

Splint Workshop

Materials, Procedures, Patient Instructions

U of U Dental School – Dr. Jim Guinn

For those who want to participate in Dr. Guinn's Splint Workshop at the U Dental School, this information will be critical to read and follow.

This material will also be valuable to those who attended the lecture "Achieving Greater Success with Splints." For those not attending the workshop, you may want to have a splint made on a staff or family member, and then follow the procedures outlined below.

Procedures Prior to the Workshop

Obtain a maxillary splint to fit the participant's mouth. Most dentists don't have the time, space, interest, equipment, or trained staff to fabricate splints in their office. I am sure you can find a lab to design and construct quality splints to your specifications.

- Have the splint fabricated out of a material that can be 1) easily added to chairside, 2) easily ground on in the operatory, and 3) easily polished in the dentist's lab. I continue to use methyl-methacrylate (Caulk Ortho Acrylic) for this purpose, but I am sure there are other materials that will work to your satisfaction. Unfortunately, I have not found a light-cured or non-acrylic material that meets these requirements. The material should be "condensed" during fabrication, by pressure or other means, to increase strength and reduce porosity that would promote mouth odors.
- I strongly recommend incorporating clasps in the splint, as opposed to wrapping the acrylic around the buccal surfaces of the teeth, for retention. The former allows for easy chairside adjustment. The latter tends to be too tight or too loose, with little adjustability.
- For patients with deep bites, where the anterior of the splint will be very thin, I incorporate a lingual bar, to reinforce the splint and avoid breakage. It also reduces acrylic shrinkage distortion during fabrication.
- During fabrication, the posterior (2nd molar region) should be left thin (no more than 2 mm between the upper 2nd molar lingual cusp tip and the biting surface of the splint (check with boley gauge). The thickness of the anterior region (cuspid to cuspid) depends on the patient's overbite. If the patient has a 100% overbite, there is typically no acrylic extending below the incisal edge of the upper central incisors. If the patient has a zero overbite, the thickness of the anterior region needs to be 4-5 mm thick, measured from the upper incisal edge.
- The overjet needs to be measured, in order to know how deep to extend the anterior portion of the splint into the palatal region. If the patient is class II, and has more than 3 mm overjet (measured from labial surface of lower incisor to incisal edge of upper incisor), the anterior-posterior biting surface of the splint will need to be much deeper than normal. Conversely, if the patient is class III, the biting surface of the anterior region will need to extend anterior to the labial surface of the upper centrals. **NOTE: All of this will be obvious to the lab if you send an opposing model and bite registration. Therefore I recommend you do so to avoid problems.**

- Your goal should not be for the lab to design a perfect occlusion on the splint, but rather, to get it in the “ballpark” for your occlusal refinement chairside.
- After receiving the splint from the lab, inspect it to insure it is free of any manufacturing residue (wax, polishing compound, acrylic shavings, etc) AND that it fits your mouth comfortably.
- **NOTE:** It is strongly suggested that the splint be ordered as soon as possible after our 9/10 lecture, in case the splint delivered to you does not fit your mouth. This will allow you time for a “do over” prior to our workshop. In addition, be sure to acquire all the other materials, burs, and instruments necessary for the workshop well ahead of time.

Items to bring to the workshop:

- A splint that fits your mouth, along with the model it was fabricated on, if available
- Slow-speed handpiece with Midwest 4-hole connector and straight nose cone. If you don't have one of these, the school can provide a few for our use.
- Acrylic lab burs, coarse and fine*
- Ethyl or Methyl Methacrylate cold-cure acrylic (Snap or Trim II, etc). Ethyl generally works better chairside, due to longer working time. Put powder and liquid in appropriate dispensers.
- Silicone mixing cup, the size of a dappen dish, or similar
- Cement spatula
- Howe or bird beak (139) pliers if your splint has clasps
- Mouth mirror
- Excavator, DE, #24 (or similar)
- Several sets of gloves
- 3-way syringe tips, disposable (if you don't have these, school can provide)
- Articulator ribbon forceps (2)
- Mylar occlusal articulating film (such as AccuFilm II)
- 2X2's, approx. dozen
- Patient bib & neck chain
- Patient mirror (so you can watch while you are the “patient”)
- Patient safety glasses (never adjust a splint chairside without patient's eyes protected)
- Face mask

