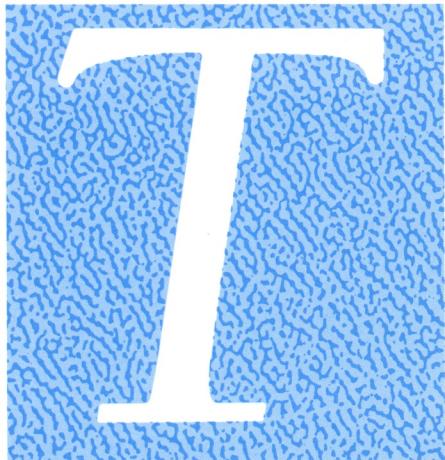
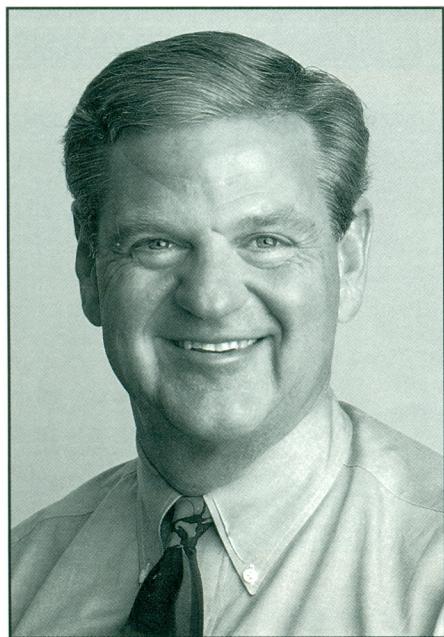


Getting That Indirect Bond

Your Back...or Indirect Bond



by James J. Hilgers, D.D.S., M.S.
Mission Viejo, California



his is a simple, no sweat system for indirect bonding. There is no question that indirect bonding greatly improves the quality and ease of orthodontics. I feel that about 30% of orthodontic excellence comes from proper bracket placement. It is such a time saver in finishing details, and no amount of detailing an archwire can compensate for a series of poorly placed brackets. No matter how good you *think* you are at direct bonding, it is fraught with peril because you simply don't have visual access to all teeth in all planes of space.

I think that many orthodontists would agree with the previous statements, but they still continue to direct bond all cases. Why? Well, most are concerned about laboratory hassles, cost and bracket retention. It is a statistical fact that only about 15% of the orthodontists in the United States routinely utilize indirect bonding. We think we have an answer to this dilemma.

The "key" is not to let the technique itself overwhelm you. Many clinicians end up with a laboratory full of models, fuss about the accuracy of bracket placement, complain about the laboratory costs and give up indirect bonding because they just consider it a hassle.

We treat indirect bonding just like it was another patient — *it never leaves the operatory*. I personally do all the indirect bonding (on the model) just as I would do direct bonding in the mouth. But now I have complete access to all the teeth. I spend my bracket placement time on the model and not in the mouth. We use our extra (emergency or S.O.S.) unit in the operatory as our indirect bond chair. During the course of the day, as a few minutes become available, I am called over to this unit to place a few indirect bonds. I am assisted by whoever is free at the moment. The whole clinical staff should participate in this system. The clinician's time spent bonding brackets on a model is no more than the time spent directly bonding brackets chairside. I personally like to do the placement of brackets on the models — it uses my experience with overtips, overrotations, etc. (the artistic aspect of bond placement). My assistants, as good as

Dr. James J. Hilgers was instrumental in the development of the Linear Dynamic System and its approach to Bioprogressive Therapy. He has published and lectured extensively and conducts semi-annual in-office seminars on Bioprogressive Simplified. Dr. Hilgers' private orthodontic practice is located in Mission Viejo, California. He received his dental education at Loyola of Chicago and graduated from the ortho program at Northwestern University.

ing Monster Off nding Made Easy

they are, would not be able to translate this clinical expertise to the procedure.

Once the brackets have been bonded on the model, a tray is made — again, right at the chairside. None of the supplies that we use are laboratory intensive. The models are kept on a numbered board in their pecking order and, as you can imagine, the cost factor using this technique of indirect bonding is almost zero.

