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For profit-minded dentists and laboratory owners, the rapid growth of implant dentistry is proving it to be a lucrative business that shows no signs of slowing down in the near future. Last year, the global dental implant market was projected to reach \$8.4 billion by 2025, growing at a CAGR of 7.9% from 2017 to 2025, according to Research and Markets. Increased demand has had a positive effect on laboratory pricing, driving fees upward for a single implant by 5.9% between 2012 and 2017, according to the National Association of Dental Laboratories (NADL) Business Surveys, with more complex cases demonstrating the potential to be even more of a profit center for those laboratories capable of handling them. Capitalizing on these trends, however, requires a deeper level of knowledge and involvement than ever in the implant process.

“As older Americans lose teeth due to periodontal disease and the eventual failure of long-term restorative work, this group will increasingly demand implant treatment as the ideal replacement,” says Greg Minzenmayer, COO of Glidewell Dental. “We have already seen a sharp movement away from implant-retained removable prostheses and toward implant-supported fixed prostheses, and with it an increased emphasis on having—or developing—the

proper soft- and hard-tissue support for dental implants. Clearly, dentists who wish to treat their patients successfully with dental implants must become skilled not only in placing implants but also at augmenting soft tissue and bone.”

The tools at the dental team’s disposal continue to advance, offering more diverse treatment options. Laboratory involvement has simultaneously become more essential with the advent of new communication technologies and more important with so many treatment and material options.

“Technologies such as CT scanning, digital treatment planning, and intraoral scanning have made treatment outcomes much more predictable,” Minzenmayer says. “They also provide a platform to bring the entire team together. Additionally, while in many ways dental materials of today have become much easier for the laboratory to navigate, it is certainly still important to know your materials.”

With this in mind, *IDT* spoke to dentists and technicians with extensive experience in the areas of bone management and implant placement, tissue management, materials selection, and collaboration about best practices.

Four advanced concepts to take your implant services to the next level

BY JASON MAZDA

BONE MANAGEMENT AND
IMPLANT PLACEMENT MATTER:
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Bone Management and Implant Placement Matter

Laboratory's involvement in early stages helps
achieve desired outcomes

The dental laboratory's involvement in the early stages of a case generally can help any restorative team's chances of achieving a successful outcome, and that is especially true for implants. Whether for a single implant or an all-on-X prosthetic, a dental technician's expertise is valuable well before the laboratory begins fabrication of the final prosthesis—including for bone management and implant placement.

"Knowing the restorative options for all implants being placed is very important," says R. Kurtis Helm, CDT, owner of Helm Dental Laboratory in Wylie, Texas. "If the surgeon starts cutting bone and placing implants without consulting the restorative dentist and the laboratory, we are often forced to change the treatment plan post-surgically to account for less-than-ideal conditions. The surgeon must be aware of the desired end result and the strategy for achieving that."

For example, Helm says, a full-arch zirconia restoration for an edentulous patient requires less bone reduction than does a restoration that includes a bar overdenture.

The first factor that must be considered is whether the implant-supported restoration will be cementable or screw-retained, says Nicolas Elian, DDS, Co-Founder, President, and CEO of Vizstara in Englewood Cliffs, New Jersey.

"That dictates how much bone volume is necessary," Elian says. "That is the first step toward working with what you need, rather than just working with what you have."

For the placement itself, several key factors and landmarks should be considered. One common mistake, Elian says, is focusing only on the implant site itself.

"It is important to look mesial and distal to the site because adjacent to the site you should have stable anatomical landmarks," Elian says. "These can include a maxillary canine that has intact soft-tissue volume and intact bony housing, in particular on the buccal side. For example, if teeth Nos. 7 and 8 are missing, then No. 9 should be a stable landmark with intact soft tissue on the buccal side and intact bone. Capitalizing on these landmarks can guide the process of reshaping the alveolae to achieve convexity rather than concavity."

Helm notes that the technician should be conscious of other anatomical structures such as nerves and sinuses that must be avoided. The laboratory, he says, needs as much diagnostic information as possible.

"Every product we produce in the laboratory requires a minimal occlusal clearance," Helm says. "If we are not getting adequate clearance, we are not able to produce the case. We need good diagnostic models, a CBCT scan, and patient photos. We also need to know the patient's expectations. Even the best restorations are not successful if they do not meet the patient's expectations."

