

BONDING

The Clinical Assistant's role in preparation and implementation of the bonding procedures cannot be overemphasized in the success of the overall procedure. Just as a baker uses a recipe to bake a consistently delicious tasting cake, if one ingredient is omitted or measured wrong, the result is poor texture or taste. Successful bonding is built on a formula, and when always followed, will yield a consistent result with no bond failures.

Preparation

Preparedness is a confidence builder; being unprepared is a confidence destroyer. When you prepare prior to the patient's arrival, you have both the supplies and information you need, so there is less stress during the bonding procedure.

1. Review the patient's treatment card to check medical history information and treatment plan :
 - Medical histories alert the need for pre-medication and/or other special precautions to be taken due to heart murmur, latex allergies or other serious conditions
 - Treatment plans verify specific appointment sequence, teeth to be bonded or banded
 - Type of brackets to use should be specified for individual patients (clear, metal, prescription variations in torque)
 - Lingual buttons or attachments
 - Adjunctive appliances to be used such as expanders, lip bumpers, habit appliance or transpalatal bars that may need a band versus a bond to accommodate the appliance

2. Utilize the patient's models or photographs to review the dental anatomy and panorex for root position. Look for :
 - Irregular shaped teeth that may need build up prior to bonding
 - Extreme crowding that will not allow initial bracket placement
 - Short posterior clinical crowns, may need occlusal stops for opening bite or a delay in bonding those teeth
 - Crowns, veneers, decalcified facial surfaces that may need added procedures or materials
 - Root evaluation for resorption or irregular positions (have the radiograph available at chairside during the bonding procedure for the doctor to review and or refer to for bracket positioning)

3. Set up a bonding tray
 - Brackets should be placed on a bonding pad as per doctor guidelines
 - Prophyl cup, dampen dish with plain pumice and water
 - Cheek retractors, cotton rolls, gauze, sponge pellets, dry angles
 - Etch and a dispensing instrument
 - Anterior bracket holders (and posterior if indicated) and height gauges
 - Scaler, mirror and condenser
 - Distal end cutter, hardwire cutter, Weingart , hemostat
 - Bonding primers and adhesives with instruments to dispense
 - Archwires and ligation devices (alastics, stainless steel ligatures)
 - Oral hygiene kit and instruction aids

Patient Instruction

Once you have welcomed and escorted the patient to your chair, the first steps should be to place a bib with chain on the patient, give them safety glasses to wear and instructions on the procedures you will be performing. Show the patient their brackets and demonstrate how a cheek retractor works. The better assistants are at explaining the next steps to the patient the more receptive and comfortable the patient will be during the procedure. Develop a routine and be consistent in following it.

CLINICAL STEPS IN BONDING

Think of the following steps as a linked chain of events that , if broken , at any point in the chain , may result in weakened bond strength that can lead to bond failure , either immediate or over time.

Polishing

Polishing the teeth with plain pumice and water using a rubber prophyl cup is recommended as a standard procedure prior to all bondings. Maintain a fulcrum while pumicing and use a light touch to be sure not to overheat the tooth. Patient comfort through the whole process of bonding should be the assistant's first concern along with the quality of the polishing procedure. Remember, the importance of completing each step of the bonding procedure is crucial to the overall bond strength. Check to confirm all plaque is removed before going to the next step.

Isolation

It is extremely important to keep the teeth dry and contaminate free during bonding, along with providing a clear field of vision for the doctor. The use of cheek retractors is highly recommended along with a high-speed evacuation

system. Patients should be individually evaluated for isolation materials such as; size and type of retractor, use of cotton rolls, gauze or dry shields, (based on the amount of saliva secretion), and size of the lips and mouth. Patient comfort and the doctor's ability to see each tooth should be a primary focus in addition to maintaining a dry field.

