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Impressions for Implant Dentistry Made Easier

By Jeffrey C. Hoos, DMD, FAGD;

As appeared in [Implant News & Views](#), May/June 2002

"The key to contemporary restorative dentistry is the fabrication of healthy, maintainable, aesthetic, and functional prostheses."¹ I believe that a truer statement could not be said concerning the field of restorative dentistry. How do we get from the beginning to the end of the journey? That is the real clinical challenge. We can all remember our first alginate impression in dental school. The first hurdle to overcome was getting the material from the bowl, to the tray, to the mouth without it "setting up" too soon. The next challenge was preventing our partner from gagging due to an overloaded tray. After that the tray had to be removed without tearing the impression to pieces. The final hurdle was now routine.

The concepts of implant dentistry are now well documented though research and clinical success. We no longer think of implant dentistry as a distant choice in our treatment planning but often a first course of treatment. Implants are gaining in popularity by both doctors and patients. "In 2001, the European dental implant market was valued at 144.4 million dollars, a substantial 12.3% increase over 2000. By 2006, this market is expected to generate revenues of 269.8 million dollars, representing a 13.5% compound annual growth rate from 2002 to 2006. There is tremendous potential for expanding the dental implant market in Europe. Only 20% of all dentists in Europe currently offer dental implants as part of their treatment scheme for tooth loss."² The article quoted goes on to discuss the three aspects that are driving this growth. They are (1) Clinical penetration (2) Patient awareness (3) Technology.

Clinical Penetration

Clinical penetration is really the ability for all restorative dentists to understand the importance of implant dentistry from its surgical to restorative procedures. Dentists will soon realize that if they are not talking about and plant placement. providing implant services, the patient is going to find an office that does.

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Patient Awareness

Patient awareness is becoming a big factor as related to implant services. The patient is becoming an informed consumer about advanced dental options. Marketing strategies are routinely used by medical companies that drive patients to physicians for elective cosmetic services and medications. We have all seen the Viagra ads on television. Patients are learning about implant placement in consumer magazines. When a patient is given only the option of a three-unit bridge, many will now say, "I don't want to ruin two good teeth. Am I a good candidate for implants?"



Figure 1. The patient presented with upper and lower partials, requesting a fixed restoration in the lower arch.



Figure 2. X ray shows sufficient bone for implant placement.

Technology

Technology continues to improve and is really a huge factor in getting dentists to consider incorporating implantology in their practices. Manufacturers are working very hard to reduce treatment times. Implant companies are also trying to reduce the cost of their product and the number of components necessary to restore patients "back to function". The introduction of one stage, immediate-loading implants has pushed the envelope to further reduce costs to both patients and doctors.

"Immediate provisionalization enables the maintenance of aesthetics and phonetics during the provisional period as well as significant soft tissue management."³ This increased speed dentists and patients are demanding must be looked at very carefully. "...we need further research that will give us a better understanding specific to implant materials, bone qualities, and the timing and magnitude of biomechanical loading of those implants. Our treatment goals should always be to make implant dentistry even more predictable."⁴

Time Saving

Considering the above factors, I am presenting a method that will simplify implant impression taking. With this easier process, time will be saved that should translate into cost savings for dentists and patients alike. Dr.

Americo Fernandes has introduced an implant system called **BASIC** [1 (888) 888-7564] utilizing clinically pure titanium implants that have the same integration success as all the other implant systems. In his article, "Simplicity Is Always Best," he states: "Each dentist has to determine his or her level of comfort with respect to implantology."⁵

Many implant protocols are technique sensitive. Brian Monteith's article shows the unreliability of traditional screw retained prosthetic systems.⁶ Additional concerns include the complexity of a system after the implants have integrated into the bone. Dentists come up against a range of prosthetic problems from having the incorrect transfer abutments necessary for the impression to having the wrong size screw with which to insert the restoration.

Disadvantages

The goal of the paper is demonstrate the ease in which impressions can be obtained after integration of the implant fixture, utilizing one specific system. Other systems use different methods to obtain the relationship between the implant fixture and the rest of the dental complex requiring restoration. Impression protocols can be divided into two categories - closed or open tray technique. The closed method calls for the removal of the impression and the placement of the transfer back in the impression. The placement back into the impression leads to potential inaccuracies. The open tray method has the transfers screwed into the abutment; impression material is used to "lock" the transfers into the tray and then the transfers are unscrewed from the fixtures. This is a time consuming process.

H and H Technique

The H and H method of taking impressions, which I have developed for conventional crown and bridge, can be easily used with the BASIC system; at the time of surgical placement of the implant, it is possible to use the transfer device to "pick up" the device and gain the proper implant orientation.

The H and H system is a dual-arch impression technique which utilizes the hydrophobic and hydraulic properties of silicon impression materials.⁷ The success of this procedure is related to using an impression material that has a durometer rating of about 85 so that the preliminary impression does not distort or flex when the secondary wash material is placed. The simplicity of the H and H impression technique makes the impression phase more comfortable for the patient and quicker for the practitioner without losing accuracy.⁸

Clinical Case

In the case presented, BASIC implants were placed in the alveolus using a "cookie cutter" approach minimizing the tissue damage that is usually seen when full flaps are made. After the placement of the implants, transfer devices were inserted into the BASIC implants and a preliminary

impression of Blue Velvet was taken.⁹

The tray was removed and the transfer devices that may have been picked up are replaced back into the implants. The secondary wash material of FlexiVelvet¹⁰ is added to the Blue material, placed back in the mouth with the proper orientation and the patient is instructed to bite down very hard. To insure proper positioning, the preliminary impression is placed on the maxillary arch and the yellow is introduced using the tip end of the gun.

This method guarantees that the tray is in the proper position when the patient closes. The FlexiVelvet material picks up the fine details of the margins of the crowns without the use of cord but also picks up the transfer devices to gain the proper orientation of the implant fixtures. The restoration was taken to completion.