While experienced clinicians may be able to accurately place implants without the use of surgical guides, Elian recommends not leaving it to chance.

"To ensure immaculate and meticulous execution, just use a surgical guide," he says. "It will show the exact distance of the cemento-enamel junction (CEJ), also known as the cervical line, the exact mesial-distal position, the buccal-lingual position, the thickness, etc."

With today's implant planning software and the laboratory's input early in the process, it is possible to provide more comprehensive treatment, considering different aspects of the case and a variety of restorative options to achieve optimal results.

"Most restorative dentists and surgeons focus on the white part in the diagnostic waxup phase," Elian says. "I recommend asking the laboratory to provide the white and the pink separately, which allows the restorative dentist and the surgeon to visualize the dimension of pink that might be missing. The laboratory team might point out that another tooth should be considered when planning treatment. It is best to see the final outcome and take the steps one at a time in a backward direction to build the foundation that allows you to reach that outcome. The dental technologist, restorative dentist, and surgeon should be working on the case simultaneously at every step. You cannot separate them."

Tissue Considerations Merit Close Attention

Adequate tissue and solid margins for abutments improve chances of success

Some implant cases arrive at the dental laboratory with a perfect spot for the restoration. Others are not so fortunate.

“Life is beautiful if you are lucky enough to have ideal bone volume and ideal soft-tissue volume, but that is rare,” says Nicolas Elian, DDS. “For a deficient ridge, it is important to consider soft tissue just as much as bone. The soft tissue may appear sufficient initially, but as the bone is built, the soft tissue is like a balloon getting thinner as it is inflated. Unless you start with excessive soft tissue, you generally cannot graft or rebuild bone without rebuilding soft tissue also.”

Because inadequate soft tissue can hinder the laboratory’s ability to provide the best possible restoration, Elian says he consults with a dental

technician from the start of the case.

“I do not want to ask the ceramist to compensate for anything,” Elian says.

Soft tissue can be added by harvesting from the patient’s own palate or using soft-tissue substitutes. Both are strong options, Elian says.

“The debate becomes whether to graft soft tissue before or after grafting the bone,” he says. “In the thin biotype patient, it may be necessary to do both. For a thick biotype, it may be best to always graft the tissue as a secondary event, once the stretching is complete.”

While anterior esthetic cases garner more attention for tissue management, it is important for full-arch cases as well.

“Emergence profile and design of the abutment

or structure are crucial to the implementation of the gingival architecture, especially in the esthetic zones and hygienic areas,” says All-on-4® consultant Thomas Wade, CDT. “Emergence profile that is at least 0.5 to 1 mm subgingival is ideal for screw-retained restorations. When the implant or abutment interface is 1 to 3 mm supragingival, the technician is forced to work from that elevated margin back down to the tissue, creating food traps and esthetic concerns.”

In addition, these openings can allow for air escape, which impacts phonetics and causes bubbling.

Interocclusal space and the height of the restoration can dictate the height of the restorative components.

The Kois Solution for Abutment Design BY DENE LEBEAU

How can a dental technician create a positive effect on soft-tissue management during the fabrication phase of an implant prosthetic? Contour is obviously the answer; however, contour of the abutment is far more important to the tissue than contour of the crown. John C. Kois, DMD, MSD, brought forth the John Kois Abutment Design (JKAD) more than 10 years ago with a basic premise of recreating the geometry of the natural tooth at and just below the cemento-enamel junction (CEJ, also known as cervical line).

Figure 1 and Figure 2 illustrate an ideal implant case fabricated more than 8 years ago. Abutments, like natural anterior teeth, should have a flat facial emergence profile up to 1 mm of the proposed free gingival margin and flat sides to support the papilla. Margin location is 3 mm coronal to interproximal bone measured from adjacent teeth and within 2 mm of adjacent teeth, dependent on coronal contour.