Etching

Place cheek retractors prior to etching. Etching prepares the tooth surface to accept the adhesive, producing a strong bond between the enamel and the adhesive. The recommended etch is a 37% phosphoric acid solution, in either gel or liquid form. For easy application and control of the etching material use a small syringe; an alternative method is a small sponge tip or brush with plastic handles. Etch the entire facial surface by either injecting the gel or dabbing the liquid on the tooth, being extra careful to avoid contacting the gingiva or inside of the mouth. Etch will burn soft tissue and cause ulcerations and patient discomfort. Once you have started etching, do not disturb the etching process. Touching up or reapplying more etch causes the enamel rods to break and can result in reduce bond adhesion. Etch for approximately **thirty to forty-five seconds**. Total time should not exceed 60 seconds from etching to rinsing. Teeth that have been over-etched may have decreased bond strength.

Rinsing

Because it takes approximately 45 seconds to etch an entire arch, begin rinsing at the starting point immediately after completion of the application of the etch. The etch solution should be rinsed from **each tooth for a minimum of five to ten seconds** in a continuous stream of water, with the high-speed evacuation unit held next to each tooth to capture the rinsed etch. Be careful that the water does not miss the tooth and go directly into the evacuator. The purpose of capturing the etch is two fold ;one, it will irritate soft tissue and two, it tastes terrible, if not captured completely.

Note: Failure to rinse thoroughly may result in compromised bonding and reduced overall bond strength.

Drying

Once the teeth are rinsed completely, dry the teeth using both air that is oil and moisture free and a tooth dryer. The teeth will appear chalky-white. If you do not see an overall chalky-white appearance on the surface of the teeth, re-etch for 15 seconds, rinse and dry. Failure to achieve a good quality, full surfaced etch can be another reason for bond failure.

Tooth Sealant

Based on the type of bonding materials used, the next step is to seal or prime each tooth to be bonded. Apply a thin coat of primer/sealant with either a brush or sponge tip applicator. Always read the instructions and steps recommended by the manufacturer or supplier of the products you are using.

Mixing Adhesive

There are varieties of adhesives available in mechanical cure, chemical cure and light cure curing systems.. When of mixing two-part adhesives, be sure to use equal amounts and mix thoroughly on a waxed pad. If you need more mixing time, place the mixing paper on a cold glass slab. If you see or feel the adhesive starting to set up, it is already too late. The previously placed bracket is likely compromised. Discard and dispense new materials and bond fewer brackets with each mix.

No Mix or One Step Adhesives - Easy to use with generally a 30 second working time. Use a light coat of adhesive primer on both the tooth and back of the bracket mesh pad. Using too much primer on either surface reduces bond strength and causes the bracket to drift.

A & B Paste – Two Step Adhesive – Increased working time up to 2 minutes with the addition of a cold slab. Using equal amounts of paste A and B, mix thoroughly. Typically, the tooth and bracket are painted with a thin coat of primer followed by the adhesive.

Light Cured Adhesive – A single paste used with a tooth and bracket primer. The working time can range from 2 to 3 minutes based on the ambient light. Care must be taken not to disturb the bracket around the two-minute mark even though you may have covered the patient's mouth to prevent light exposure. Any time a bracket is moved once the setup has begun-----this applies equally to any type of adhesive system, there is a risk of bracket failure either immediately or in the future.

Placing Adhesive on the Bracket

Placing the adhesive properly on the bracket base pad is crucial for the overall success of the bonding. When injecting or applying the adhesive, make sure it is firmly pressed into the mesh pad on the bracket base, without running or slumping as it is applied to each bracket. The critical key in this step is to get just the right amount of adhesive on the mesh pads. If too little adhesive is used, there may be gaps between the bracket base and tooth surface which may result in bond failure or decalcification.. If excess adhesive is used, there tends to be additional flash around the periphery of the bracket, which creates both cleanup difficulties and potential hygiene problems throughout treatment.