Figure 3. BASIC implants placed using proper surgical protocol.



Figure 4. The implants at time of placement using the "cookie" cutter method to gain access to the implant sites.



Figure 5. Transfer devices in place at the time of the implant placement.



Figure 6. Note the parallelism of the implants to allow withdrawal in the impression.



Figure 7. Check retractors in place to allow for visualization of the tray placement and insuring the patient is in maximum intercuspation.



Figure 8. Blue Velvet in place with hand holding the mandible.



Figure 9. Close up of the Blue Velvet showing that it is not engaging the embrasure spaces or over the partial.



Figure 10. The Flexi Velvet was place while the tray was still in the patient's mouth. The transfer device would be placed back in implant site for the secondary impression, if it had come out with the Blue Velvet.

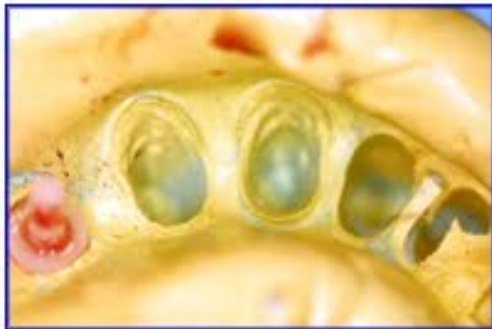


Figure 11. Completed H and H impression showing margins of teeth #'s 27 and 28.



Figure 12. Transfer copings picked up in the H and H impression.



Figure 13. Healing caps in place while implants integrate.



Figure 14. Three months later the implants with the healing caps off.



Figure 15. Lab work completed for the two crowns and the three implant supported crowns.

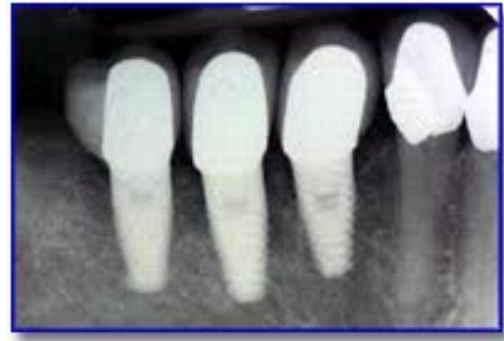


Figure 16. Radiograph showing implant supported crowns and crowns on 27 and 28.



Figure 17. Final restorations.

Conclusion

By utilizing the H and H impression technique with the BASIC implant system, the number of appointments is reduced. Overall this can have a positive effect on reduced costs and patient acceptance of implant treatment.

Acknowledgement: Thanks to Posey Laboratory (800) 437-6739 for providing the dental laboratory services.

Jeffrey C. Hoos, DMD, FAGD maintains a private group practice in Stratford, Connecticut. He has been involved with implant dentistry since

1980 and was Branemark certified for surgical placement in 1988. Dr Hoos lectures extensively teaching a course, "[Balancing: the Art, Science, and Business of Dentistry.](#)" He can be reached at jchdmd@msn.com.

Notes:

1. Silverstein DDS MS, Lee H. Guest Editorial, Practical Procedures & Aesthetic Dentistry, vol. 14 no. 2 2002 page 120.
2. Executive Summary, European Markets for Dental Implants 2001, Implant Dentistry, vol 11 no 1 2002 page 7.
3. Park, Kwnag Bum et al, Immediate Implant Placement with Immediate Provisional Crown Placement: Three Case Reports, Practical Procedures & Anesthetic Dentistry, vol 14 no. 2 2002 page 147.
4. Cronin, Robert, Perspectives, The Current Most Pressing Concerns of Implant Dentistry, Implant Dentistry, vol 11 no 1 2002 page 14.
5. Fernandes, Americo: Oral Health July 1998 page 48.
6. Monteith, Brian, J. Prosthetic Dent 69:495-302, 1993.
7. Hoos, Jeffrey et al, Innovative Impression Technique, Henry Schien self education.
8. Hoos, Jeffrey and Kaplowitz, Gary, Profitable Dentist, August 1998, September 1998, August 1999.
9. Blue Velvet, Trade name of a product from JMorita.
10. Flexi Velvet, Trade name of a product from JMorita.

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**Jeffrey C. Hoos
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The highly regarded Dr. Hoos is a world-renowned practitioner and author of frequent articles. He has developed many innovative and exciting dental techniques including the H & H cordless impression method.

Dentists from around the world regularly visit his practice to learn how to implement his advanced techniques in their own practices.

Dr. Hoos lectures extensively on Practice Management as well as Implant and Cosmetic Dentistry. He recently celebrated his 20th anniversary in private practice in Stratford, CT.



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Dr. Joe Stevens -- Million Dollar Staff

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- B. Patient Comfort
- C. Gaining Informed Consent


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2/14/04: Patient Ellen Pack on right, General Manager Susan Gregan on left.

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We would like to welcome Frank D. Raviola, DDS to our practice. He is a welcome addition to this office. Dr. Raviola is a Periodontist, and will enable us to better serve our patients.

Dr. Hoos was inducted into the International Academy of Dental Facial Esthetics (ADFE) on December 2, 2002 In New York City.

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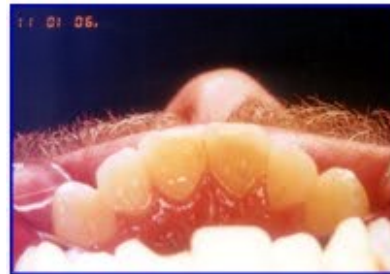
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Balancing the art, science, and business of dentistry

Hard-surface disinfectants

Jeffrey C. Hoos D.M.D., F.A.G.D.