*We use the following acrylic burs:

NTI Universal Cutter

Shape: 251 Size: 060 Head: 13.9

Coarse: #228-2663

Fine: #228-4410

For pointed acrylic bur, we use Dedeco 82T, Mfr# 8002

Obviously Brasseler and others have similar burs

Continued below:

Workshop Outline

Workshop will last approximately 4 hours

Workshop will begin with brief review of the day's procedures

Participants will pair up

Go to assigned operatory

Exchange splints with each other

Decide which participant will be the "patient" first

Each participant will be given approx. 90 min to complete the following procedures:

1. Evaluate the fit of the splint substructure; to be sure it fits passively, without rocking, tipping, or putting pressure on the teeth. Perform internal relines of the splint if necessary. NOTE: Be VERY careful to not allow the acrylic to lock the splint on the patient's teeth. See 2nd paragraph on next page.
2. Design the occlusion of the splint to be a deprogrammer. Specifically, when done, the patient will only occlude on the splint with their lower incisors. In eccentric movements, they do touch in the cuspid regions. The splint is designed so that the patient would occlude on the 2nd molars if the anterior tooth contacts were slightly reduced.
3. Convert the deprogrammer appliance to a stabilization appliance, in which all the teeth occlude in their relaxed jaw position, and only the anterior teeth occlude in eccentric movements.

See Details Below:

Splint Substructure Adjustments

Before making any occlusal adjustments to the splint, insure that it fits the patient's teeth passively, and that it does not rock when applying pressure front to back and side to side. Even if there is no rocking, I always incorporate a thin wash of cold-cure acrylic on the inside of the splint, to insure all teeth are bearing the load equally. For the workshop, this step is not necessary if the substructure fits well without rocking.

BEWARE: When performing an internal relin of the splint, it is very easy to allow the acrylic wash to set up and lock the splint in the patient's mouth. Acrylic sets up much faster in the patient's mouth than it does on the bracket tray, because the cold-cure process is heat-sensitive. Therefore, watch very carefully, and monitor the residual acrylic on the bracket tray. When it becomes slightly doughy, start breaking the seal of the splint in the mouth, using an excavator, in order to insure that it does not lock in. Conversely, you do not want to take it out of the mouth prematurely. If you do, it will never go back in again, because the acrylic will distort before it is cured. Acrylic distorts the most just before it's final set. Typically, you only need to break the seal on one side briefly, and then seat it again. Re-check every 30 seconds or so. I often pry it off 5 or 6 times while it is setting, to see if it has set yet and to prevent it from locking in place. Believe me, you don't want to have to cut a splint out of a patient's mouth with a handpiece. The key is to use a thin layer of acrylic on the inner occlusal surface of the splint.

Adjusting the occlusion to create a deprogrammer splint

- Before checking the occlusion on the splint, insure that it is no thicker than 1-2 mm when measured with a boley gauge between the inner cusp tip and the occlusal surface of the 2nd molars. Do not worry about the splint thickness involving other teeth at this point.
- Start by having the patient close on Mylar articulating film with a "painted" surface, to transfer marks to the splint. Remember to not tell the patient to "bite" into the splint. You may need to assist them in relaxing their jaw before closing.
- Remove all marks on the splint until the patient starts to touch the 2nd molars again.
- If the patient starts out touching the 2nd molars prior to other occlusal adjustments, you will likely need to add acrylic to the occlusal surface of the splint. In doing so, add soft cold-cured acrylic to the anterior occlusal surface, then insert in the mouth and have the patient close into it without clenching. Have them remain closed until it is set. NOTE: Always wet the occlusal surface of the splint with liquid monomer prior to adding acrylic, to improve the bond. If the occlusal surface has been polished, roughen it up with an acrylic bur. In addition, make sure there are no occlusal marks from the articulating ribbon before adding acrylic to the occlusal surface.
- In making adjustments, remember the "Nascar racetrack". Specifically, grind the occlusal surface flat and level for all posterior teeth, and transition to a banked surface from cuspid to cuspid. The angle of this banked surface should be parallel to the line formed from the incisal edge of the upper incisors to the joint.

To test this, place a mirror handle or tongue blade against the occlusal surface in the incisor region. Note the angle when looking at the side of the patient's head.

