

## EXA'lence in Impression Taking Prise d'empreinte EXA'lence

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### About the Author

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Taking impressions for the fabrication of indirect restorations has been challenging for many clinicians, but there are many ways to enhance ones techniques. There are many critical components that need to be addressed to achieve a successful impression. These components along with the implementation of various new materials and tools will help anyone to make the impression process easier and provide more consistent, accurate results. This technique article will highlight the procedure and steps in taking an impression for a posterior crown restoration on a molar. The same technique can be utilized for multiple units as well.

### Tray Selection

Surprisingly tray selection can have a huge impact on the quality of the impression taken. Closed bite impression trays account for the majority of all impressions taken, which might help to explain why approximately 90% of all impressions taken have some form of visible errors present.<sup>1</sup> The potential for

distortion is higher with this type of tray than virtually anything else available. If the tray is not rigid it can distort often unrecognizably, until the final restoration is attempted to be delivered, whereby it is then needing adjustments done or potentially necessitating a new impression for replacement. Furthermore the potential for errors in occlusion are many due to the lack of proper arch support, inability to reproduce true movements in the disposable articulators used, and the change in vertical dimension upon removing the tray from the poured/articulated model.

Impression materials shrink towards the bulk center of the material, so anytime an open bite impression tray fits more accurately to the teeth and supporting tissues the less material that is necessary and the less material shrinkage that will occur.<sup>2</sup> It is for this reason that custom trays are still shown as being the most accurate in producing ideal impressions.<sup>3</sup> Furthermore a custom tray provides better adaptation to the tooth and

supporting structures, and less room for material to escape when compared to prefabricated perforated trays. A tray that has very few or no perforations will be better at forcing the impression materials further into the gingival sulcus and provide better adaptation to the teeth due to the seating pressure. Custom trays often are very difficult to remove due to the suction created by such a well-adapted impression. If a custom tray is not available then the tray system that most closely resembles one in fit and function would be the Border-Lock® trays by Clinician's Choice. The 18 different shapes are unlike any other tray system available. The shapes that are available better approximate the shape of most dentitions compared to other prefabricated tray systems. They are similar to Rimlock trays where the retention is at the periphery of the tray, causing pressure under seating to force impression material into the gingival sulcus and around the teeth with the excess getting extruded out borders of the tray where upon hardening provides the mechanical



Figure 1 Preparation.



Figure 2. Full arch heavy body and medium body impression.



Figure 3. Close-up of impression.

retention to resist displacement of the material upon removing the tray from the mouth. The Border-Lock trays are made from Plexiglas®, unlike their sister product known as Heat Wave™ which have four maxillary and four mandibular shapes available, however they are made of a thermoplastic material that upon heating in a water bath at 158°F for a period of 60 seconds they become pliable allowing for custom fitting of these premade trays. The ability to custom fit a pre-existing tray is a wonderful luxury to have as a better approximated tray will yield better results.

For this impression of a single restoration I chose to use a Border-Lock tray because the adaptation is excellent and a single tooth does not justify the need for a custom tray.

### Technique

Margin preparation of a tooth can also be helpful in achieving a good impression. An irregular margin can be more difficult to accurately impress and could yield more flaws. Therefore the final step in margin preparation can be done with either a fine finishing diamond or a sonic handpiece such as Komet's SFILM to smooth margins and eliminate any irregularities. Additionally the final impression can be more difficult to visually access if it is acceptable, if there are obscure or irregular margins. After achieving precise, smooth well-defined margins on a preparation, the prepared tooth and all of the other teeth in the arch will be dried. It is important to dry not only the prepared tooth, but also the adjacent teeth as well as the rest of the teeth in the arch so that there is no distortion in the prepared tooth impression or the occlusal surfaces of the remaining teeth. The proper occlusal relationship can then be established without distortions that would cause the occlusion on the restoration to be incorrect. If a surfactant is desired during the impression technique it can be placed after the teeth had been dried.

A two-step impression system using a low viscosity syringeable wash material dispensed onto the teeth and a high viscosity tray material to provide displacement of the syringed material has been found to be the most accurate.<sup>4</sup> Utilizing the desired viscosity

of syringeable material start by placing the syringe tip in the area that is the most difficult margin to see or reach so that the highest level of success can be achieved, typically the distal. Starting at the distal buccal line angle of the preparation allows for the distal margin to be done typically leading into the distal lingual line angle and around the lingual, then into the mesial and finally across the buccal/facial of the tooth. The mesial and facial aspects are the easiest to access whereas the distal and distal lingual line angles typically are the most difficult to properly prepare and capture in an impression. Start syringing the impression material into the sulcus watching as the material flows into the sulcus, angle the syringe tip to allow the impression material to be dispensed into the sulcus and in front of the syringe tip, then begin moving around the tooth staying in close proximity with the tooth and moving slow enough to allow the impression material to stay in front of the syringe tip while dispensing. Try not to touch the gingiva with the tip as it may introduce bleeding from contact if the tissue was previously irritated or bleeding. After going around the entire marginal circumference of the tooth, the material can then be distributed on the axial wall still moving in the same direction only now dispensing on the axial walls moving around the tooth circumferentially again for the second time. After making the second pass dispense material occlusally still without ever lifting the tip off of the tooth and keeping the material flowing in front of the tip. Upon finishing do not stop dispensing and pull the tip out of the impression material. Avoid this as it is possible to pull the material away from the tooth due to cohesion of the material and potential risk of creating voids in the material. Instead, keep dispensing material and move to the adjacent unprepared tooth and dispense material into the occlusal table. Continue syringing material onto the occlusal of every tooth in the arch if time permits to ensure the highest level of accuracy for better model articulation. During the whole process care must be taken to keep the syringe tip embedded inside the material being dispensed to avoid capturing voids. If multiple teeth are to be impressed more time should be spent placing the syringeable material on the margins and axial

walls forgoing the occlusal table if necessary as the tray material will easily reproduce the area.

