Implant impression techniques comparative review: Transfer impression versus direct abutment level

By Zvi Fudim, DDS

The inaccuracy in dental implant impression is a vast and unsolved problem. It is so serious that the high rate of osteointegration of the majority of implants is absolutely meaningless. Knowing that traditional transfer impression techniques seldom deliver a passive fit of a framework means that most bridges will end up with a failure (Fig. 1).

Different studies show that transfer techniques is almost four times worse than the official requirement. Therefore, besides the mechanical issue, it is also a patient’s right to know that impression transfer method is extremely inaccurate, and requires at least a warning and a legal consent. Patients are often misled by widely accepted sources that state they are placed but, in general, dental implants are placed but, in general, dental implants have a success rate of up to 98 percent. With precision dies (see below), implants can last a lifetime (WebMd.com).

Numerous in-vitro studies have examined implant restoration accuracy. There is no doubt about the fact that the transfer impression is to blame for the misfit of the framework, but what exactly causes the distortion has not yet been pointed out.

What is wrong in the transfer impression?
The first problem is that the transfer, which is mechanically caught in the impression material (such as PVS), does not become an integral part of the impression. In fact, it can be easily moved. However, due to the friction between the surfaces of the transfer and the impression material, it does not return back to its original position (Figs. 2a, 2b, 2c). That displacement cannot be avoided when the technician engages analogs into the impression. In other words, forces in first, torque or pressure dislocate and mobilize irreversibly the imbedded implant parts.

Fastingen in the screw into the analog should be done avoiding any contact with the tray; however, that cannot be always guaranteed. The shift of the transfer can take place even due to the gravity forces of the impression tray, especially in the molar areas. A tray that weighs 100 grams is mechanically caught in the impression material and is mechanically caught in the impression material and can partially compensate the expansion of the dental stone and with aid of a rigid impression tray provides fabrication of accurate restoration. The main concern with the direct impression is the abutment’s subgingival area registration. In 2008 JADA Dr. Vincent Bennani published a review called Gingival retraction techniques for implants versus teeth. Bennani covered most gingival retraction means for natural teeth and discussed the possibility of applying them in the impression of the implant restoration. His conclusion was that there is no existing device or method for gingival retraction that practically can be used for direct impression of the implant abutment. Aluminum Chloride Expy® was recently tested for use with the titanium endosseous implants and was found as a harmful material for the polished surfaces of the implant and implant parts. Bicon Implants® uses oversized healing abutments or custom oversized temporary abutments to expand the surrounding tissue. This method has little predictability because the rebound of the tissue varies from patient to patient.

Recently, a Canadian company, Stomato-Industries presents a gap between the transfer and the analog. However, the main advantage of that device is the fact that it does not impact the accuracy of the final restoration (Fig. 7). It is undeniable that the plastic collar eliminates the need of the impression transfer and the analog. However, the main advantage of that device is the fact that it does not impact the accuracy of the final restoration (Fig. 7).

Finally, more and more dentists today have come to the conclusion that a simple direct impression of the abutment is much better than the traditional transfer impression. The accuracy of the PVS material is very high; it has high volumetric stability and a good resistance for tearing. Additionally the PVS by its slight rate of shrinkage can partially compensate the expansion of the dental stone and with aid of a rigid impression tray provides fabrication of accurate restoration. The main concern with the direct impression is the abutment’s subgingival area registration. In 2008 JADA Dr. Vincent Bennani published a review called Gingival retraction techniques for implants versus teeth. Bennani covered most gingival retraction means for natural teeth and discussed the possibility of applying them in the impression of the implant restoration. His conclusion was that there is no existing device or method for gingival retraction that practically can be used for direct impression of the implant abutment. Aluminum Chloride Expy® was recently tested for use with the titanium endosseous implants and was found as a harmful material for the polished surfaces of the implant and implant parts. Bicon Implants® uses oversized healing abutments or custom oversized temporary abutments to expand the surrounding tissue. This method has little predictability because the rebound of the tissue varies from patient to patient.

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Fig. 2a: An open tray transfer impression with engaged analog.

Fig. 2b: Shows alignment of the analog with the rest of the impression.

Fig. 2c: Following torque there is misalignment of the analog.

Fig. 3a: Astratech polyether close tray impression.

Fig. 3b: Following torque there is misalignment of the line on the analog.

Fig. 3c: Polyether close tray impression presents a gap between the transfer and the rest of the impression.

Fig. 5: G-Cuff device installed on the abutments.

Fig. 7: Final impression implant Direct Legacy.
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Dentists create 24/7 online conference, tradeshow, C.E. forum

Dentistry is mired in a perfect storm that challenges the profession from all sides: weak economies in the United States and worldwide, dental trade show attendance declining every year, and dentists reluctant to close their offices or give up personal time (away from their friends and families) in order to take continuing education courses or spend time at trade shows like they did in the past.

On the vendor side, there are more than 150 trade shows in the United States and worldwide. As a profession, we have come to expect vendor visibility (and often high visibility) at major events. We ask vendors to support lunches and cocktail hours, supply tote bags and more, to the point that it is assumed they will always meet our needs. But are we meeting theirs? The way all of us learn to the point that it is assumed they will always meet our needs.

ROI (return on investment). As a profession, we have meetings, it is more difficult for vendors to realize a good ROI (return on investment). At a profession, we have met many are in the decline. And when attendance drops at meetings, it is more difficult for vendors to realize a good ROI (return on investment).