Also, you needn't feel guilty because you are not using one of the mechanical surveying devices to place the brackets on the model. They may improve bracket placement slightly, but they overly complicate indirect bonding and turn it into a laboratory rather than an operatory procedure; they place in the hands of a technician that which you can better decide as a clinician. The laboratory technician is simply not going to take into account, for example, the fact that the case is an open bite, or that a bit more tip is necessary on one tooth, or that a tooth size discrepancy exists...etc., etc., etc. After using these surveyors for some time, I did not see enough of a difference to warrant their use, especially when you take into account what you, as a clinician, can add to the indirect bonding procedure. It just didn't balance out for us. It was the hassle factor.

So, described herein is a tried and true approach to indirect bonding that we have been extremely happy with for several years.

Give it a try. It truly is —

Indirect Bonding... Made Easy!

Supplies Needed:

Small art brush

Bracket Gauge — Ormco #801-0000

Liquid foil separator — Great Lakes #GL0400

Cutter Dental Cuttersil® Light — Columbus Dental #35511

Cutter Dental Cuttersil® Universal Hardener —

Columbus Dental #35166

Cutter Dental Cuttersil® Putty Plus — Columbus Dental #35507

Disposable Impression Syringes (dental supplier)

Synthesis™ Dual Syringe Adhesive Kit-#740-0180

Synthesis™ Jar Adhesive "B" only (for bonding chairside) —

Ormco #740-0184

Fluorobond™ "A" only (extra for bonding chairside) —

Ormco #740-0167

Parotisroll cotton rolls — (dental supplier)

Ultra-Etch® Heavy — Ultradent Products 800-552-5512

Model Setup:

1. Mark long axis of each tooth to be bonded. Start the long axis line with a sharp pencil on the occlusal (so you can determine

| Average Tooth Size Chart | | | |
|---|--------------|----------------|--------------|
| Used for Vertical Height Marks on Model | | | |
| Upper Arch | Small | Average | Large |
| Centrals, Laterals | 3.5 | 4.0 | 4.5 |
| Cuspids | 4.0 | 4.5 | 5.0 |
| Bicuspids | 4.0 | 4.5 | 5.0 |
| Molars | 3.5 | 4.0 | 4.5 |
| Lower Arch | Small | Average | Large |
| Centrals, Laterals | 3.5 | 4.0 | 4.5 |
| Cuspids | 4.0 | 4.5 | 5.0 |
| Bicuspids | 4.0 | 4.5 | 5.0 |
| Molars | 3.5 | 4.0 | 4.5 |

mid-crown width). This line is then extended down the facial surface of the tooth to the gingival margin.

2. Create a cross-hatch mark signifying either the bracket pad height or the slot height from the incisal edge or cusp tips of the appropriate teeth. The Ormco Bracket Gauge has a blue plastic tip at each of the height settings that can be removed and used (without the tip) to mark the bracket slot height. I prefer to use the gauge with the blue tips *on* to mark the occlusal or incisal edge of the bracket pad. The closer the measured part of the bracket is to the placement standard (the incisal edge or the occlusal cusp tip), the less the error in placing the bracket. Consistency and symmetry of placement are the keys to proper bracket positioning. After you've determined the bracket and tube heights that work consistently well with your mechanics, always doing the same thing in the same way is paramount to consistency and minimizing error.

3. Check carefully to insure that you are not measuring the bracket to a worn cusp or a chipped or grooved incisal edge; if the tooth is going to be manicured later, take this into account at this time. This is not so important with posterior teeth, where you are more concerned about lining up marginal ridges, but it is very important with anterior teeth, where uneven or angled incisal edges are quite common. Many clinicians prefer to manicure the incisal edges of anterior teeth before taking the impression for the indirect bond to minimize this problem.

4. Paint a liberal coat of liquid foil separator over the teeth and gingival surfaces on the model. Always place the separating liquid

continued on following page

Dr. Hilgers

continued from preceding page

on the model after the pencil lines have been drawn on the model; this will prevent the marks from coming out on the bonding base (a bit embarrassing when you can see the pencil line through the ceramic brackets once they are bonded to the teeth). If you wish to hurry the drying process of the liquid foil separator, the model can be placed in a microwave oven for 15 seconds—we have a small, inexpensive microwave right at the chairside for this purpose.