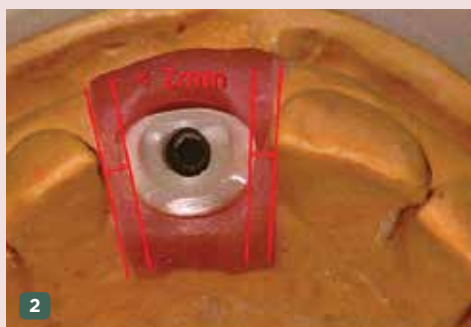
Figure 3 shows two No. 8 abutments made for a case, circa

2010—a JKAD abutment (right) and one from a standard design center. Both abutments are at the same vertical height, but the facial margin on the left is too coronal and narrow, adding risk to the gingival contour. This design offers no papilla support; it is also too far away from the coronal of the adjacent teeth and doesn’t capture the extent of the facial contour. Placed in the mouth (Figure 4), this JKAD abutment would look much like a tooth preparation if the screw hole were digitally removed from the photo. The flat interproximal walls are within 2 mm of the adjacent teeth, and the CEJ is the perfect size to create a crown that harmonizes with No. 9.

Three months post-operatively, the patient demonstrates excellent tissue health and papilla support (Figure 5). A 5-year post-operative photo showed little to no change.

Acknowledgement

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“I recommend working closely with the surgeon to determine abutment height,” Wade says. “Surgeons sometimes do not pay attention to prosthetic considerations.”

Undulations in the soft tissue post-surgery/healing phase can also cause problems in the final restoration.

“Training the tissue for a better final restoration should be achieved by incorporating some tissue compression with a highly polished, convex intaglio surface on the provisional during the healing/tissue stabilization phase,” Wade says. “Prior to the final restoration impression, any disruptive, tall tissue undulations can be improved by the dentist with laser treatment or other methods.”

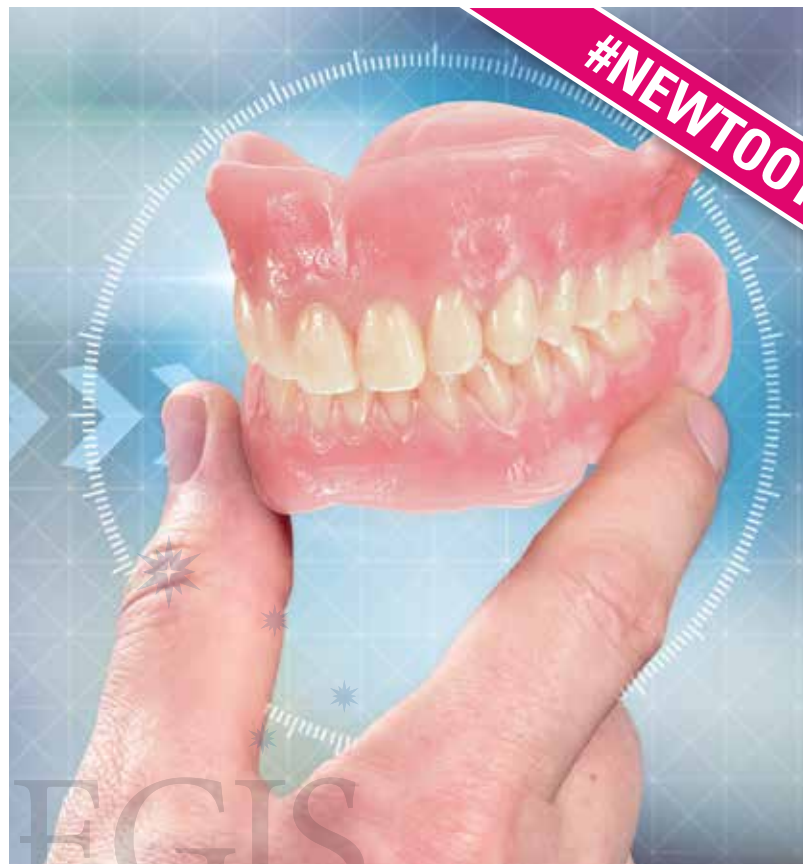
Wade offers extensive lectures on tissue management strategy for full-arch cases but says the most important step is simply acknowledging the issue.

“The patient lives with this restoration every day,” Wade says, “so we owe it to them to do everything possible to achieve a successful outcome.”