The heavy body tray material should be dispensed homogeneously into the tray without any incorporation of voids. Depending on the tray system used will determine how much material is necessary. In one vertical movement place the heavy body tray material directly down onto the arch being impressed. Any rocking or reseating movements can potentially introduce flaws, pulls and voids into the impression.

### Tissue and Fluid Management

Tissue management starts prior to the appointment with proper oral hygiene, medicated rinses if necessary and potentially premedication to control salivary rates and crevicular fluids during the appointment. The second step of tissue management is not traumatizing tissues during tooth preparation or while packing retraction cord. Initial gross reduction of the tooth structure should be performed along the occlusal and axial portions of the tooth leaving the gingival portion to be prepared last. Having already prepared the axial walls allows for retraction cord placement and displacement of the periodontal tissues. The placement of a single retraction cord displaces the gingival tissues out away from the forthcoming margin as well as positioning them apically. The tissue displacement provides a little more room to prepare the tooth with less risk of abrading the gingiva and introducing iatrogenic trauma and bleeding to the procedure. Based on periodontal tissue type, crestal bone height and biologic width a second larger cord placed on top of the already placed smaller cord may be desired based on ones technique to further displace tissues.<sup>5</sup> Preparing tooth structure in a counterclockwise direction during margin preparation will assist with the least amount of tissue trauma due to the rotational direction of the bur rolling against marginal gingiva. Additionally implementing a fine diamond for margin development is also less abrasive to gingival tissues and will provide better margins.

If one has taken care prior to the dental

appointment to condition the periodontal tissues and eliminate any gingival inflammation then cord packing should not cause any bleeding provided there is no iatrogenic trauma introduced via preparation techniques or cord placement. A single cord can be left in the sulcus while taking the impression provided it is 0.5 mm or more away from the margin. Should the retraction cord need to be retrieved to allow more space for the impression material it should be thoroughly hydrated with water to eliminate potential epithelial attachment to the cord which could otherwise cause tears within the sulcus and bleeding.<sup>6</sup>

If bleeding does occur the clinician will have to use any of a variety of materials and devices to achieve hemostasis so that they may continue with the impression process. This typically becomes one of the more challenging and difficult tasks to perform. Thankfully the advent of inexpensive portable diode lasers has created a very quick and efficient tool to contend with bleeding issues typically eliminate the issue within a few minutes. The ability to quickly achieve hemostasis with a portable diode laser has no rivals as traditional hemostatic agents that are scrubbed into the gingival sulcus cannot compare to the speed and efficiency. The portable, cordless NV diode laser by Discus is the size of a cigar and can be used to control bleeding, sulcular fluids or provide gingival troughing within seconds making it a product that no office should be without. In the absence of a diode laser there are other hemostatic products that will provide good hemostasis; Ultradent Corporation makes the Viscostat line of products with either an aluminum chloride or a ferric sulfate solution. These products along with their applicator tips can provide good hemostasis quickly. Other paste type products like the Kerr Corporation offers with aluminum chloride in their Hemostasyll and Expasyll provide good hemostasis as well as some gingival displacement.

Due to margin placement subgingivally on the distal of the preparation it was necessary to remove the retraction cord prior to taking an impression. The bleeding that ensued was resolved using Viscostat (Ultradent Corporation) and an infuser tip to scrub the



Figure 4. Final restoration.



Figure 5. Product packshot.

liquid into the capillaries to control the bleeding.

### Impression Material

EXA'LENCE has combined the ideal properties of both vinylpoly siloxanes (VPS) and polyethers (PE) to create a product they have coined as a Viny PolyEther Silicone (VPES). The chemistry of the material is new and allows for the material to be intrinsically hydrophilic, without the need for built in surfactants like traditional VPS materials. The material incorporates high tear-strength properties, improved elasticity and marginal accuracy. Various viscosities of impression materials are available based on one's personal technique or desired handling. The viscosities available for G.C. America's

EXA'LENCE impression line are: extra light, light, monophasic (medium consistency), a heavy body, and heavy body rigid and regular set putty. (PRODUCT PHOTO)

Set time is important as no one enjoys having a mouth full of impression material, nor does anyone want to be waiting. As we all have been told, time is money. Hence having the ability to select from two different setting reaction times is very important. EXA'LENCE offers a fast set (1 minute working time) and a regular set (2 minute working time). The majority of crown preparations are done as individual units and do not require an impression with a long setting time. Even if there are two or three preparations a fast setting impression material still could be the

material of choice for some dentists that are quick and efficient at taking impressions. For anyone requiring more time or preparing more teeth, an impression material with a longer setting reaction is immediately more desirable as working time is critical to obtaining an ideal impression with no pulls, distortion and proper incorporation of the syringeable and heavy body materials. EXA'LENCE addresses this common necessity for the dental practitioner in having two different setting options for all of their viscosities. In this case a heavy body tray material coupled with a medium viscosity syringeable material was used to assist in displacement of the tissues to capture an impression. (PRODUCT PHOTO)

### Summary

There are many steps involved with creating an accurate impression for the fabrication of an indirect restoration. The implementation of a modern impression material, a well-adapted impression tray, good tissue management and a sound technique can simplify the impression process. The procedure that has been demonstrated should provide anyone with additional options to create EXA'LENCE in their impressions.

### References

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