

MASTERING H&H

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When I was a senior in dental school, we switched from making copper band-compound impressions for crowns and bridges to condensation reaction silicones. Initially I thought this would be great because we could now avoid burning ourselves and our patients with heated compound. But the big problem was getting the condensation reaction silicones down into the sulcus to capture an impression of the finish line.

I labored through packing cord, hemostatic agents, electrosurge and so on. What happened to all those preps in the textbooks that were supragingival! Everything I did ended up with a subgingival finish line in a roiling sea of boundless saliva, ferocious tongues and hemorrhagic gingiva. Every time I made an impression it felt like a job!

When I graduated dental school, I began using irreversible hydrocolloid. That was an improvement, but required a great deal of armamentarium and I had to pour up the master cast immediately after.

Fast forward to 1994 when I hooked up with Dr. Jeff Hoos, the inventor of the H&H impression technique, and J. Morita which invented the impression materials for the H&H technique. After I mastered the H&H technique, crown and bridge became my favorite dental procedure.

The H&H technique is short for 'hydraulic and hydrophobic.' In this technique, you use hydrophobic impression materials and hydraulic pressure to drive a low viscosity PVS (polyvinylsiloxane) impression material deep into the sulcus to capture a perfect impression of the subgingival finish line, but the dentist must first understand H&H in order to use it effectively.

After preparing your tooth for a crown, you make your final impression with H&H. In the first step, a double-arch tray is used to make a preliminary impression of the prepared tooth, adjacent teeth and opposing teeth using PVS bite registration material. After the material has undergone its initial set, the patient is instructed to open and the dentist holds the impression on the arch opposing the prepared tooth. The dentist washes off the prepared tooth and then washes off the impression of the prepared tooth. The dentist then delivers a very small amount of PVS low viscosity material to the bite registration impression of the prepared tooth and the patient closes down into the impression.

As the patient closes the prepared tooth plunges into the bite registration impression and compresses the low viscosity material against the walls of the impression. Hydraulic force is generated and propels the low viscosity material into the depth of the sulcus.

This captures the entire subgingival anatomy of the root to the depth of the sulcus. The finish lines are clearly reproduced in the final impression.

The advantage of H&H is that you do not need to isolate, retract gingival tissue or stop hemorrhaging. The low viscosity material is propelled with sufficient force to displace blood and saliva and to insinuate itself in between the tooth and free marginal gingival. You do not need cord, hemostatic agents, electrosurge or lasers. All you need are the impression materials.

J. Morita developed Blue Velvet and Flexi-Velvet specifically for the H&H technique and each has unique properties. Blue Velvet differs from all other PVS bite registration materials in that after undergoing its initial set, under loading, it undergoes plastic deformation when deformed. It does not rebound as do other PVS bite registration materials. In practical terms this means that when the patient bites down into the set bite registration material, and the low viscosity material is compressed against the walls of the impression, the hydraulic force generated may cause the walls of the impression to slightly bulge outward. Because of the unique chemistry of Blue Velvet, if deformation occurs, there is no rebound of the walls as there is with other materials.

Flexi-Velvet is a low viscosity PVS material that is thixotropic. It stays where you deliver it. It will not run all over the impression. It also undergoes significant shear thinning when subjected to hydraulic force enabling it to penetrate into small areas like the gingival sulcus.

Now H&H was developed specifically to capture impressions of subgingival finish lines. When you have a preparation with finish lines that are supragingival, you should remove the bite registration impression after it has set and relieve around the finish lines about half a millimeter. You can also use SnoWhite, which has a lower viscosity than Flexi-Velvet and was developed specifically for cases like this. If only part of the finish line is supragingival, relieve around the part that is supragingival.

I have been using the H&H for 12 years with great success. Some tips to improve your success with H&H:

- Use the J. Morita impression materials that were developed specifically for H&H: Blue Velvet, Flexi-Velvet and SnoWhite.
- Relieve the bite registration impression wherever the finish lines are supragingival. This is required because the original H&H technique was developed for capturing impressions of subgingival finish lines. In those cases the initial impression with bite registration material only extended as far as the gingiva and did not extend into the sulcus. The sulcular impression was captured in the second step with the hydraulically propelled low viscosity material. Supragingival finish lines are captured by the bite registration material impression in the first step. To compensate for this, about half a millimeter of relief is required around the area of the finish line. This will enable the low viscosity impression material in the second step of the protocol to flow freely around the supragingival finish line.

- Deliver only a small amount of Flexi-Velvet or SnoWhite to the Blue Velvet impression (about the size of a pea for a typical molar).
- When the patient bites down into the Flexi-Velvet or SnoWhite, lay your thumb across the inferior border of the mandible and push upward to insure that the patient bites all the way down into the impression. This is critical to generate adequate hydraulic force. When the first impression was made, the patient experienced no resistance when closing into the bite registration material. In the second step when the patient bites into the set bite registration material, resistance is felt both from the set bite registration material and the low viscosity material. In order to overcome the tendency of patients to stop biting when they feel resistance, it is necessary to use the upward pressure from the thumb lying against the inferior border of the mandible.
- When your patient is about to bite down into the Flexi-Velvet or SnoWhite, tell your patient to “close.” If you tell your patient to bite down, they may bite down only on the side with the impression tray thinking that this is what you want them to do.
- Evaluate the final impression. If you cannot see Blue Velvet showing through the Flexi-Velvet or SnoWhite, the patient did not bite all the way down.

You must also tell your lab to use two extra coats of die spacer everywhere but the finish lines. H&H is a highly accurate impression technique that reproduces every bump, ridge or ripple in great detail. This will insure an easy seating appointment. Most dental laboratories already have experience with H&H and in most cases all you have to do is indicate that you have made an H&H impression and the lab will know what to do.

There are several significant advantages to using the H&H:

- You do not need retraction cord, cord packing instruments, hemostatic agents, electosurge, lasers or an experienced assistant. All you need is impression material.
- You do not have to worry about saliva or isolation, hemorrhagic tissue, irrepressible tongues or collapsing gingival tissue. You just make your H&H impression without concern for any of these factors.
- The H&H is a far less technique sensitive procedure than conventional impression.

Eighty percent of the crown and bridge work done in the US is constituted by single crowns. The H&H impression protocol is perfect for single as well as multiple units. But when that emergency patient comes walking into your office with that broken tooth, and you have to squeeze that patient into your busy schedule for a crown prep, think H&H; especially if that broken tooth is going to need a subgingival finish line.

For all my single crown impressions, I use 30 Second Blue Velvet bite registration material and 30 second Flexi-Velvet or SnoWhite for the wash in the second step. Each of these materials has a working time of 30 seconds and an intraoral setting time of 60 seconds. I can make most of my final impressions in about 3 minutes. No need for any of the equipment or materials required for conventional impressions. I do not have to wait for hemostasis or tissue retraction. I prep, impress and place the temporary crown. Quick and easy and no stress.

Learning how to use H&H effectively is like learning any other technique in dentistry. There is a learning curve. I am just an average dentist with average skills. And if I could get through that leaning curve, you will too. I think in the future, Dr. Jeff Hoos will be recognized for introducing one of the most important techniques in clinical dentistry. The H&H is a great technique. I just cannot imagine going back to making conventional impressions for crown and bridge with all the stress and rigmarole. H&H is the way to go!

For further references and background material please see:

- Hoos J, Kaplowitz G. Proper placement of dual-arch impression trays. J Am Dent Assoc. 2003 Jun;134(6):729-30.
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