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Adding Value as a Material Consultant

Dentists need technicians to be experts on the newest options

Among the most important subjects on which clinicians consult laboratories is material selection. For an implant case, providing educated input on materials requires an in-depth knowledge of how they are impacted by particular variables.

“Especially with the edentulous patient, so many factors go into the decision making,” says R. Kurtis Helm, CDT. “Simple things such as dry-mouth symptoms or sleep apnea can affect the materials we consider to be options. If the patient is a heavy bruxer, a long cantilever should be avoided and a more wear-resistant material such as zirconia is preferable. Restorative space and components are important factors; if there is only 7 mm of restorative space, a bar overdenture or hybrid is not an option.”

The same strength-vs-esthetics considerations that are required for crown-and-bridge are also present for implants. A more monolithic material may be desirable for the posterior, while layering porcelain on top of a ceramic substrate may be preferable in the esthetic zone. Implant placement, however, can be a wild card.

39% OF NADL LABORATORIES SAY

MORE THAN HALF OF THEIR CLIENTS ASK FOR NEW RESTORATIVE MATERIALS

SOURCE: NADL 2017 MATERIALS AND EQUIPMENT SURVEY

“Even with the angle correction offered by some abutment manufacturers, sometimes an implant is placed in such a manner that the prosthetic screw that will hold the restoration cannot be brought lingual enough to avoid negatively impacting the esthetics,” says Jerry Ulaszek, CDT, President of Artistic Dental Laboratories, Inc. in Chicago and Bolingbrook, Illinois. “At that point, it can become necessary to use a screw-retained abutment with a cemented restoration on top of

begin developing a plan for materials based on the restorative space, componentry, etc.”

Popular new materials for implants include polymers such as PEEK and PEKK, which are advertised as being more esthetic than traditional substructure materials but with comparable strength.

“Polymers are easy to work with and very easy for laboratories to adopt,” Helm says. “Our job as technicians is to tell the restorative dentists about the options, limits, and liabilities of each material, and to let them make the final decision.”

Polymers remain relatively new to implant dentistry, however, and traditional materials are still very viable options.

“PEEK and PEKK offer the advantage of being white, but I have never had a case that was negatively impacted because we used a milled titanium bar,” Ulaszek says. “Eventually, if I am 100% comfortable that I can make predictable restorations with polymer substructures, I would consider it, but for now we are in the early adopter stages, so I prefer to let others figure out what works and what does not work.”

Some materials require different workflows, but Helm says that should not be a determining factor in treatment planning. Whatever material is deemed best for the patient, Helm trusts his experienced technicians to fabricate the restorations as effectively as possible.

“We mold our material choices based on the patient’s ultimate goals—what they are trying to achieve and what they are seeking in the finished product,” Helm says. “Laboratory workflow should not impact the decision.”

While that decision ultimately rests with the dentist, the laboratory often is more knowledgeable about the various materials available, and in those cases it is incumbent upon technicians to act as consultants during treatment planning. Ulaszek says that some prosthodontists occasionally push for certain materials, but general dentists typically trust the laboratory.

“As long as you never let them down by providing inaccurate information that compromises a case, dentists are very willing to listen to what you have to say,” Ulaszek says. “If we say we really believe a treatment plan is the best option, 99% of the time they are willing to go along with it as long as we can justify our rationale.”

53%

OF NADL LABORATORIES SAY **CLIENTS LEARN ABOUT NEW RESTORATIVE MATERIALS VIA EDUCATION OR**

TRAINING BY THE DENTAL LABORATORY

SOURCE: NADL 2017 MATERIALS AND EQUIPMENT SURVEY

it. Sometimes that situation is simply unavoidable for the surgeon, and it can change the way things must be done.”

The first step, Helm says, is setting expectations for the patient regarding the end result.

“Many times, patients do not know what they want; they just want to be able to eat,” Helm says. “Once we get to know them and understand what they are looking for, we can



Becoming an Insider in the Operatory

Active participation as a consultant during surgery improves the restorative process

Serving as a consultant to the clinician is important. Being onsite for the implant placement can be even more helpful.

Andrew Rusinowski, President of Smiledent Inc. in Mount Kisco, New York, attended his first dental implant surgery approximately 5 years ago; the surgeon was a friend, and the patient was the surgeon's uncle. Now, Rusinowski works with several surgeons and attends three to four surgeries per week.