Success in private practice is can be achieved when the doctor and staff find the correct balance between three important factors: art, science, and business. Delivering beautiful dentistry gives the doctor great satisfaction and makes patients most appreciative of the services they have received - this is the art of dentistry. Producing sound and esthetically pleasing restorations based upon applied scientific principles and by using the latest materials fulfills the science of dentistry. Providing your services in a friendly, timely manner and at an accepted fee is the most important part of the business of dentistry.

There are often scientific and business aspects of dentistry that must also be considered besides the delivery of your services. This is the support function of your staff and facility, providing a clean and sterile environment within which the doctor and staff must operate. This article is intended to give an overview of an often overlooked, or I should say misunderstood, component of providing a clean and sterile environment - hard-surface disinfectants.



Hard-surface disinfectants are used by hundreds of thousands of healthcare professionals to kill bacteria, viruses, and fungi on various surfaces found within their offices and operatories. While these products are absolutely necessary, it is important to remember that not all are created equal, nor are all as effective as you might be led to believe in every circumstance. Some have been found to be highly toxic, even potentially carcinogenic to the office staff, while others are much safer and equally, if not more, effective. Some may not actually kill the target or "benchmark" organism, (e.g.: TB) that you would have expected it to, or not kill it quickly enough to be practical for your particular application.

A quick reference guide to disinfectants							
Disinfectant	Spores (P)	Bacteria (SP)	Viruses (V)	Enveloped (E)	Non-enveloped (N)	Gram-negative (G)	Fungi (F)
Phenol (BTL)	P	SP	G	G	G	P	E
Phenol (BTL)	P	SP	G	G	G	E	G
Bleach (BTL)	P	G	G	P	E	P	E
Bleach (BTL)	E	G	SP	G	P	E	G
Quat (BTL)	P	E	E	G	T	E	G
Quat (BTL)	E	E	G	E	E	E	G
Quat (BTL)	P	E	G	E	E	E	G

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A brief discussion of the existing types of hard-surface disinfectants available on the market today and what you should look for in choosing the perfect product for you and your office follows.

First, every EPA-registered hard-surface disinfectant product's label must include an ingredient statement that lists the concentration of each active ingredient found in the product. All disinfectants must also clearly list an EPA registration number on the products label and list the kill times for the microorganisms that the product claims to kill. For EPA registration purposes, every antimicrobial product must satisfy specific regulatory requirements, including those pertaining to safety and efficacy, which are proven through exhaustive independent testing. Minimum efficacy test requirements for sanitizers, disinfectants, and sterilants differ greatly from one to another so it is important to note whether the product is called a sanitizer, a disinfectant, or a sterilant. Disinfectants comprise the

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largest number of antimicrobial products found on the market today and come in many different chemical compositions and delivery systems, which only further confuses the issue of which product to use in your office.

What products are what?

Glutaraldehyde

- Banicide (Pascal)
- Banicide Plus (Pascal)
- Cidex Plus 28-day Solution (Johnson & Johnson)
- Metricide 28 (Metrex Research Corp.)
- MaxiCide (Henry Schein Inc.)
- MaxiCide Plus (Henry Schein Inc.)
- ProCide (Cottrell, Ltd.)
- Sterall (Colgate-Hoyt)
- Wavicide-01 (Wave Energy Systems Inc.)

Phenol

- Asepti-Phene RTU Disinfectant Deodorant, EPA Reg. No. 334417-303 (Huntington Laboratories; exclusively distributed by Patterson Dental)
- Birex SE, EPA Reg. No. 1043-92-51003 (Biotrol International)
- Dual-X, EPA Reg. No. 34810-21-51003 (Biotrol International)
- Professional Lysol Brand Disinfecting Spray, EPA Reg. No. 777-53 (Reckitt & Colman, Inc.; exclusively distributed by Sultan Chemists)
- ProPhene/ProPhene Plus, EPA Reg. No. 46851-1-50611 (Cottrell Ltd.)
- Sporidicin Brand Disinfectant Towelette, EPA Reg. No. 8383-7 (Sporidicin International)
- Vital Defense - D Disinfectant Solution, EPA Reg. No. 46851-1-9273 (Block Drug)

Sodium hypochlorite (bleach)

- Dispatch Hospital Cleaner Disinfectant Towels with Bleach, EPA Reg. No. 56392-8 (Caltech Industries)
- Dispatch Spray, EPA Reg. No. 56392-7 (Caltech Industries)

Sodium bromide and sodium dichloroisocyanurate dihydrate

- MicroStat 2, EPA Reg. No. 70369-1 (ChemLink Laboratories, LLC)

Iodophores

- Asept-All Iodophore Surface Disinfectant Cleaner Concentrate, EPA Reg. No. 5185-22418184 (Sultan Chemists)
- Biocide, EPA Reg. No. 4959-16-51003 (Biotrol International)
- Huntington Iodophor, EPA Reg. No. 303-63 (Huntington Laboratories; exclusively distributed by Patterson Dental)
- Huntington Hi-Sine Detergent Germicide, EPA Reg. No. 303-63 (Huntington Laboratories; exclusively distributed by Patterson Dental)
- Iodo Five, EPA Reg. No. 4959-16 (Cottrell, Ltd.)

Quaternary ammonium chlorides

- CetylCide II, EPA Reg. No. 61178-1-3150 (Cetylite Industries Inc.)
- Citrus II Hospital Germicidal Deodorizing Cleaner, EPA Reg. No. 1839-83-68939 (Beaumont Products Inc.)
- DisCide TB, EPA Reg. No. 1839-83-10492 (Palmero Health Care)
- Madacide-1 Hospital Disinfectant/Decontaminant Cleaner Detergent/ Disinfectant, EPA Reg. No. 1839-83-11703 (Mada Medical Products Inc.)
- Precise QTB Hospital Cleaner Disinfectant, EPA Reg. No. 1839-83-56392 (Caltech Industries)
- Sterall Plus Spray, EPA Reg. No. 46781-6-48930 (Colgate Oral Pharmaceuticals, a subsidiary of Colgate-Palmolive Co.)

