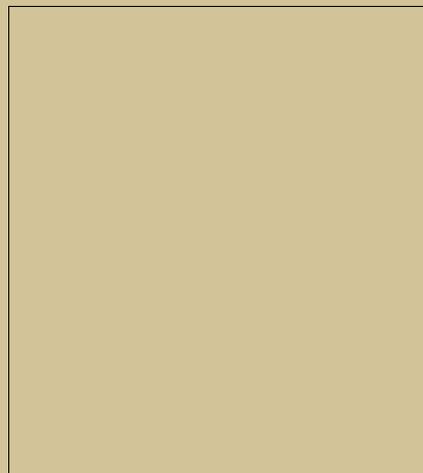


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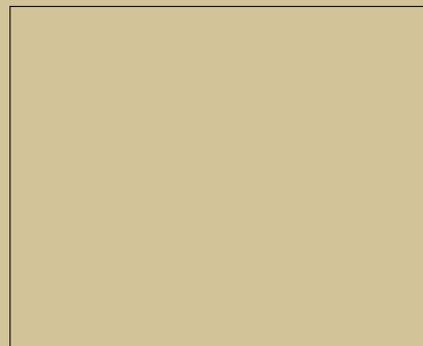
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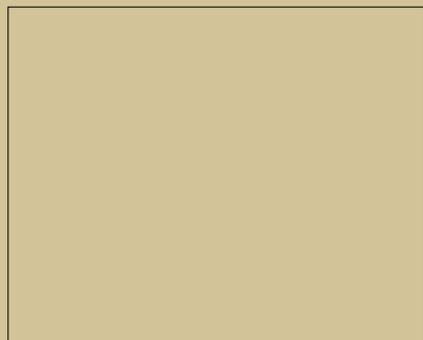
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Esthetic loading of dental implants

By Dr. Wilkie J. Staderker, DDS

The following article describes the esthetic loading (EL) of dental implants. EL of implants means placing an implant in an esthetic location then putting an esthetic temporary on it.

After the implant is allowed to heal an esthetic restoration is done. This article will also give the dentist insight into which factors will make EL implants most successful and acceptable to patients.

Introduction

We live in the era of esthetics. Patients' esthetic demands drive dentistry, and esthetic loading of implants is one way today's dentist can address these demands. A study by Schnitman¹ describes the placement and loading of implants. Schnitman and other authors²⁻³ have identified several factors that are helpful in predicting the successful placement and loading of implants. These factors include bone quality, implant length, extent of loading, implant surface, initial stability and, of course, experience of the surgeon.

When placing an implant in an esthetic location, there is a simple method, highlighted by Garber and Salama⁴, that one can follow to maximize esthetic results. First, the practitioner should evaluate the lip's form, shape and position and determine whether the patient has a high, medium or low smile line. If the patient has a high smile line, there may be a higher esthetic hurdle to overcome.

Patients with high smile lines will see every part of a new restoration



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Fig. 1: Esthetic loading case

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with every smile. By contrast, patients with low smile lines will see little to none of the new restoration when they smile. The medium smile line, often considered most attractive in our society, may offer fewer esthetic challenges.

Following the same simple method, the practitioner should next evaluate the gums. If they are inflamed, that inflammation must be addressed prior to surgery. Are the gums symmetrical or asymmetrical? What is the gingival form? Finally, evaluate the teeth, their shape, the position of the contacts, and the dimensions of the horizontal and vertical overlaps. Do the teeth have a masculine or feminine appearance? What type of occlusion is there? How do the contacts relate to the papilla? Do the teeth have a proper silhouette shape? After consideration of these elements, a cone beam X ray may also be taken.

A cone beam X-ray may be helpful in assessing bone width. Identifying the bone width can help increase the cortical bone contact, an important factor in performing implants, particularly in an EL case. Cortical bone contact is important because the more there is, the greater the chance of osseointegration. But although cone beam X-rays can be useful in making this assessment, they do have certain shortcomings. For example, they often do not meet all of the manufacturer's claims. They may have limitations because of calibration of the equipment and operator error. Also, the metal in existing restorations can interfere with the cone beam X-ray quality. Performing a cone beam X-ray may also give the patient unrealistic expectations because in his or her mind, spending extra time and money on a special X-ray means the results will be perfect, right? There is also the potential for legal liability if the cone beam X-rays, which are full skull X-rays, are read incorrectly.