5. The brackets are placed exactly as if direct bonding. The assistant uses the Synthesis Dual Syringe to dispense equal amounts of Paste A and Paste B. The assistant then mixes the two dollops, compresses the mix into the mesh base, and hands it to the doctor for placement on the model. The bracket is first compressed against the tooth at "best fit" position to minimize the amount of bonding material between the bracket base and the tooth. The periphery of the bracket is then cleaned with a sickle scaler and the bracket is finally positioned relative to the vertical and horizontal axes. One bracket after another is sequentially placed (rather than all at once) so that concentration can be maintained for the perfect positioning of each and every bracket.

Indirect Bond Tray Fabrication

1. On a disposable mixing paper mix CutterSil Silicone Impression Material (approximately one inch long) with 4 drops of CutterSil Hardener for about 15 seconds.
2. Cookie cut the impression material (green) into a syringe and squirt over each bracket; cover each completely, making sure to get thoroughly around each of the bracket wings. This must be done rather rapidly, as the material will start to set before you get to the last bracket.
3. Mix one (1) scoop of CutterSil Putty Plus (white) with four drops of CutterSil Universal Hardener and blend thoroughly. It is easiest to make a small indentation in the putty, put the drops of hardener in the indentation, fold over the putty and mix with gloved hands. (To prevent staining of the fingers, use latex gloves without any powder on them as the powder will cause the putty to set unevenly.)
4. Flatten out the putty slightly and place over the model (and the previously placed impression material) to form a smooth white rubber tray. It is very important that you keep the tray at least 5 millimeters thick for rigidity. It is this rigidity that holds the brackets against the teeth. The tray is trimmed just below the gingival portion of the bracket with a Bard-Parker knife.
5. After white putty is set, place in bowl of water and soak for one minute to release the brackets from the model. The midline is marked by cutting out a small wedge with the Bard-Parker, and the patient's name is drawn on the tray with blue felt-tip ink. The tray is then placed back on the patient's model and stored until bracket placement.

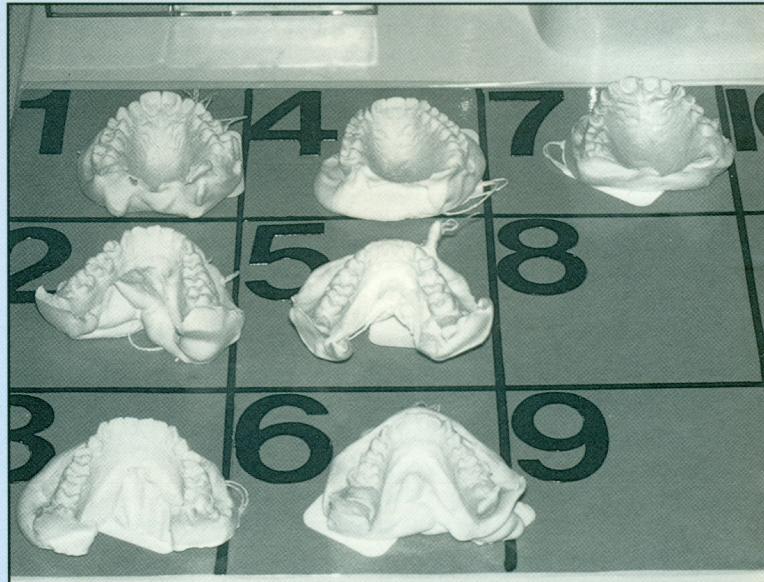
Indirect Bonding To Patient

1. Prepare the tray for placement. The back of each bracket base should be rinsed thoroughly to remove any residual separating medium or dust. Dry with air syringe; bracket base/bonding

Indirect Bonding Made Easy



1A. The key to simplified indirect bonding is that the procedure never leaves the operatory. A spare (emergency) chair is utilized for fabricating the indirect bonding tray. Since all of the same materials that are utilized for direct bonding are utilized in the indirect bonding process, there is never an unsightly amount of laboratory material at the chairside. The doctor is called to this chair and completes the bonding of the brackets to the model, just as if it were an actual patient.

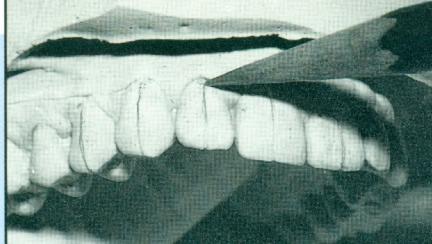


1B. The indirect bonding models are poured in the laboratory and kept at the chairside on a numbered board that indicates the pecking order (i.e., the models are arranged in their sequence of placement to prioritize each according to the patient's bonding date). As an assistant is freed throughout the day, she will call the doctor to the indirect bonding chair to place a few bonds. In this way, the bonding to model process is done during the spare moments that occur each day in all practices.

continued on page 16



2A. To prepare the model for the placement of the bonds, the assistant marks the exact center of the mesio-distal width of each tooth with a small hatch-mark (as the model is viewed in the occlusal dimension). This is accomplished with a thin pencil line.