For more information, email info@xpapce.com or go straight to the online community at: www.xpsquared.com

Fifteen leading experts serve as academic advisors, monitoring content and time lines of the xpAPce and XPsquared courses delivered online by world class scholars. Learn more at www.xpapce.com, www.xpsquared.com and www.2-virtualevents365.com.

xpAPce and XPsquared launched

Adaptive learning technology trains new dentists

Dental Tribune U.S. Edition | August 2012

Evidence-based assessment tools that also document student progression. “The development of E4D Compare and its utilization in teaching institutions provide both students and faculty an innovative method of self-paced learning and a more consistent and objective evaluation of all parameters. This is another example of our commitment at D4D to making dentistry better at every level,” said Dr. Gary Severance of D4D Technologies. “There is a crisis in dental education; many students believe that grading is subjective and inconsistent,” said Dr. Gary Severance of D4D Technologies.

“D1Q Technologies, manufacturer of the D1Q Dentist™ system, has launched E4D Compare™ — an innovative adaptive learning technology tool for dental teaching institutions.

E4D Compare provides students with self-evaluation tools for precise measurement and feedback about the student's sample preparations and restorations and how they compare to the institution's standards. As students progress, they develop digital portfolios that demonstrate their accomplishments in tooth preparation, restoration design and occlusal articulation.

From the faculty perspective, E4D Compare provides complimentary courses linked together that enhance the learning experience, or they may be a larger course by one scholar who provides greater insight into a specific topic or technique. All courses and modules have one thing in common. They provide the tools that utilize current thinking and practices that enhance patient outcomes.

Our thinking: If we have one XP company, why not two? That’s how xpAPce was named, it is the name of our online dental educational community. XPsquared is much like a giant box store. It houses the day-to-day workings of our profession under one “Internet roof.” It is a place where vendors display their products in booths just as they do at brick-and-mortar trade shows. There are plasma screens for videos, PDFs, training films, FAQs, company descriptions, contact information for sales reps, chat rooms at every booth in real time that are linked to the vendors’ websites so vendors can take orders, arrange for in-person demonstrations and more. Cost effective, efficient, far-reaching, the XPsquared community members can hold study clubs, host conferences, blog with colleagues in the Network Cafe, read the latest journals or discover where the day-to-day workings of our profession take place from all sides: weak economies in the United States and worldwide, dental trade show attendance declining every year, and dentists reluctant to close their offices or give up personal time (away from their friends and families) in order to take continuing education courses or spend time at trade shows like they did in the past.

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For more information, email info@xpapce.com or call (212) 355-5335.

(Photos provided by xpAPce and XPsquared)
Excel Studios is a full-service dental laboratory specializing in full-mouth and implant reconstructions. The state-of-the-art facility is equipped with the latest in CAD/CAM technology. Through its unique partnerships with leading implant manufacturers, it is able to offer name-brand products with full manufacturer warranties for your peace of mind. Visit Excel Studios on the Web at www.weknowsmiles.com or contact a representative directly at (800) 981-9008, and let Excel Studios help you reach your ceramic goals.

(Source: Excel Studios)

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(Source: Excel Studios)

E4D Technologies is the creator of the E4D Dentist and E4D Labworks systems, which use high-speed laser scanning technology to produce digital 3-D impressions of teeth without the application of contrast agents. Intuitive DentalLogic™ software enables operators to customize restoration designs and send them wirelessly to the precision mill that uses the latest restorative materials to produce fine esthetic restorations. E4D also offers E4D Compass for restorative-driven implant solutions and E4D Compare adaptive learning technology for teaching institutions.

(Source: E4D Technologies)

The practitioner has to do everything possible to keep the restoration in the zone of 10 µm of the marginal fit. An implant, unlike a natural tooth, does not have periodontal mechanism that gives the natural tooth a resilience of 50-80 µm. Splinting as many crowns as possible divides evenly the load between the implants but can compromise the passivity due to the poor accuracy. To achieve 10 µm level of accuracy, every single negative cause should be eliminated from the impression procedure.

The only recipe for implant-supported restoration success is an accurate impression. Currently, the alternative to the transfer impression is the silicon or optical direct impression of the abutment with G-Cuff™ by Stomatotech or with an optical impression with an aid of scanable bodies. These two methods deliver a substantial passive fit that assures longevity of the implants and of the whole restoration.

Note: A complete list of references is available from the publisher.

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The greatest advantage is for optical impression users, because it allows scanning the abutment exactly the same way as a natural tooth. The digital impression is an extremely accurate method for taking impressions, and it is gaining its place in the dental general practice very fast. Still, its use in implant prosthodontics is limited. A comparative study by J. B. Da Costa published in JOD, shows that there is no difference between direct oral scanning and indirect scanning of a stone model from PVS impression, which confirms the high accuracy of both methods.

Summary

The passive fit of the prosthetic framework is extremely important, especially for longevity of an implant. Every implant, even the cheapest one, can last many years in the patient’s mouth if only it is correctly loaded and properly restored. Lack of the passive fit usually leads to serious bone loss and implant failure.

The students that have used this program have seen fast results and have been engaged from the beginning. The E4D Compare software provides new possibilities for enhancing the learning experience within the dental curriculum. E4D Compare is available through Henry Schein Dental and is compatible with E4D Dentist and E4D Labworks systems and PCs meeting certain processing and graphics requirements. For more information, go to www.e4d.com/compare.

Dr. Walter Renne, course director for CAD/CAM technologies and ceramics at the Medical University of South Carolina, College of Dental Medicine. “The E4D Compare software program enables students to learn by challenging themselves against the ‘master’ templates. E4D Compare has proven to be revolutionary in my classes.

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