New Generation Quat/Alcohol Technology

Low-concentration products

- Asepti-Care TB+II, EPA Reg. No. 1130-15-1677 (Ecolab Inc.)
- Asepti-Wipe, EPA Reg. No. 9480-5-303 (Huntington Laboratories; exclusively distributed by Patterson Dental)
- Cavicide, EPA Reg. No. 46781-6 (Metrex Research Corp.)
- Envirocide, EPA Reg. No. 46781-6 (Metrex Research Corp.)
- GC Spray-Cide, EPA Reg. No. 1130-15-10214 (GC America Inc.)
- Madacide-FD, EPA Reg. No. 1130-15-11703 (Mada Medical Products Inc.)
- MaxiSpray Plus, EPA Reg. No. 46781-6-10597 (Henry Schein Inc.)
- Medica DC10 Germicidal Solution, EPA Reg. No. 1130-15-65575 (First Medica)
- MetriWipe, EPA Reg. No. 9480-5-46781 (Metrex Research Corp.)
- Sani-Cloth Germicidal Cloth, EPA Reg. No. 9480-5 (PDI)
- Sani-Cloth Plus Germicidal Wipes, EPA Reg. No. 9480-6 (PDI)
- Sanitex Plus One Step Cleaner, Disinfectant, and Deodorizer, EPA Reg. No. 1130-15-64285 (Cross Country Paper Products)

High-concentration products

- DisCide ULTRA Disinfecting Spray, EPA Reg. No. 10492-5 (Palmero Health Care)
- DisCide ULTRA Disinfecting Towelettes, EPA Reg. No. 10492-4 (Palmero Health Care)
- Super Sani-Cloth Germicidal Wipes, EPA Reg. No. 9480-4 (PDI)

Generally speaking, these disinfectants can be placed into seven categories based on the specific active ingredient (the chemical or combination of chemicals in the product that actually kill the target microorganisms) they contain. They are glutaraldehyde-based, phenol-based, iodine-based, sodium hypochlorite (bleach)-based, sodium bromide/sodium dichloroisocyanurate dihydrate-based, quaternary ammonium chloride-based, and quaternary ammonium chloride/alcohol-based products. All of these have varying degrees of efficacy and speed of kill, and may also carry drawbacks ranging from (minor) the need to mix or a mild odor to (major) staining, extreme toxicity, or loss of efficacy under imperfect conditions. The next six paragraphs further explain each category's pros and cons.

1. Glutaraldehyde-based products are generally cheap and are not known to stain or corrode surfaces that they are applied to. Where the disadvantages lie is in their need to be mixed, the foul odor they produce, their toxicity, and their need for contact times up to 20 minutes. These products are more specifically meant to be used as cold sterilants, not as hard-surface disinfectants.

2. Phenol-based products generally don't have much of an odor and do not stain or corrode the surfaces that they are applied to, and have the increased benefit of low price when concentrated formulas are purchased. Where these products lose points is in the fact that they are not very fast-acting (typically 10 minutes), a residue will eventually build-up on the surfaces in your operatory, and they are found to be extremely toxic, often causing sinus and respiratory problems, as well as headaches and nausea due to overexposure and lack of proper ventilation. Visit the EPA's Web site at (www.epa.gov/ttn/atw/hlthef/phenol.html) for more information regarding the toxicity of phenol-based products.

3. Iodophore-based products are generally low odor, non-corrosive, and extremely cheap, but they lack speed of kill and the dilution and contact times are far too critical for their efficacy to be consistent and practical in most healthcare settings.

4. Bleach-based products are well-known for their killing power, speed, and safety, but they tend to be extremely corrosive and damaging to surfaces and usually contain a heavy odor. They are not typically recommended for use on most surfaces found in a dental operatory.

5. Quat-based products are the most commonly used type of hard-surface disinfect for both the healthcare and consumer industries and, aside from the speed of kill (also typically 10 minutes), they have been found to be very effective and safe. One drawback is the potential for staining and residue to be left behind, depending on the amount of quat found in the particular products formulation. The higher the level of quat, the more it will lead to staining.

6. Quat/Alcohol-based products appear to be the safest and fastest products on the market today. They also kill a wide range of pathogens and don't typically contain any staining or corrosive characteristics. They are fairly cheap, especially for a ready-to-use product, and don't appear to present any health hazards. They do tend to contain an odor, although it usually dissipates rather quickly. The higher the level of alcohol found within the particular product, the faster the kill rates will be. Another benefit of these products is that they can be found in both the traditional ready-to-use liquid and convenient presaturated towelette delivery forms.



The CaviCide family from Metrex is one of the new generation quat/alcohol technology products available today.

Clearly, with the excess of disinfecting products from which to choose, selecting the one that meets your specific needs is crucial and extremely difficult. Ease of use (convenience), kill times (speed), esthetics (odor, residue, appearance, staining), effectiveness as determined by substantiated label claims, compatibility, cost, and toxicity are the factors which ultimately will be weighed when making your decision. As you may notice from the chart on the article's first page, there are not many product categories that score good or better in every column. As a matter of fact, there is only one.

It is important, in fact critical, that the product chosen works as claimed, to protect both the user and patient against potentially harmful, transmittable diseases, but also that it does not cause more harm than good to the user and the surrounding personnel due to toxicity. With increasing pressure on the dental staff to attend to more patients in less time, it is also imperative that the treated surfaces are germ-free when the next patient arrives. A 10-minute kill time does little good if the next patient is being seated within five minutes of your disinfection routine.

In conclusion, look at the required ingredient statement on the product's label to determine its contents, and also look at the kill times and the pathogens it claims to kill. Make sure that the product kills a wide range of these pathogens and especially the pathogen ("benchmark organism") that you might be most concerned with in your office. Do not use a product that is not EPA-registered, no matter what claims it makes on its label. Also, know the drawbacks of the type of chemistry that you are using. They may kill a broad spectrum of pathogens, but they might also be harmful to you, your patients, and the expensive equipment found in your office.