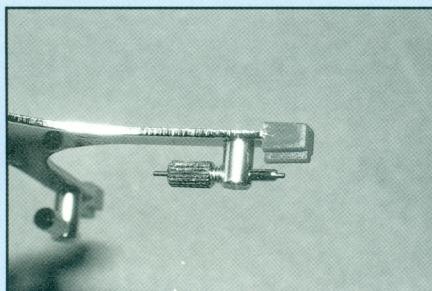
2B. The model is then turned to see each tooth in the facial dimension. The original hatch-mark is then extended along the long axis of the tooth to the gingival margin. This is the mesio-distal demarcation for bracket placement and allows for correct bracket angulation as it relates to the crown and root axis of each tooth.



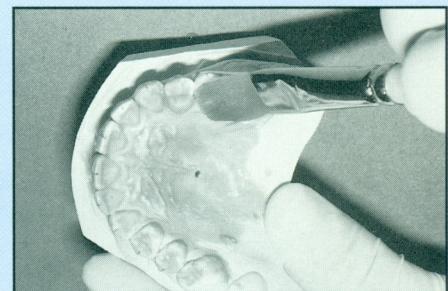
2C. The vertical height of the bracket is then marked. In this instance, the edge of the pad to the incisal edge is registered. This is accomplished according to general tooth size (see table) using the Bracket Height Gauge (Ormco).



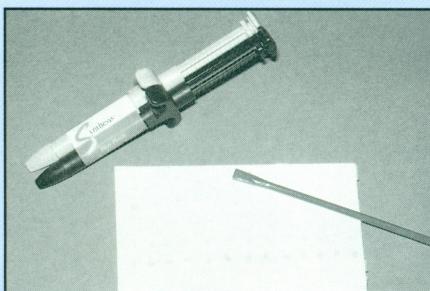
3A. The final vertical and horizontal references demarcated on each tooth.



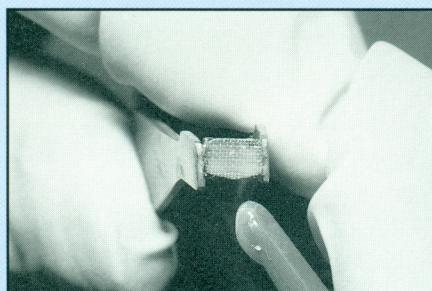
3B. The Bracket Height Gauge has a small pencil lead in each of 4 wings. These mark the incisal edge (cusp tip) to bracket slot in 3.5, 4.0, 4.5, and 5.0 mm increments. If the clinician prefers to measure brackets from the edge of the pad, the blue caps are left on each spindle.



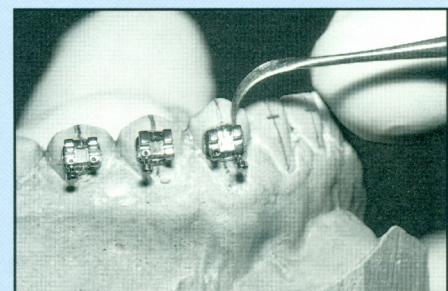
3C. The indirect bonding model is coated with a thin layer of separating medium. This is accomplished after the pencil lines have been drawn so that the pencil lead does not show through when using clear brackets. Drying the separating medium can be hastened by placing the model in a microwave oven for 15 seconds.



4A. Just as it is utilized in the direct bonding procedure, small dollops of Synthesis two paste bonding adhesive are dispensed on a paper mixing pad. Several extra dollops are included in case a bracket is dropped in the transference process.



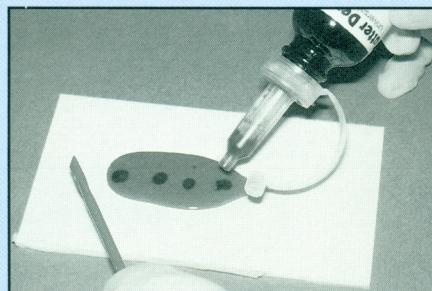
4B. The 2 dollops of Synthesis paste (A and B) are spatulated and placed on the bracket base. The bracket is then transferred to the clinician for placement on the model.



