Missing Those Quality Images?

By Todd Snyder, DDS

The ability to take a good impression is nothing short of amazing when considering the environment we work in: upside down, under water and in the dark.

The impression technique has evolved considerably from the days of plaster impressions, copper bands and hydrocolloid.

You would think with all of the modern technology and science we would be capturing an amazing reproduction of the oral environment with the blink of an eye.

Today there are many materials and devices on the market that can make the process easier for everyone and provide great results too.

Current impression technologies have many forms available to fit the needs of each practitioner. The digital impression technique has created quite a lot of interest within the dental community. Systems such as the CEREC AC by Sirona, iTero by Cadent and the Lava COS by 3M ESPE all have a lot to offer dentists when compared to the traditional cumbersome technique.

Avoiding a messy two-step, putty wash system makes it nice for patients in terms of not having a mouth full of impression material for many minutes. Additionally, the level of accuracy with digital impressions is nothing short of superb.

All of the units have various proprietary software and capture devices, but for the most part a large wand/capture device on it takes a digital image that can then be used to create a three-dimensional model.

Minor points of contention

Some minor grievances that have been discussed with the systems are that the quality of the models that are fabricated for some of the systems are not as nice as hand-poured models, and the turnaround time to get models from the fabricating companies can sometimes be lengthy.

These are simple inconveniences when compared to tissue and fluid management during impression taking. These are the biggest obstacles in capturing a quality dental impression, neither of which is addressed with these modern marvels unless your preparation margin is supragingival. In addition, the current price point may displace some users investing in the technology.

The next generation intraoral scanners could quite possibly have technology that can look through gingival tissues, crevicular fluid and blood to find the cavo-surface margin without having to jump through the same hoops of tissue and fluid management.

These systems will become even better investment regardless of cost when that becomes a reality.

Keeping tissues and liquids at bay

Until the next level of technology evolves, we will all still have to contend with moisture and tissue retraction techniques. The elusive cavosurface margin, fortunately, various combative solutions and devices can be used to hold tissues and liquids at bay.

Hemostatic materials such as Viscostat (Ultradent) and Hemostasiyl (Kerr Corporation) are excellent in handling bleeding issues. Simply scrubbing either liquid into a bleeding capillary will typically cause hemostasis. Rinse the area vigorously to allow for removal of any excess material and identify any additional or stubborn capillaries that need more attention.

For displacement of gingival tissues, there is nothing better than the placement of the single or double retraction cord techniques.

A single cord can work very well at displacing tissues, however, it will either need to be removed, which can cause bleeding, or if left in during the impression technique it will need to be pushed past the margin enough to leave the margin exposed along with additional root surface.

Many dentists opt for the double cord technique with a small cord placed followed by a larger second cord to help keep tissues at bay. When it is time for the impression, the second cord is removed leaving the smaller cord behind.

Some interesting alternatives can be used instead of a second cord or, in some cases, in place of cords altogether.

Products such as Expa-syl (Kerr Corporation) and other soon-to-be-released products, are allowing for some decent tissue expansion and hemostasis at the same time. After placement, these materials can either be washed out of the area or lifted out with an instrument.

Preparation technique

Although oftentimes overlooked, the preparation technique can provide substantial benefits to control bleeding issues. Preparing the tooth structure along the gingival tissues in a clockwise manner...
can cause bleeding of the tissues from the bur abrasion as opposed to a counter-clockwise movement where the bur would be rolling on the gingival tissues creating less damage. This modern device that creates no damage to adjacent gingival tissues is a sonic handpiece (SF1LM from Komet) that uses special sonic tips to prepare and finish margins.

Unlike the rotation cutting action of traditional burs and handpieces, this instrument vibrates back and forth so there is no cutting effect on gingival tissues.

Lasers

If bleeding occurs with any technique, the fastest approach to control bleeding, crevicular fluids and tissue management is the use of various types of lasers.

Lasers can be used to remove excess tissues or to trough around margins within seconds to expose tooth structure and create a dry field.

The ability of lasers to stop crevicular fluids and bleeding makes for the driest field possible for impression taking, and nothing else is available in the dental market that can achieve this type of result.

The availability of inexpensive diode lasers from companies such as Discus and AMD LASERS are, for the first time, making it affordable for every office to utilize this technology and to simplify the impression taking process for everyone, including the patient.

Impression trays

Impression trays have also gone through their fair share of enhancements and developments over the years. The metal, perforated trays and Rim-Lock border trays have given way to disposable plastic versions of the same.

The advent of the overwhelmingly popular triple tray has laid claim to approximately 85 percent of all current impressions sent to dental laboratories.

These trays have been implemented like many other techniques and materials to cut down on overhead on both impression trays and materials because one single triple tray can not only take the impression of the prepared tooth, but also the opposing teeth and register a bite reference.

