resin-modified glass ionomer and the plasma-arc curing light has produced consistently successful results with deciduous teeth, mixed-dentition patients, and Phase I cases. The additional cost of the curing light and the encapsulated adhesive can be recovered quickly, considering both the time saved in initial bondings and the reduced frequency of rebondings.



Fig. 5 Adhesive should not be extruded in a glob.



Fig. 6 Adhesive extruded in thin line, then applied to bracket bases.

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