"Previously, we rarely had a chance to interact with the surgeon," Rusinowski says. "The impression was sent to us, and we worked with it. Now, for the first time, we have become partners. We are present at the diagnostic stages with the restorative dentist, we discuss optimal placement and strategies with the surgeon, and more. It helps every member of the team provide better results for the patient."

Becoming more knowledgeable about how one's surgical counterpart operates can help frame the collaborative process.

"I have acquired practical knowledge about how surgeons treat bone, how they evaluate where the implant can or cannot be placed, and more," Rusinowski says. "Knowing how they treat the bone helps me with the diagnostic steps. Knowing the surgical procedures educates me in my restorative thinking. I may ask the dentist to torque the implant a bit deeper for timing to help on the final restoration. I have learned a lot about simple things to request from a surgeon that will help me a lot on the final restoration."

While some things can only be learned firsthand—Rusinowski likens it to learning how to layer porcelain—technicians can prepare for this role with extensive reading, participation in study clubs, and more.

"Understanding the whole masticatory system is important," says Jerry Ulaszek, CDT. "You really need to know how the jaw and muscles work, how the teeth function, and why."

Those early experiences can be transformative—for both the technician and the surgeon.

"A technician sometimes cannot truly appreciate the challenges the surgeon and restorative dentist face until seeing them up close," Ulaszek says.

Conversely, the clinicians can gain a newfound appreciation for the knowledge and

insight that the technician offers.

"Many surgeons have never worked closely with a technician," Rusinowski says. "Spending time working together on restorative procedures creates a bond that no advertising can achieve. You can show your skills and your ability to think

How to get started

Carving out a role in surgical procedures is not easy for a dental technician, Andrew Rusinowski says. Here is how he recommends getting started:

"First, identify an area in which your laboratory excels. For us, it was Prettau bridges (Zirkonzahn, zirkonzahn.com). Involving ourselves in the surgical phase of Prettau cases completes the circle, because we can contribute to the structuring of the position and angulation of the implants for a final screw-retained bridge.

"You cannot simply read about surgeries and immediately contribute to live procedures. You need to gain a deep understanding of each step. Learn what works and what does not work. I recommend asking other technicians to share their experiences and then developing a good relationship with a surgeon who will invite you to observe live conversions before actually joining the team.

"You need team members who are willing to start this process with you, because it is a process. Several surgeries are necessary for the surgeon, the restorative dentist, and the technician to become accustomed to each other. Once that happens, though, the results are entirely worth it."

and manipulate materials and parts on the fly."

No matter how knowledgeable and experienced the technician becomes, however, understanding each team member's role is crucial. The technician should only be a consultant at this stage.

"There is a clear distinction," Rusinowski says. "I am the dentist's GPS. The dentist is the driver, and I am providing advice on where to go."

Ulaszek insists on working only with surgeons. While he has been asked to help general dentists with implant surgeries in their offices, each time he has politely declined because numerous medical problems can occur during surgery and he believes most general dentists are not equipped to respond.

"A whole lot more goes on in the operatory than placing an implant in someone's bone, and from a liability standpoint, I do not want to be the most knowledgeable person in that room about how this procedure works, because that opens you up for possible lawsuits," Ulaszek says, noting that even if a lawsuit is dismissed, legal costs can be crippling. "If I am in the room, I want a surgeon, general dentist, and dental assistant with me. I am only there to provide technical advice. When I am asked questions, I say, 'From a prosthetic standpoint, this would be best.' I am only providing my opinion from a prosthetic standpoint, not from a biological standpoint."

Ulaszek does have professional liability insurance, and he recommends that every laboratory at least consider that.

"The moment you pick up a phone and give an opinion on something like the type of abutment, you are providing professional advice," he says. "If something should go wrong and the patient files a lawsuit, you can get drawn in on that."

So many things can go right, however, as the collaborative approach helps each team member expand his or her knowledge and better understand the entire restorative process.

"Collaboration makes us all much better operators and much better specialists," Rusinowski says. "The surgeon gives more consideration to the restorative process, and the technician thinks more about the surgical process. The result is often a better outcome for the patient."