4C. The brackets are sequentially placed by the doctor, using the general references on each tooth. These, of course, can be altered by the clinician to take into account clinical needs of bond placement (rotations, overbite, etc.). In this manner, the doctor's clinical acumen is brought to the bonding process.



5A. CutterSil light body and Universal Hardener. Utilized to encapsulate the brackets.



5B. CutterSil Light (1-inch strip) with 4 drops of Universal Hardener. The material is spatulated thoroughly and placed in a plastic lab syringe. When this green colored material is used on clear brackets, they are first coated with a thin veneer of Pam cooking spray to allow for easy removal of the CutterSil Light.

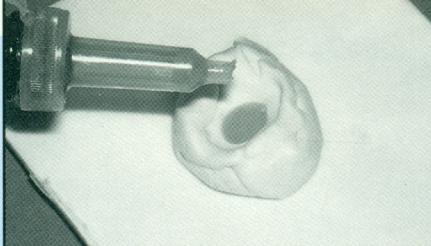


5C. CutterSil Light extruded completely around the wings and base of each bracket.

continued on following page



6A. CutterSil Putty Plus with Universal Hardener. Utilized in forming outer tray.



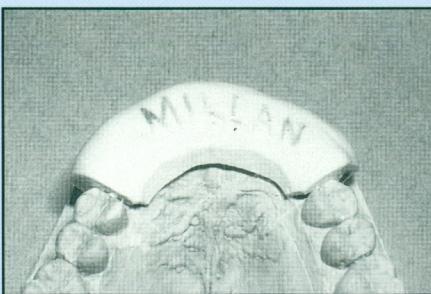
6B. One scoop of CutterSil Putty Plus is placed on a paper mixing slab. Four drops of Universal Hardener are thoroughly incorporated. If using rubber gloves to prevent discoloration of fingers, wash gloves so that glove powder doesn't disturb setting process of putty.



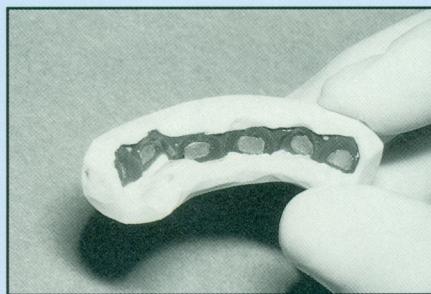
6C. The putty is rolled over the teeth from the labial to the lingual. Minimum thickness of the CutterSil putty tray should be 5 mm to maintain tray rigidity.



7A. The excess tray material is trimmed away with a Bard-Parker art knife. The tray is trimmed just below the bracket wings at the gingival margin.



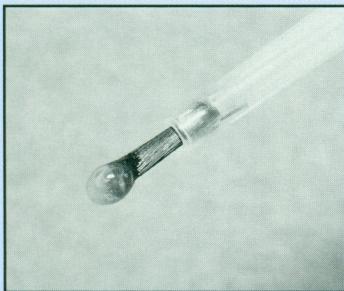
7B. Final tray with name and midline marked with pen.



7C. Indirect bond tray is removed from model by placing in water bath for 60 seconds. The residual separating medium is removed with a clear water flush and toothbrush. Note 5-8 mm thickness of outer putty tray.



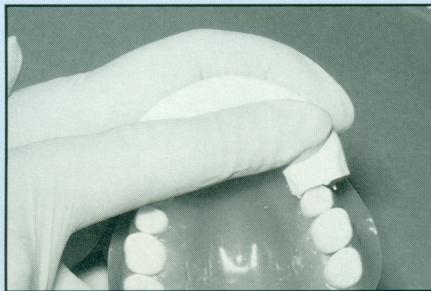
8A. Preparation of the indirect bonding slurry. The lighter colored Paste B is mixed with Fluorobond Sealant A in equal proportions. These can be purchased separately for economic use of the bonding adhesives.



8B. The bonding slurry is mixed on paper covering a cold aluminum mixing slab. This slows the setting process and gives the clinician adequate time (approximately 60 seconds) to coat the adapted bracket bases in the bonding tray. A thin dollop of the slurry is placed on the end of a disposable sealant brush.



8C. A thin veneer of the slurry is utilized to coat each bracket base. Care must be taken to avoid unwanted excess and bonding flash around brackets.