By using the right applied science (choosing the correct chemistry for you and your staff), hard-surface disinfection can be done in a safer, better, and more efficient manner. Doing this can only better your current practice. It's all in finding the proper balance.

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Esthetic Temporary Fabrication: An Innovative Technique

**By Jeffrey C. Hoos, DMD, FAGD;
 Raymond L. Bertolotti, DDS, PhD**

As appeared in *Contemporary Esthetics and Restorative Practice®*, January 2000

The current trend for chairside fabrication of temporary restorations is to use a cartridge-delivered temporary composite (Luxatemp®, Zenith Dental / DMG; 3M™ Iso-Temp™ Temporary Material, 3M™ Dental Products; Turbo Temp, Danville Engineering). These composite materials have many advantages over traditional powder-liquid methyl methacrylates, including increased accuracy and speed. However, fracture resistance is a frequently encountered problem when using these cartridge-delivered composites. Therefore, we have developed a fast technique for making temporary restorations using conventional light-curing composites. These temporaries have dramatically increased fracture resistance.

This new technique offers enhanced esthetics as well as better mechanical properties. The technique requires only a clear vinyl poly-siloxane (VPS) impression material (Star VPS™, Danville Engineering) (**Figure 1**); Memosil™ C.D., Heraeus Kulzer, Inc; or PolySil, SciCan USA) and any conventional, light-curing composite.



Figure 1. Clear Star VPS™ impression material.

PRELIMINARY IMPRESSION

Before teeth preparation, a trayless technique is used to make the preliminary impression (**Figure 2**), and cheek retractors allow for great visibility. The clear VPS material is placed on the palatal aspect and moved to the buccal using an impression gun tip. The patient is asked to bite down and position the tongue on the roof of the mouth. This movement will immediately place the teeth in maximum intercuspation. This position, which will be molded in the preliminary impression, ensures that the patient's previous occlusion is reproduced. Before removing the cheek retractors to border mold the impression, ask the patient to use his or her tongue to gently guide the material toward the teeth. The patient's tongue and muscle movement makes for a well adapted and suitably thin impression. Ideally, the material should be kept thin; however, if it is thick, it is clear enough that light can pass through to cure the composite with extra curing time.

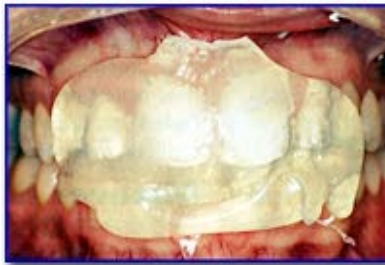


Figure 2. Preliminary impression in clear VPS using a trayless technique before teeth preparation.

COMPOSITE PLACEMENT PROCEDURES

After teeth preparation (**Figure 3**), a slightly excessive amount of composite is placed into the preliminary impression (**Figure 4**). If the composite is stiff, place the syringe in warm water to lower the viscosity. The composite and tray is then seated over the prepared teeth and the patient is asked to gently bite the impression.



Figure 3. Completed teeth preparation.



Figure 4. Composite placed into the clear VPS impression.

While not necessary, the teeth may be disinfected and desensitized by placing Microprime™ (Danville Engineering) or Gluma® Desensitizer (Heraeus Kulzer, Inc.) over the prepared teeth before seating the composite (**Figure 5**). If desired, a water-based lubricant can be used to ensure bonding does not occur to the prepared tooth or to a previously placed composite.



Figure 5. Seating of composite filled VPS impression.



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FINAL PROCEDURES

It is best to do a partial cure of the composite (**Figure 6**), remove the impression, and trim off the excess composite (**Figure 7**). Margination of the composite is sometimes improved by using a 12-fluted 7901 carbide bur (Brasseler USA®) (**Figure 8**). Apply a surface sealant (Palaseal®, J. F. Jelenko & Co., Inc.) before fully light-curing the sealant and the composite (**Figure 9**). The result is a fully cured, strong, esthetic temporary restoration with excellent retention (**Figure 10**).



Figure 6. Light-curing through the VPS impression.



Figure 7. Carving instrument to remove excess.



Figure 8. A 12-fluted carbide bur margination.



Figure 9. Application of surface sealant.



Figure 10. Completed temporaries.



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HELPFUL HINTS

In our experience, bonding or cementing the restoration is not necessary if the tooth preparation is mechanically retentive and will be used for only 2 weeks. The excellent adaption of the composite to the tooth makes sensitivity a very rare occurrence. The temporary is removed by splitting with a bur and separating the two halves with a prying instrument. Because the temporary is destroyed, the preliminary impression should be retained until the case is completed.

In the event that the tooth preparation is not retentive, a preliminary spot etching (**Figure 11**) may be performed in the center of the facial area. A light-curing bond agent is applied and cured (**Figure 12**), then the procedure is performed as previously described. Light-curing the composite will adhere it to the air inhibited surface of the bonding agent. Removal is the same as previously described, except that an additional step of removing the spot bond is necessary and can be performed with a fine disc.



Figure 11. Spot etching.



Figure 12. Curing of the bonding resin applied to the etched spots.

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Re-Examining an Impression Material for Edentulous Impressions

By Jeffrey C. Hoos, DMD, FAGD

As appeared in *Dentistry Today*, April 1996

When the Perfectim System was developed, a technique for full-denture impressions was perfected. Using this system, I can obtain full-denture impressions that result in a precisely fitting prosthesis with negligible post insertion adjustments due to sore spots.

One of the notable features of the system is the unusual control afforded in influencing the flow of the impression material. Because it is static when placed on tissue or in a tray, the material only flows when pressure is applied. Thus, the usual dripping, sagging, slumping and gagging associated with traditional impression material is eliminated.

