

The Importance of Impression Material Selection in the Era of Digital Dentistry.

Back-to-Back Double Cord Impression Technique for the Anterior Esthetic Zone

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As advances in digital technology continue to enter the dental industry, it is hard to grasp the significance of such times. As wonderful as scanning, milling, and 3D printing are, our younger generation got caught in the middle of this revolution. We are the students that were taught and trained in the analog world and are expected to perform in the digital universe. It is a great challenge. One that, I am not afraid to say, is sometimes difficult and confusing.

Impression techniques are a perfect example of this dilemma. While many of our colleagues have embraced digital scanners in their offices, we start to feel the pressure of being left behind if we don't do it. Once we acquire the technology, we quickly realize that it does not replace analog impressions entirely. Hence, analog impressions are here to stay, and we ought to attempt to get better at them.

It comes as no surprise that as a former dental technician and a present prosthodontist I strive for perfect impressions every time. Do I get them? Of course not, not every time that is. But that does not mean that I don't aim for perfection with every attempt.

In my search for perfection I came to realize that it is not all about the protocol and the technique. The materials used are of prime importance as well. In the following case, I focus on the impression technique and materials used.

The goal of making definitive impressions is to provide accurate information for indirect restorations. Polyvinyl Siloxane (PVS) Impression materials have become one of the most widely used in restorative dentistry. They are the number one product of choice for indirect restorations such as crowns, fixed dental prostheses, veneers, inlays, onlays, implant supported restorations, and removable partial as well as complete dentures. Newer PVS impression materials have been designed to provide optimal properties to enhance precision and minimize clinical challenges such as voids, bubbles, pulls, and tears. The rheological or flow characteristics of newer PVS impression materials have improved their handling properties and adaptation to soft and hard tissues.

Factors that influence the accuracy of an impression include proper material handling, clinicians' experience and skill, impression materials, means of material application, impression technique, working time, number of units to be impressed, and patient compliance. Furthermore, the preparation margin position (sub-, equi-, or supragingival), gingival health and soft tissue management, moisture control, and tray selection are all paramount for making a predictable and accurate definitive impression.



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is a Prosthodontist working in the Boston area. Prior to becoming a dentist, he worked as a dental technician for nearly a decade. A graduate of Harvard School of Dental Medicine, Dr. Ortiz has quickly become a thought leader and prominent Prosthodontist who splits his time inside and outside the clinic sharing his clinical skills and speaking internationally. His dental photography and adhesive dentistry courses repeatedly sell out and are requested all across the globe.

Through the years I have developed a double cord technique that works well for me in most multi-unit cases. It is important to recognize however, that the success of my technique is intimately related to the impression material used. In the case presented below, I used Aquasil® Ultra+ material because it has proven to be a material I can trust every time.

There are many aspects of Aquasil Ultra+ material that make it, in my opinion, superior to other impression materials. Tear strength being the most important. As a dental technician by training and at heart, I recognize that an impression material has to capture not only the margins, but the emergence profile. I need that emergence profile in order to design a restoration that follows the natural contour of the tooth. The only way I can get the emergence profile is by having the impression material not only flow to the bottom of the sulcus, but to come out untruncated as the impression is removed. Aquasil Ultra+ material's tear strength has exhibited superiority not only in research but in practice.

Subsequently, it is important for an impression material to hold its properties until the laboratory gets to work with them. As we all know, in a multi-unit case, the lab might pour up the same impression several times. It is here where tear strength becomes crucial. The impression must be able to sustain multiple pourings without tearing or deforming.

Another aspect of Aquasil Ultra+ material I like is its hydrophilicity. The chemical structures of a hydrophobic head and hydrophilic tail, hydrophilic-lipophilic balance value, as well as degree of fluorination, seems to do the trick. Synergistically, the surfactants allow the hydrophilicity of Aquasil Ultra+ Material to be unsurpassed by other impression materials, either A silicone or polyether based, regardless of cured or uncured state.