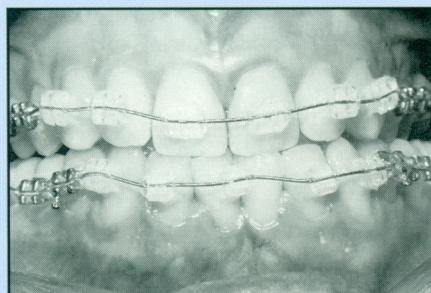
8D. Tray placement. The most critical portion of the indirect bonding process. The assistant who has etched and sealed the teeth never leaves the patient and is vigilant about contamination with saliva. The bonding tray is held in place for 3 minutes with both light occlusal and labial pressure. Too much pressure in either direction and the tray is flexed, compromising the bonding process. The tray is then maintained in the mouth without pressure for an additional 3 minutes.



9A. The tray is removed by cutting through the occlusal portion intra-orally with a Bard-Parker art knife.



9B. The lingual portion of the tray is peeled away with a scaler. The labial portion of the tray is then removed in the mesio-distal direction.



9C. Initial (light) archwires are placed for bracket comfort, elastic separators are placed and the patient is reappointed for a subsequent banding appointment.

Dr. Hilgers

continued from page 8

surface should be frosty when properly cleansed. The bracket pad area can be freshened with acrylic monomer; some feel this helps with ultimate retention.

2. Place a mixing paper on a frozen aluminum slab. The paper prevents moisture from being incorporated into the cement mixture. Place equal amounts of Paste B with Liquid A on the paper. Do this process before etching the teeth so that the cement components have time to chill — this will considerably slow the setting time. A disposable mixing spatula and disposable brush, as well as the tray, are set next to the mixing slab. All is now prepared for spatulating and placing the bonding slurry on the bracket bases.

3. Prepare patient for bonding procedure in usual way: prophylaxis, dry, etch teeth (with 15 second Ultra-Etch), using cotton rolls to keep the area isolated. We like to use short Partisrolls instead of regular cotton rolls. These longer cotton rolls have a wire in the center of the roll so that they can be shaped and contoured to the vestibule of the mouth. Once the dry Partisrolls are placed, the teeth are carefully redried and sealed with Fluorobond Sealant.

4. This is critical: **ONCE THE TEETH HAVE BEEN ETCHED AND SEALED, THE ASSISTANT MUST NEVER LEAVE THE PATIENT.** She must watch to make sure that the teeth aren't contaminated.

5. Once all is prepared, the doctor is called over to mix the slurry. The cooled paste and liquids are spatulated. This paste should be quite thick — thicker than you might think — but thin enough for a dollop of the spatulated material to be picked up with the disposable paintbrush. A thin veneer of the cement is painted on the back of each bracket base. If the cement is chilled, you have up to 1 minute to complete this process.

6. The tray is handed to the assistant who places the tray in the mouth. Placing and holding this tray is, again, a very technique sensitive part of indirect bonding. If the tray is simply held down with occlusal pressure, it has a tendency to flex outward very slightly. This will move some of the brackets away from the teeth, preventing contact with the thin veneer of bonding slurry. Therefore, the assistant must place both occlusal and labial pressure against the tray. The easiest way of doing this is to place a downward occlusal pressure with the middle and forefinger of one hand while the forefinger of the other hand wraps around the tray and places a light labial pressure. This sounds cumbersome, but once you get the feel of the right tray pressure, it's easy and it is crucial to the prevention of immediate bond failures. In my opinion, the tray placement and holding technique is *the* critical technique gap in immediate bond failures. Always look to this part of the technique first when you're experiencing failures.

7. The tray is held snugly for 3 minutes and then let set another 3 minutes for final set. The tray is best removed by cutting through the occlusal surface to the incisal edge of the teeth with a Bard-Parker knife. The lingual portion of the tray is peeled away with a scaler and then the labial portion rolled away from the bonded brackets.

8. Just a hint: Use the whiter of the two bonding pastes (not the yellower) so that if you're using clear brackets you won't pick up the yellowish tone on the teeth. Also, we will spray kitchen Pam over the clear brackets before making the tray so that the green impression base doesn't get stuck in the bracket wings. It's tough to get out without this separator.

Remember, keep it simple, pay attention to technique, keep it in the operatory and out of the laboratory, and voilà, you're ready to tie in archwires.