Clinical Case

A patient presented with an edentulous maxillary jaw (**Fig. 1**). A properly sized stock or custom tray is tried into position (**Fig 2**). Any areas of the tray are relieved where interference with tissue or muscle attachments is observed. After correction, the tray is painted with vinyl adhesive and allowed to dry for a minimum of five minutes.



Figure 1



Figure 2

A cartridge of Universal Blue Velvet in a dispensing gun is extruded directly onto the vestibular areas of the maxillary jaw. Patient-held cheek retractors are employed to aid this procedure (**Fig. 3**). A previously prepared tray is inserted into position and the patient should go through all facial and lip movements. When cured, a completed border molded tray is obtained that has been achieved in a totally passive environment (**Fig. 4**). The border molded tray is carefully filled with Flexi-Velvet and the tray is reinserted into position in the mouth. The flow of the Flexi-Velvet is controlled solely by the amount of pressure applied (**Fig. 5**).



Figure 3



Figure 4



Figure 5

After removal, the impression should be dried and a small amount of Flexi-Velvet should be applied in the post dam area. The impression should be reinserted and allowed to cure. The denture base should fit with precision and require few (if any) insertion adjustments if the vertical dimension and centric occlusion are established correctly. Using the same technique, excellent fitting mandibular full dentures are achievable. However, the border molding procedure must be accomplished around the entire perimeter of the tray.

The success of this procedure is credited to two of the Perfectim materials, namely Universal Blue Velvet (75 durometer) and Flexi-Velvet (40 durometer).

For technical information, call (800) 818-7788, or to order call (800) 752-9720.

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Photographs by Jeffrey C. Hoos, D.M.D., F.A.G.D.

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Decalcification or Caries?



Application of Caries Detector



Cervical caries detected only on #28



Traditional crown preparation appears to be caries-free



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After complete caries removal



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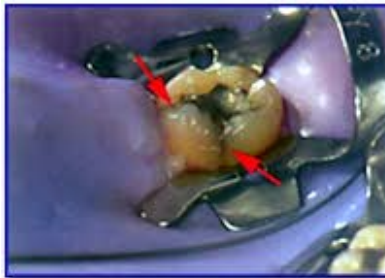
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Symptom: biting pain



Close-up of only restoration in
patient's mouth



Fractures visible after application of
Caries Detector



Patient symptoms:
Hot and Cold sensitivity



Restorations removed and Caries
Detector applied



initial caries detected at first
application



2nd application: more decay found
on walls of preparation



Final preparation: caries free



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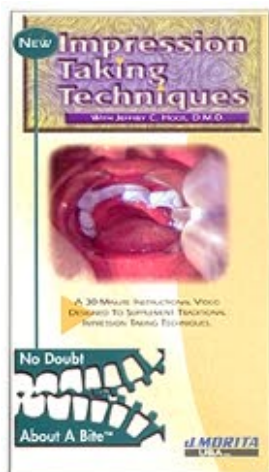
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Enhanced Magnification For Clinical And Laboratory Acuity During Prosthetic Restoration Fabrication

From *Collaborative Techniques*, Spring 2002

Jeffrey C. Hoos D.M.D., F.A.G.D.

Enhanced visual acuity is paramount to successful diagnosis, treatment planning, fabrication, and the provision of a durable aesthetic restoration. While the use of advanced magnification has traditionally been associated with endodontic procedures, recent developments in the ergonomic design of many operating microscopes (OPMs) have resulted in their increased application for routine clinical and laboratory procedures. In a recent interview, COLLABorative Techniques and Jeffrey C. Hoos, DDS, discussed the application of enhanced magnification devices for clinical and laboratory acuity. The following is a presentation of the interview:



COLLAB: *How have recent developments in the ergonomic design of many OPMs resulted in their increased application for routine laboratory and clinical procedures?*

Hoos: In the beginning of microscopy for dentistry, dental professionals were forced to use other industry's microscopes for applications in dentistry. Therefore, professionals had to compromise their positioning. Now that microscopes are becoming more accepted, companies are understanding that dentistry requires the proper positioning of the patient and - more importantly - the proper positioning of the dentist so that he or she can be in an ergonomic position for comfort.

COLLAB: *Why is enhanced visual acuity paramount to successful fabrication and the placement (ie, seating) of a durable aesthetic restoration?*

"Advanced magnification can be applied for every clinical application - from routine to complex procedures. The use of OPMs increases visualization by providing a series of magnification, from low to high power, so the clinician and technician have a versatile range of acuity, without changing position or loupes."
- Arturo Garcia, DDS

Hoos: As dental professionals mature, they begin to realize that improved visualization will result in their increased ability to provide improved dentistry. Many practitioners generally start out using low levels of magnification (eg, x2.5) and realize that enhanced acuity will only improve the degree of excellence provided. The level of magnification is then gradually increased to X3.5 or X4.5. With the introduction of OPMs, the professional is provided with even more detailed visual acuity. Therefore, the clinician can be assured that the margins are finished correctly and your restorations are fully seated.

COLLAB: *How does enhanced visualization of preparations facilitate accurate restoration?*

Hoos: Ideal preparation designs provide sharp detail, adequate reduction for the bulk of the restorative materials, and smooth contoured margins that are consistent with the gingival architecture. Improved visualization of the interproximal and subgingival regions has resulted in reduced iatrogenic failure of prosthetic restorations, as well as the immediate identification and reparation of surface defects that may have been caused by carious

defects, fractures, bur skipping, diamond grit scratches, or structural irregularities from previous preparations. The use of advanced magnification allows the timely detection of such surface defects that may have otherwise compromised the longevity of a restoration, and these complications can be addressed prior to impression capture.