1. Initial situation: significant discrepancy on the gingival heights of all 8 maxillary anterior teeth.



2. Close up of initial situation: Patient presents with a thin soft tissue biotype. Probing depths on all 6 anterior teeth confirm that gingivoplasty could be attempted without the need for crown lengthening.

Clinical Case

A 27-year-old woman presented for replacement of PFM crowns on teeth #7, 8, 9 and 10. Her chief complaint was: "I am getting married in 9 months and I don't like my smile. The crowns I have are ugly and I would like you to give me a beautiful smile for my wedding".

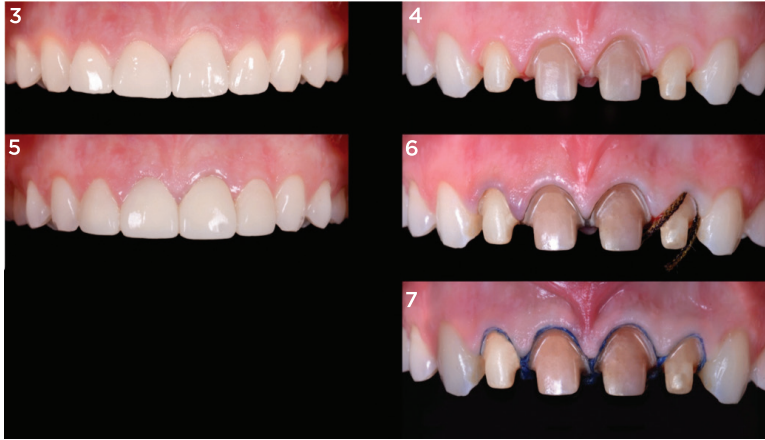
After going over the patient's medical and dental history I proceeded to a full extraoral and intraoral evaluation. Occlusal and facial analyses were also conducted. Teeth #8 and 9 had suffered trauma more than 10 years prior. At the time, root canal treatments were done on both of them, followed by full coverage restorations. Root canals did not need to be retreated. Teeth #7 and 10 were crowned for esthetic reasons at the same time as #8 and 9.

Smile analysis showed that the length of the teeth was adequate. However, it can be appreciated in image #1 and 2 that there is a significant discrepancy on the gingival heights of all 8 maxillary anterior teeth. Especially between #8 and 9. Patient presents with a thin soft tissue biotype. Probing depths on all 6 anterior teeth confirm that gingivoplasty could be attempted without the need for crown lengthening.

Upon closer evaluation it can be seen that the thin soft tissue biotype allows for the dark hue of the root #8 and 9 to show through. A discussion took place with the patient regarding the limitations in treatment options when it comes to preventing the low hue to show through.

Treatment Plan Development

Using photographic, intraoral and extraoral records, a treatment plan was proposed. Teeth # 7, 8, 9, 10 crowns are to be sectioned and removed. Underlying teeth are to be reevaluated. Gingivoplasty is needed on all maxillary teeth from second premolar to second premolar in order to harmonize the gingival architecture. Teeth #7-10 are to be prepared again and provisionalized. The maxillary centrals are to be bleached in order to attempt to increase the value of the preparations. The dark hue is deemed at risk of show through in the final restorations if not done. A healing period of 6 months was planned to allow the maxillary anterior soft tissue to heal and settle. Four lithium disilicate low translucency crowns with layered feldspatic porcelain are to be fabricated and delivered.



3. Four unit splinted laboratory fabricated provisional in situ.
4. 12 week follow up visit. A second minor corrective gingivoplasty was performed.
5. 20 week follow up visit.
6. Provisionals were removed and preparations polished using a prophylaxis cup and paste. A single #00 cord was placed in the sulcus as a first step of the double cord impression technique.
7. A second continuous #1 cord was placed on the same teeth.