- On the anterior of the splint, note the location where the lower central incisors contact the splint when the patient is closing in a relaxed jaw position. This banked surface should extend approximately 3 or 4 mm anterior to this contact point, and 2 mm posterior to the contact point before the occlusal surface turns up toward the palate.
- Continue making adjustments until the patient only touches their incisors and their 2nd molars when closing in a relaxed jaw position.
- Eliminate any eccentric posterior tooth contacts on other teeth. Do not remove eccentric contacts on cuspids.
- Lightly remove the 2nd molar marks. Check to be sure these 2nd molars are also not touching eccentric movements.
- When done, the patient should only be occluding on both lower incisors in a relaxed jaw position. In eccentric movements, they do occlude on cuspids.
- When finished, verify that they are "almost" touching their 2nd molars. This is important, in case the patient gets "lost" and fails to return for follow-up adjustments. It reduces their risk for undesirable occlusal changes.

To Convert a Deprogrammer to a Stabilization splint

Roughen the occlusal surface of the splint with a bur, to enhance an acrylic bond. Do NOT remove the occlusal contacts in the incisor region.

Mix cold-cure acrylic.

Add monomer liquid to the occlusal surface of the splint.

Add the acrylic wash to all occlusal surfaces, and insert it in the mouth while still soft.

Have the patient attempt to close on their back teeth, insuring that they are closing onto the appliance substructure. Have them stay closed until set

After curing, remove all acrylic except the cusp tips of all opposing teeth.

- Continue refining the occlusion using articulating film, until all teeth are touching.
- Have the patient hold their teeth together on the splint and move side to side. Remove all eccentric interferences on the posterior teeth, being careful to not remove the cusp tip contacts. The occlusal surface should be smooth when done, i.e., no cusp tip ridges remain.
- When done, the patient should be touching the incisors harder than the cuspids, but the cuspids should disclude the posterior teeth immediately in any eccentric movement.
- Finally, ask the patient which tooth touches first when they close on their back teeth. Remove these contacts until the patient says they "can't tell" which tooth touches first or hardest.

NOTE: In your office, if you are initially fitting the patient with a stabilization appliance, you have two options.

1. You can initially design it as a deprogrammer, as described above, and then utilize the acrylic wash technique to create the stabilization splint.

2. The second option is to generate the occlusal contacts to meet the specifications of the stabilization splint. In other words, you would be performing an “equilibration” on the splint, with the goal of getting all 14 contacts to touch at the same time. This can be very time consuming. However, if your lab has been successful in creating an occlusion that is close to ideal, you may want to use this approach.

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Important Office Procedures Prior to giving the patient the splint

Before delivery, remove any rough surfaces and sharp edges. Polish in the lab with pumice. Be careful to not over-polish. Doing so may remove occlusal contacts. Then dry the splint and perform final polish on a dry rag wheel. When using lathe rag wheels, it is easy to catch clasps on the wheel, which usually results in tearing the splint out of your hands, often resulting in a broken splint. Be sure to cover clasps with your gloved fingers when polishing.

If the patient does not have TMD symptoms, instruct them to wear during sleeping hours only. For those with TMD symptoms, tell them to wear it at night, and for 20-30 minutes at a time during the day if they notice holding their teeth together. Tell TMD patients to ask themselves once an hour: "Where are my teeth right now?" However, do not have them wear it more than a total of 2-3 hours during the day, plus at bedtime.

Give them instructions in how to care for the splint, both verbally and in writing (see patient instruction handout below).

At follow-up appointments, if the splint is intended to treat jaw symptoms, you will likely need to reduce contacts on the posterior of the splint, because the patient's lateral pterygoid muscles have relaxed and/or swelling and inflammation in the joint has resolved. It may take two or more follow-up appointments to reach a point of stability on the splint, depending on the patient's level of pain and dysfunction.

Be sure to remind all patients wearing a splint to have them bring them to their recall appointments for evaluation & adjustment.

Also review lecture slides on this topic.

Patient Jaw Splint Instructions

At your appointment today you are being fitted with what is called an orthopedic appliance, or more commonly known as a “jaw splint,” or simply a “splint.” In order to maximize the effectiveness of this device, it is very important that you follow the specific instructions Dr. _____ gives you.