COLLAB: *What elements of impression taking are improved by enhanced magnification? How is communication between the clinician and technician enhanced by the accurate detail communicated by these impressions?*

Hoos: By utilizing an OPM, the clinician is able to better visualize critical parameters and, because of this enhanced visualization, the professional can now determine if the information communicated by an impression is accurate. Impressions can be inspected once they are captured to accurately communicate critical parameters. Immediate inspection allows the clinician to determine if any preparation inadequacies (eg, unwanted bevels, undercuts, sharp transition line angles, roughness at the margin) exist that may compromise the final restoration, and if these structural imperfections can be rectified prior to the transfer of data to the laboratory technician.

COLLAB: *How is the provisionalization stage enhanced through the use of advanced magnification?*

Hoos: The provisional stage is critical when providing complex restorations because of the need for tissue management and the development of aesthetic contours. By utilizing the microscope, provisional restorations can be placed with the utmost detail, and enhanced tissue management (eg, ovate pontic development, gingival readaptation) can be facilitated. The use of OPMs also allows the clinician to see if the provisional restorations are polished correctly, therefore eliminating gingival irritation.

COLLAB: *How has the use of increased visualization via loupes and advanced magnification devices facilitated the provision of complex, laboratory fabricated restorations?*

Hoos: By working as a team, the laboratory technician and clinician can effectively communicate critical parameters and ensure provision of an accurate, precise restoration. The increase in visual acuity through the use of a microscope in the laboratory assures that the technician can deliver high-quality restorations with precise marginal integrity. Precision handling

"The use of a microscope helps the clinician and technician achieve balance between the ART, SCIENCE, and BUSINESS of dentistry. Having the opportunity to visualize the preparation, fabrication, and placement of restorations fulfills the art. Using science-based principles for design and cementation helps ensure longevity. Providing prosthetic replacements that offer aesthetics and longevity for our patients give our practices important business growth and profit."
- Jeffrey C. Hoos, DDS

of the laboratory fabrication results in fewer redesigns, and the incorporation of magnification will enhance the technician's ability to inspect the final impression, select individual die segments, and trim dies.

COLLAB: *How has the use of advanced magnification facilitated the final laboratory assessment, fabrication, and finishing procedures?*

Hoos: By being able to see the margins in great detail, the laboratory can then finish the margins to its final seating point with the utmost assurance that they've done a magnificent job. Marginal finishing techniques and the removal of refractory materials are also facilitated by the incorporation of advanced magnification, and delicate porcelain margins can be better protected during the polishing procedures by the operator's ability to more clearly visualize small, thin structures.

COLLAB: *How does the use of magnification devices allow precise marginal adaptation of laboratory fabricated restorations?*

Hoos: Being able to see your work in fine detail allows you to be able to finish your work to the utmost detail. By providing a sealed margin (ie, marginal adaptation), the dental

professional can be sure that the minimum amount of cement or bonding resin agent is used to ensure an excellent final fit. Therefore, clinicians do not have to worry about marginal breakdown, and prosthesis will last much longer so long as this parameter is addressed.

CONCLUSION

Precise visualization of the restorative interface is essential to the long-term function and success of prosthodontic treatment. Improved marginal adaptation can be achieved through increased magnification and illumination will result in improved hard and soft tissue health and enhanced aesthetics. As microscopes are modified to serve the increasing demands of both the clinician and laboratory technician, their utilization for precise clinical and laboratory procedures will continue to expand.

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Advanced Magnification for Improved Quality Control: Balancing the Art, Science, and Business of Dentistry

By Jeffrey C. Hoos, DMD, FAGD

As appeared in *Collaborative Techniques*

The use of a microscope helps the clinician and technician achieve the BALANCE between the ART, SCIENCE, and BUSINESS of dentistry. Having the opportunity to visualize the preparation, fabrication, and placement of restorations fulfills the art. Using science-based principles for design and cementation helps ensure longevity. Providing prosthetic replacements that offer aesthetics and longevity for our patients gives our practices the important business aspect for growth and profit.

Improved visualization results in an improvement in quality for the dentist. Being able to see greater detail when preparing teeth, inspecting impressions, and finishing the final restorations will result in greater doctor and patient satisfaction. The ability to "see what you are doing" will assure that the preparation and final insertion will be done to the maximum of the doctor's ability.

The microscope was traditionally used during endodontic procedures to allow clinicians to find canals that were previously difficult to find and that may have been committed to a surgical corrector (Figure 1). Use of microscopes for improved visualization of the operative field has increased the application of these devices within the general dental office. Improved vision increases the ability to provide improved dentistry. The following two cases demonstrate the use of the microscope in the preparation and insertion of anterior restorations. The images provided are not used to demonstrate the complete documentation of the cases, but to show how valuable the increased visual acuity is in the preparation and finishing of the cases.

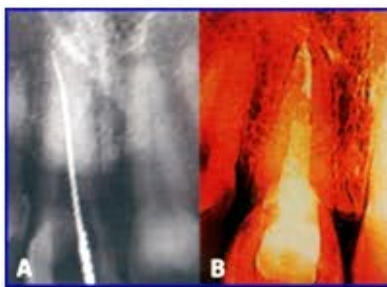


FIGURE 1A. Magnified radiograph demonstrates instrumentation of the existing root canal space.

1B. Postoperative evaluation demonstrates complete root canal fill.

CASE PRESENTATIONS

Case 1

A 40-year-old male patient presented for restoration of the maxillary region (**Figure 2**). Since the patient desired a conservative preparation design in order to maintain as much natural tooth structure as possible, porcelain veneers with minimal reduction were selected. A diamond bur (856-020, SS White Burs, Lakewood, NJ) was used to complete the preparations without the removal of decay to gain the initial outline form (**Figures 3 and 4**). A caries detector solution was used to locate microleakage around the preexisting restorations and the decay was removed (**Figure 5**). The preparations were readdressed once the decay was removed and polished using finishing burs (OS1, FT9, Brassler USA,

Savannah, GA) to develop smooth margins (**Figures 6 and 7**). Impressions were taken using the hydrophilic and hydrophobic (H&H) technique (J. Morita, Irvine, CA) without cord retraction (**Figures 8 and 9**). The microscope allowed the clinician to clearly observe the need to retake the impression as noted on the distal aspect of tooth #8(11). Magnification of the final restoration assured an excellent marginal finish (**Figure 10**).