Treatment Rendered:

During the first treatment appointment the patient was anesthetized via local infiltration on the maxillary anterior region. Gingivoplasty was performed via electrosurgery on teeth #4-12. Teeth #7-10 crowns were sectioned and removed. Teeth were re-prepped. Teeth #8 and 9 presented, as expected, with low value and high chroma. The chair side whitening performed did not have a significant positive result. At this point the patient was offered internal bleaching. She declined the treatment. A four unit splinted laboratory fabricated provisional was relined using PMMA resin and cemented using a temporary cement as seen in image #3.

Three follow up appointments took place after the previously described treatment. Image #4 shows 12 week follow up visit, at this point it is decided to have a second minor corrective gingivoplasty. Image #5 corresponds to a 20 week follow up visit.

At 26 weeks the final impression was taken using the Back-to-Back Double Cord Technique. The patient was anesthetized. Provisionals were removed and preparations polished using a prophylaxis cup and paste. A single #00 cord was placed in the sulcus of #7, 8, 9 and 10 (image #6). A second continuous #1 cord was placed on the same teeth (image #7). This continuous cord looped on the lingual interproximal aspect of the preparations. Both cords were mildly soaked in hemostatic solution.

Custom trays were made from diagnostic models using Triad® Material. Two consecutive (“Back-to-Back”) PVS impressions were taken using Aquasil Ultra+ Material. The first impression (image #8) was taken using Aquasil Ultra+ XLV Wash Material applied directly in the sulcus after removal of the #1 continuous cord. Aquasil Ultra+ Heavy Body Material was placed on one of the custom trays and into the mouth. Manufacturer’s specifications were followed. Immediately after the removal of the first impression, the #00 cords were removed and a second impression using the same materials was taken (image #9). By taking a second impression immediately, I minimize the need to repack cords for a second impression if the first one was not adequate. I can have a back up impression in 3 extra minutes.



8. The first impression was taken directly after removal of the #1 continuous cord using Aquasil Ultra+ XLV wash and Heavy tray materials to ensure margins as well as emergence profile are captured accurately.



9. Immediately after finalizing the first impression, the #00 cords were removed and a second impression using the same materials was taken.

At this point a bite registration was taken. Protrusive and lateral records were taken as well as facebow record. Stump shades and tooth shades were selected. Photographic records including cross polarized images were taken. Provisionals were re-cemented.

Three weeks later, the final cementation appointment took place. Provisionals and excess cement were removed. Prepared teeth were polished using prophylaxis cup and paste prior to try-in (image #10). Radiographic and clinical examination were used to confirm seating and fit of restorations. Contacts and occlusion were checked. After patient approval, the restorations were bonded and excess cement removed. Alginate impressions were taken for fabrication of occlusal night guard device, which was fitted and delivered two weeks later.



10. Final lithium disilicate low translucency crowns with layered feldspathic porcelain.



11. Final situation.



12. Before Treatment



13. After Treatment.



Conclusion:

As many of us transition into full digital workflows, the need to use analog technology is still present. High quality VPS final impressions are an essential part of the daily practice. The Back-to-Back (B2B) Double Cord Impression Technique was designed to minimize the need to retake impressions. In this case a double cord impression technique with a new generation VPS material was used to minimize the need of retake in a 4-unit anterior scenario. This procedure becomes even more critical in large full arch/mouth reconstructions, also diminishing the need to expand the sulcus for extended periods of time.

In order to successfully achieve accurate and predictable results, we cannot ignore the quality of the materials we use. No matter how good we think we are at what we do, we need to rely on scientifically proven materials that offer the advantages that allow us to succeed. As careful as I have become at taking records, treatment planning, caring for the soft tissue, etc., I have also become careful when choosing the materials I use. Aquasil Ultra+ has demonstrated time and again to be a superior impression material in many ways. Knowing that I can trust the material I use allows me to treat patients in the best manner like helping a 27-year-old walk down the aisle with a proud smile.

RESOURCES:

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