Passing Sequence

The best passing sequence is the one that your doctor prefers. The key is to be consistent in your practice. Typically, start with the mandibular arch working from the patient's left to right, followed by the maxillary arch. There may be instances, however, where you are bonding the full arch and will want to bond all posterior teeth in both arches prior to the anterior segments. Evaluate each patient based on teeth to be bonded, amount of saliva the patient produces, field of isolation, and visibility.

Curing

Follow the recommended curing time for the particular adhesive system you are using. When using light cured adhesives, take into consideration the individual light cure unit. Some light cure units require 20 seconds to cure and another unit can cure the same bracket in 3 seconds and another in 10 seconds. Confirm the requirements for each light cure unit. Check the light output of each unit daily to ensure it is working properly.

Hold the wand as close as possible to the bracket without touching. For the bracket to cure, it is imperative that the light reach behind the bracket to cure. Where there is short inter-bracket space, the wand can be held directly between the two brackets, parallel with the tooth surface. With a wider interbracket space, such as upper centrals, angle the wand at a 45 degree toward the mesial and distal of each tooth to ensure the light gets behind the bracket to cure.

Clean Up

Ideally, excess adhesive should be removed as you place each bracket. However, once the adhesive has set, check the periphery of each bracket. Using a scaler, check the contact points of each tooth to ensure no primer or adhesive is present, preventing the patient from flossing.

Archwire Placement

After light curing, allow 5 minutes before placing archwires. When using a non-light cure technique, allow 10 minutes before archwire placement. Utilize time effectively during this time by cleaning your work area, cut and prepare archwires and rinsing the patient.

Address excessively long distal ends of archwires by either cutting flush or annealing the wire and bending back. If you are cutting the archwire flush, either place a "v" bend in the archwire between the centrals, a tie back mesial to the first molars, or add a crimpable stop to prevent migration of the archwire. The recommended choice will be based on the patient's malocclusion and the doctor's treatment plan. Always double-check the ends of the archwire to confirm that there will be no irritation to the patient. Never assume the ends of the archwire are adequate because the patient says everything feels OK.

Special Tips

Bracket Modification

- In some cases, bracket wings and ball hooks may need to be removed or bent out of the way due to severe rotation or gingival impingement.

Bracket Positioning

- When polishing the teeth pay particular attention to the patient's posterior bite. If you notice short molar crowns or a crossbite that may get in the way of bracket positioning, be sure to inform the doctor prior to bracket placement. A second set of eyes looking at the case and understanding the importance of placing the brackets correctly the first time benefits both the patient and practice in reducing extra chair time and emergency appointments.

Adhesives

- Review all the instructions and follow the guidelines for the particular products including; adhesion boosters, primers, sealants, porcelain or metal crowns/fillings.
- Adhesive products are expensive; dispense only what you will use for each patient.

Archwires

- Select and cut archwires using the patient's models when setting up the bonding tray.
- When using a resilient and flexible archwire it may be necessary to anneal the archwire end prior to bending back. Using a bird peak plier, hold the arch wire where you want the heat to stop then anneal the wire distal to where you are grasping the wire. This process ensures you are not dead softening the portion of the archwire anterior to the bird peak.

Proper bonding technique sets the stage for the entire treatment. Attention to detail during every step of the bonding procedure will bring you one-step closer to zero bracket failure, which in turn leads to happier patients, team members and orthodontist, and a productive, efficient, successful practice.

Having a "bonding recipe" or technique that is followed consistently by every member of your clinical team can only bring you closer to a zero bracket failure rate.

Think of the times you have had bond failure during an initial bonding, having a patient call on the way home from their appointment saying that a bracket miraculously fell off. This does not make for a happy, satisfied patient. Take the time to review each step and verify team members are following the “bonding recipe”, regardless of their experience. Attention to detail will bring you one-step closer to an efficient and successful practice with many ambassadors (patients) singing your praises.

Cathy Sundvall
Practice Enhancement Consultant
csundval@earthlink.net
863-427-4346