Figure 2. CASE 1. Preoperative facial view upon presentation. The preexisting composite restorations were defective, and the patient desired a conservative restoration using porcelain veneers.



Figure 3. The veneer preparation was performed using rotary handpieces and diamond burs under increased magnification to ensure proper reduction.



Figure 4. Magnified view of the preparations. Note the precise ending of the finish line without wounding the gingiva as well as the distal anatomy of tooth #8(11).



Figure 5. The microscope was used to visualize decay removal and to ensure complete removal of the defective tooth anatomy.



Figure 6. The final tooth reduction was evaluated. Note the existence of striations in the preparations.



Figure 7. The preparations were polished under high magnification to allow for finishing without injury to the surrounding gingiva.



Figure 8. Magnified image of impression showing incomplete capture of the tissue margins.



Figure 9. Magnified view of the anterior veneer preparations.



Figure 10. Postoperative evaluation following delivery and cementation of the final restorations. Marginal integrity was evaluated at x30 magnification to ensure proper integration.



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Advanced Magnification for Improved Quality Control (Continued)

Case 2

A 15-year-old female patient presented for restoration of the maxillary region (**Figure 11**). Teeth #7(12) and #10(22) were missing and required orthodontic treatment as well as restoration with cantilevered pontics. The patient desired conservative restoration of the anterior region using porcelain veneers. The cantilevers were scheduled for placement on the lingual aspects of teeth #6(13) and #11(23).



Figure 11. CASE 2. Preoperative facial view of the patient upon presentation. Teeth #7(12) and #10(22) were missing and aesthetic restoration of the entire anterior region was desired.

Restorative Procedure

Bone sounding and bipolar tissue removal (Bident, Philadelphia, PA) were performed to ensure minimal damage to the gingival tissue. Tissue healing and tooth preparations were evaluated under high magnification and care was taken during final polishing to prevent damage to the soft tissues (**Figure 12**). While the issue of cantilevers for missing teeth has been the subject of literature and beyond the scope of this article, please note the design of the lingual retainer preparation, which was used to provide mechanical and chemical retention (**Figure 13**).

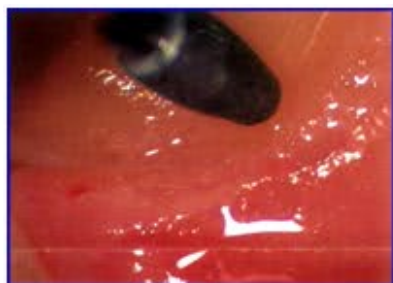


Figure 12. The veneer preparations were modified with a finishing bur under high magnification, taking care to preserve the soft tissue margins.



Figure 13. Occlusal view of the veneer preparation demonstrates placement of cantilever design for mechanical and chemical retention.

Impressions were obtained using the H&H technique to allow for accurate reproduction of the prepared structures (**Figures 14 and 15**). Preoperative photographs and impressions were forwarded to the laboratory to allow development of working models (**Figure 16**), and the cantilever pontics were fabricated with a gold arm on the lingual aspect of the preparations (**Figure 17**). Upon return of the definitive restorations, the teeth were cleaned

using pumice and water and acid-etched prior to the application of a primer (Panavia, Kuraray, New York, NY). The final insertion of these restorations was performed using a dual-cured resin cement (Panavia F, Kuraray, New York, NY) according to the manufacturer's instructions. The veneers were finished and bite adjusted in excursive movements and the final finish verified with high magnification (**Figure 18**). The final polishing was performed using a diamond polishing kit (ET, Brasseler USA, Savannah, GA) and rubber discs, points, and cups (One Gloss, Shofu, Menlo Park, CA). The definitive restorations were inserted with great patient satisfaction (**Figure 19**).



Figure 14. Magnified view of the impression taken using the H&H technique demonstrates marginal detail and accuracy.



Figure 15. The tooth preparations and location of the edentulous spaces were accurately captured and evaluated prior to forwarding the impressions to the laboratory.



Figure 16. Impressions were forwarded with preoperative photographs to allow laboratory fabrication of a preoperative stone model of the patient's existing condition.

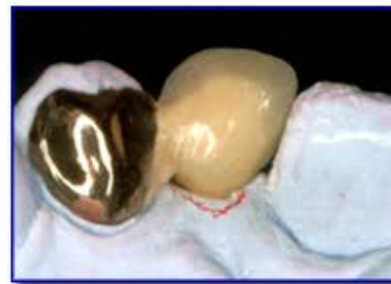


Figure 17. The cantilever pontic was fabricated with a gold lingual arm and evaluated under increased magnification to ensure proper fit prior to delivery.



Figure 18. The definitive restoration was seated intraorally and polished using finishing burs (ET, Brasseler USA, Savannah, GA).



Figure 19. Postoperative facial view demonstrates aesthetic integration of the definitive veneers and pontic restorations.

CONCLUSION

Incorporation of increased magnification allows the user improved visualization of the surgical field. Both clinicians and technicians can use this tool to ensure development of aesthetic and functional restorations for any type of treatment indication. Evaluation of the existing structures can be facilitated with ease to allow proper diagnosis and treatment planning. Tooth preparation, impression taking, and maintenance of the gingival architecture can be carefully implemented using this tool to allow accuracy and precision during the clinical protocol. Laboratory fabrication is also facilitated using magnification, as the working models and restorations can be carefully evaluated to determine proper fit prior to intraoral delivery. Use of increased magnification allows the restorative team to clearly

communicate any existing structures and details that must be reproduced in the restoration, for consistent and reliable results.

Acknowledgment

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