Unless otherwise instructed, you must wear this device every night. Generally, daytime wear is not necessary. However, if you are having jaw symptoms, you may be asked to wear it part-time during the day. These times include:

1. When you notice yourself clenching or resting your teeth together.
2. When you are experiencing significant stress or physical exertion.

You are not asked to wear the device if you are talking frequently or eating. If you do put it in during the day, just wear it for 20 to 30 minutes at a time, for a total of no more than 2 to 3 hours, plus at bedtime.

Because this is a foreign object in your mouth, there will be an initial adjustment period. You may experience an increase in saliva while wearing the device this will go away within 1 to 2 weeks. You will also become less aware of it as continue to wear it. It will also be much more effective after you have accommodated to having it in your mouth. Do not be surprised if you find it out of your mouth when you wake up in the morning. This typically only lasts for a week or two, and stops as you get used to having it in your mouth.

Some people may think the appliance is “moving” their teeth. This is a normal feeling. Specifically, when you wake up in the morning and remove your splint, for the first few minutes your bite relationship may feel “off”. We can assure you the device has not moved your teeth. Overnight, your brain has “forgotten” how your teeth mesh together. We spend a great deal of time making sure that your jaw splint fits your teeth precisely, in order to avoid tooth movement. If you have been wearing an orthodontic retainer, it is best to continue to wear your retainer for approximately 4 hours during the day (typically after dinner). When you go to bed, take the retainer out and just wear your jaw splint.

If you have been having jaw symptoms, during the initial adjustment period do not expect significant symptom improvement the first few weeks. You may even experience an increase in symptoms or develop new symptoms for a short time. For example, it is not uncommon for your teeth to become sore in the beginning. Some patients will experience fatigue or tiredness in their jaw muscles. This should go away in a few days.

Your appliance may be modified or re-designed at subsequent appointments. This is necessary to accommodate changes in your jaw position, as muscle tension subsides and/or swelling resolves.

Please avoid clenching, grinding, or resting your teeth on the device. Your teeth should only touch momentarily when swallowing. However, after swallowing, your jaw should relax with your teeth slightly apart. Putting your teeth together greatly increases the stress and tension in your jaw muscles, and overloads your jaw joints. Some patients feel that they clench their teeth more because of wearing the splint. This is unlikely. What is actually happening is that the splint makes you hyper-aware of when you do clench your teeth.

After brushing your teeth in the morning, leave the toothpaste on your toothbrush, and scrub the device inside and out, then thoroughly rinse it to remove any toothpaste residue. To give it a fresh “taste”, you may want to soak the device in a denture cleanser (such as Efferdent) when it is not in use. However, you do not need to soak it more than once or twice a week. DO NOT soak the device in mouthwash, as they contain alcohol or harsh ingredients that will damage the splint. Also, do not attempt to clean it with other chemicals, such as hydrogen peroxide. Putting it in a dishwasher will also ruin it, as will leaving it in a hot car in the summer. It is also very important that you follow proper oral hygiene, by brushing twice a day and flossing daily.

Your splint is made as thin as possible, so that it is not too bulky in your mouth. You may find small perforations in the biting surface of the splint. This is normal and does not weaken or affect the function of the device. There is no danger of breaking your splint during normal use. However, you should be very careful when you are handling it, as it can easily break if dropped onto a hard surface or stepped on. Keep it safe in the container we have provided for you when you are not wearing it. Keep this device away from household pets. Dogs are especially drawn to them and can quickly damage them beyond repair. There is a charge to replace damaged or lost appliances.

Be aware that if you fail to wear this device for several nights that it will either not fit, or will feel very tight on your teeth. This is because everyone’s teeth move slightly from day to day. Leaving the device out for more than a week may result in it not fitting at all. There is a fee charged to re-design a splint that has not been worn as directed.

The length of time that you will need to wear this device can vary. It could range from a few months to many years, depending on your situation. Ongoing use will be necessary if you continue to clench or grind your teeth, or if you have a long-term condition such as arthritis or dislocation of the disc in the jaw joint. If you take care to protect it, the same device can last up to 5 years. If you are a severe grinder, we may need to resurface the device, by adding more material to the biting surface. There is an additional charge for this service.

Be sure to bring your device with you to all recall appointments in the future.

Please call our office if you have questions about wearing this device. It is not necessary to wait to your scheduled appointment if you have a concern.