Taking all of these shortcomings into consideration, it may still be useful to have a cone beam X-ray in certain cases, but it is essential that the practitioner and the patient be on the same page. One way to minimize expense and legal exposure is to have a qualified independent contractor perform the X-ray service. The practitioner thereby avoids the expense of owning and maintaining the X-ray machine, but still benefits from having a radiology specialist review and evaluate the X-ray. Of course, the practitioner should not rely solely on the radiologist's assessment, but should review the X-ray him or herself as well.

Treatment and discussion

The present case (Fig. 1) was



Fig 2: Removal of precision attachment



Fig. 6: Surgical stent

determined to be a suitable EL case because the missing tooth was in an esthetic location. At first glance one would not think that a posterior tooth could be in an esthetic location. This patient was missing one premolar and every time she smiled a "black space showed." This makes the space an esthetic location.

The patient was also in group function. This is very important in EL cases because malocclusion, heavy interferences and micromovement can cause fibrous integration instead of osseointegration. The precision attachment was then removed (Fig. 2) and a one-piece implant (NobelDirect®) (Fig. 3) was chosen for the EL case. The benefit of a one-piece implant is that there is no microgap and, therefore, there is a reduced chance for coronal bone loss post-abutment insertion. But an EL case can also be performed with a two-piece implant.



Fig. 3: Nobel Direct implant



Fig. 4: Incision with vertical release



Fig. 5: Guide pins



Fig. 7: Placement of EL implants

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The advantage of a two piece implant is that if the practitioner places the implant and the case subsequently turns out not to be a suitable EL case, the practitioner can simply bury the implant and continue with the case using the traditional two stage implant surgery model. This alternative is not available with the one-piece implant, and the case would have to be abandoned entirely if it turned out not to be a suitable EL case.

An important early decision upon starting an EL case is the type and location of the incisions. The wrong incision type and location can sideline the entire surgery. In the EL case featured here, a full thickness crestal incision (Fig. 4) was performed first. Vertical-releasing incisions were then made and the papilla was excluded to get the maximum esthetic results possible.

The implant was then placed in the best esthetic location with the aid of guide pins and a stent (Figs. 5 and 6). During placement, great pains were taken to ensure that the implant had no mobility. One way to reduce the amount of mobility the implant will have after placement is to underprepare the osteotomy, thereby increasing the possibility of a snug fit. A snug fit reduces mobility and micromovement. For example, one can underprepare the osteotomy by 0.5 mm and, before closing the case, use a torque test to verify that the implant is sufficient for loading. The manufacturer of the implant used in this case recommends that the implant can withstand 35 to 45 Ncm of torque before the implant is loaded.

Several factors influence the success of an EL case. The first is case selection. The practitioner must be able to tell a patient when he or she is not a suitable candidate for an EL implant. Bone quality is often an important consideration in making this determination. Because an EL patient will have a temporary restoration placed the same day as the implant, the practitioner should limit case selection to patients with Zarb⁵ type I or type II bone. According to Zarb, patients with type I or type II bone have the highest cortical bone content which, presumably, should give the best chance of success.

There are various claims that certain intrasurgery techniques can increase the chance of successfully loading an implant after surgical placement. For example, some practitioners rely on the “ping” test to determine if an implant will integrate.

The ping test may prove effective with sophisticated listening equipment that can discern the “ping” sound, but the average human ear may not be able to distinguish such small changes in sound. Mobility is yet another factor that some practitioners point to as influencing the chance for success. I always check

mobility before an EL case is concluded. One shortcoming of this technique, however, is that you may get a false reading if the implant is integrated only by basal bone and not by facial and lingual cortical bone.

A perio test is yet another tool that some claim can be used to increase the chance for success. But this test can give false readings depending on the width and length of the implant. X-ray is another useful way some use to increase the chance for success; but it has the limitation of only showing the mesial and distal bony contact of the implant and not the facial and palatal bony contact. In my opinion, the best way to determine if an implant can be loaded after placement is by the torque test. Ottoni⁶ recommends that an implant be able to withstand at least 32 Ncm of torque if it is to be loaded directly after placement. In his study, Ottoni found that this minimum degree of torque gives the implant the best chance of survival.

After surgical closure, a temporary restoration is placed on every EL case. The temporary serves several functions, the most obvious being that it gives the patient instant gratification. Another important function is that the temporary restoration can have a damping effect on chewing and biting because it is typically made of acrylic or composite, not porcelain or metal. It is very important that all EL cases have stable occlusion, i.e., no malocclusion with a lot of heavy interferences.

When making a temporary, the practitioner should follow all of the esthetic rules. The contact should be exact and the emergence profile should be perfect.