The downside to this technique is the lack of ideal jaw movement that can be reproduced with the models that are created, the absence of cross-arch stabilization and the inability to create an accurate interocclusal record.

This can create dental restorations that may need more adjustment when it comes time to deliver.

Custom trays made from traditional acrylic or modern materials such as Triad (Dentsply Caulk), although seemingly extinct in most offices, still provide the best impression results, but another modern material may soon take over.

The HEATWAVE mouldable custom tray (Clinician’s Choice) comes in a variety of sizes and is anatomically shaped to provide an excellent fit straight out of the box, but the difference is that it can be customized further.

When placed in a hot water bath the tray becomes pliable and can be custom moulded to fit even more precisely. Additionally, the ability to use less impression material with a custom tray and to create an ideal impression due to better adaptation on the first attempt provides a substantial savings of both time and money.

If someone does not have the modern digital impression devices, he or she is fortunate to still have the ability to choose from numerous types of advanced impression materials. Polymers, polyvinyls, blends and smart wetting surfactants are all various materials available to practitioners.

Polymers, having been known for their affinity to moisture (hydrophilic), and the polyvinyls, typically having been more moisture sensitive (hydrophobic), have changed.

Many of the polyvinyls are getting extremely good results via improvements in their chemistry over recent years. The bulk of the market sales come from polyvinyl impression materials. They are available in various viscosities, such as putties, heavy bodies, medium bodies and light and extra light bodies, which makes it easy to find a viscosity to meet anyone’s preferences.

Furthermore, most companies offer variations in setting and working time for those that want speed for individual teeth or those that need a longer setting time so they can impress full arches.

The most common technique that has been shown to provide the best results is a heavy tray material with a low viscosity wash material placed around the tooth that flows into the gingival sulcus capturing the marginal detail.

Impression guns and volumeters such as Pentamix (3M ESPE) or Volume Mixer (Kerr Corporation) have simplified the mixing process to achieve accurate material dispensing and proper mixing for better physical properties compared to hand mixing techniques.

The most recent additions are surface modifiers that allow for better adaptation of impression materials to the tooth structure above and below the gum line. These materials allow for better surface adaptation via decreased surface tension (B4, Dentsply Caulk).

Impression technique

Start the indirect impression technique by preparing the tooth structure in a clockwise manner to reduce tooth structure quickly, but staying away from the gingival margin. After breaking the interproximal contacts, place your first retraction cord.

Continue preparing the tooth and margins to ideal in a counter-clockwise direction, so as not damage gingival tissues, or use a sonic handpiece.

If a second cord is desired, it can be placed and margins can be refined again if necessary. Based on tissue tension, pocket depth and margin visibility, one can first rinse and then remove, one or both cords.

The advantage of leaving one cord in is that it holds the tissues away from the margins and alleviates most bleeding issues.

Bleeding typically occurs due to previously irritated tissues, bur trauma, cord packing trauma or epithelial tears due to the cord not being moistened before removal.

Should bleeding occur, chemical coagulants can be implemented quickly to resolve most bleeding issues. A laser could be used as an alternative to retraction cords and chemical coagulants to expedite the process.

An impression can then be captured either with a digital impression device or a heavy body and wash material using the impression tray of your choice. However, a full-arch custom tray will typically achieve the best results.

Upon retrieval from the mouth, the impression needs to be evaluated and professionally trimmed. The remaining cord is trimmed to leaving a contactless strip of material placed around the tooth that flows into the gingival sulcus capturing the marginal detail.

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Fig. 3: Heat Wave customizable impression tray (Clinician’s Choice) and Take 1 Advanced Impression material (Kerr Corporation).

Fig. 4: Utilization of Expa-syl (Kerr Corporation) to displace tissues and control bleeding.

Fig. 5: Light body impression material syringed into the gingival sulcus.

Fig. 6: Example of a triple tray impression.

Fig. 7: Broken tooth with enlarged gingival tissue.

Fig. 8: Preparation margin exposed by using a soft tissue laser.

Fig. 9: Full arch custom impression tray.

Fig. 10: Depiction of a marginal defect in an impression.

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Dr. Todd Snyder maintains a private practice in Laguna Niguel, Calif. He lectures both nationally and internationally, has authored numerous articles in dental publications and is a consultant for many dental manufacturers.

Snyder has been on the faculty at UCLA in the Center for Esthetic Dentistry, and currently at Esthetic Professionals.

Todd Snyder, DDS
25500 Rancho Niguel Road, Suite #230
Laguna Niguel, Calif.
92677
(949) 643-6733
www.drtoddsnyder.com
doc@tcsdental.com

(Photos/Provided by Dr. Todd Snyder)