Violating Tarnow’s⁷ rules for contact length may cause papilla death. Tarnow’s rules state that the distance from the bone to the contact points must be no more than 5 mm to allow for papilla growth. If there is more than 5 mm of space from the bone to the contact point, the papilla may not grow back. The esthetics rules should be followed because, ultimately, the temporary will be judged by the patient’s personal success scale. Before a temporary was fabricated the flap was thinned to give the best possible closure and esthetic results (Figs. 7-9)

Once the temporary phase of an EL case is completed (Fig. 10), I follow the healing protocol outlined by Brånemark⁸. That protocol recommends allowing three months of healing for the mandible and six months of healing for the maxillary arch before the implant is loaded with the final restoration.

By using solid composite for the temporary restoration, the patient may be more willing to wear the temporary for the extended period of time recommended in this protocol. The extended healing period also gives the patient sufficient time to make multiple changes in shade selection for the permanent restoration until he or she finds a suitable one.

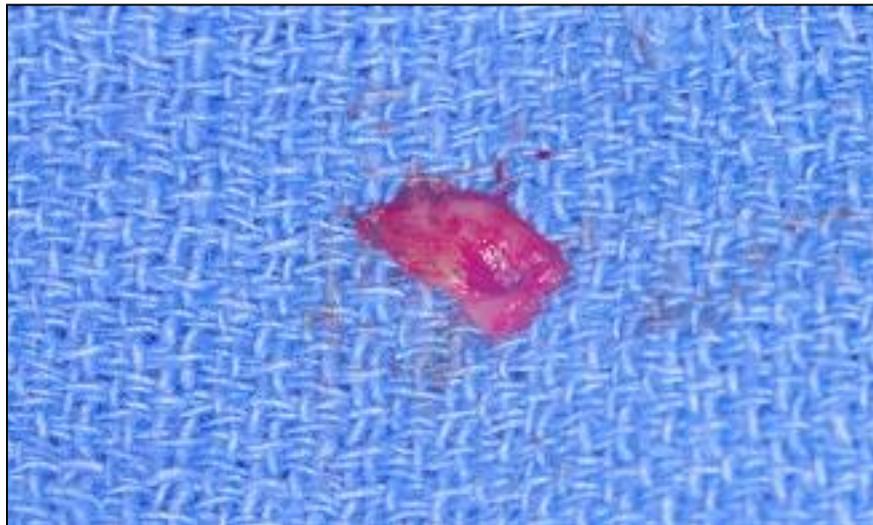


Fig. 8: Thinning of flap



Fig. 9: Closure of EL case



Fig. 10: EL temporary

Conclusion

In presenting this case, I deliberately omitted the term “immediate loading” because I believe it is inaccurate and gives the patient false expectations. There is nothing immediate about immediate load implants! In fact, the patient rarely gets a final restoration immediately. Furthermore, most dentists grind immediate load temporary restorations close to or entirely out of occlusion, paying no attention to esthetics.

Given the misleading implications of “immediate loading,” coining the term “esthetic loading,” I believe, is a more accurate description of cases performed in the esthetic zone; and Ericsson’s⁹ term of “individual functional loading” can be used for cases in non-esthetic zones. Both terms

are far more descriptive and give patients a more accurate picture of purpose and final results.

EL implants are becoming increasingly mainstream. The EL case demonstrated here was a successful one. The patient was happy and the final restorations (Fig. 11) met all of her demands. Open communication among the patient, surgeon, restorative dentist, and laboratory was essential in achieving these results.

In the not so distant future, patients will walk into their dentist’s office and demand an EL implant. As the number of EL implants increases, a more precise definition of the



Fig. 11: Restorations courtesy of Karen Mills, DDS.

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EL implant — one that goes beyond simply describing the placement of an implant in an esthetic zone — will continue to emerge. As more EL procedures are performed, we will also eventually know what impact bone type, both at the surgical site and in adjacent teeth, has on esthetics. We will also know what effect implant design has on esthetics, both with regard to papilla growth and post-placement bone loss.

Understanding these principles and others will make esthetic load-

ing of dental implants more predictable and cost-efficient for patients.

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II About the author



Dr. Stadeker is a board-certified periodontist who practices in Metro Atlanta. His practice focuses on all aspects of periodontics and surgical placement of dental implants. Dr. Stadeker lectures locally and is a state delegate for the Georgia Dental Association, current president of the North Georgia Dental Association and committee chairperson for the Northwestern District Dental Society. Dr. Stadeker can be reached by telephone at (678) 354-5119, by fax at (678) 354-5191 or by e-mail at Periowilk@bellsouth.net.

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