

Aesthetic Loading of Implants



Wilkie J.
Stadeker, DDS

We live in the era of aesthetics. Patients' aesthetic demands drive dentistry, and aesthetic loading of implants is one way today's dentist can address these demands. Aesthetic loading (AL) means placement of a dental implant in an aesthetic position and loading it with a temporary restoration. A study by Schnitman¹ describes the placement and loading of implants. Schnitman and other authors^{2,3} have identified several factors that are helpful in predicting the successful placement and loading of implants. These include bone quality, implant length, extent of loading, implant surface, initial stability and, of course, the surgeon's experience.

When placing an implant in an aesthetic location, one can follow a simple method, highlighted by Garber and Salama,⁴ to

Patients with high smile lines will show every part of a new restoration with every smile. By contrast, patients with low smile lines will show little to none of the new restoration when they smile.

maximize aesthetic 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 aesthetic hurdle to overcome. Patients with high smile lines will show every part of a new restoration with every smile. By contrast, patients with low smile lines will show little to none of the new restoration when they smile. The medium smile line, often considered most attractive in our society, may offer fewer aesthetic 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

continued on page 106



Figure 1. Presurgical aesthetic loading case.



Figure 2. NobelDirect 3.0 implant.



Figure 3. Incision and flap reflection.



Figure 4. Placement of AL implant and closure.



Figure 5. Temporary restoration.



Figure 6. Temporary restoration and low smile line.

Aesthetic Loading of Implants...

continued from page 104



Figure 7. Restorations by Phillip Bracken, DMD.

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 adequate bone width, which can help increase the cortical bone contact, an important factor in performing implants, par-

ticularly in an AL case. Cortical bone contact is important, since the more there is, the greater the chance of osseointegration. However, while 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 equipment calibration or operator error. Also, the metal in existing restorations can interfere with 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 use a cone beam x-ray in certain cases, but it is essential that the practitioner and patient are 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 as well.

TREATMENT AND DISCUSSION

The case described in this article (Figure 1) was determined to be a suitable AL case because the missing tooth was in the aesthetic zone. The patient was post-orthodontics and in group function. These factors are important in AL cases because malocclusion, heavy interferences, and micromovement can cause fibrous integration instead of osseointegration. A one-piece NobelDirect 3.0 (Nobel Biocare) implant (Figure 2) was chosen for the case. The benefit of a one-piece implant is that there is no microgap, therefore there is a reduced chance for coronal bone loss post abutment insertion. But an AL case can also be performed with a 2-piece implant. The advantage of a 2-piece implant is that if the practitioner places the implant and the case subsequently turns out not to be a suitable AL case, the practitioner can simply bury the implant and continue with the case using the traditional 2-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 AL case.

An important early decision upon starting an AL case is the type and location of the incisions. The wrong incision type and location can sideline the entire surgery. In the AL case featured here, a full-thickness crestal incision (Figure 3) was performed first. A vertical-releasing incision was then made, and the papilla was then excluded to achieve the maximum aesthetic results. The implant was then placed in the best aesthetic location, taking great pains to ensure it had no mobility (Figure 4). 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, which reduces mobility and micromovement. I usually underprepare the osteotomy by 0.5 mm, and before closing the case I use a torque test to verify that the implant is sufficient for loading. The manufacturer of the implant used in this case recommends that

diadent

AD INFO for CG ONLY

the implant can withstand 35 to 45 Ncm of torque before the implant is loaded.

Several factors influence the success of an AL 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 AL implant. Bone quality is often an important consideration in making this determination. Because an AL 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.

Various claims suggest that certain intrasurgery techniques can increase the chance of successfully loading an implant after surgical placement.

Various claims suggest 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 AL 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 periodontal 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, he

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 AL case. The temporary serves sev-

continued on page 108

ndn

**AD INFO for CG
ONLY**

Aesthetic Loading of Implants...*continued from page 107*

eral functions, the most obvious being that it gives the patient instant gratification. Another important function is that the temporary restora-

tion 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 AL cases have stable occlusion, ie, no malocclusion with a lot of heavy interferences.

When making a temporary, the practitioner should follow all of the aesthetic rules. The contact should be exact, and the emergence profile should be perfect. Violating Tarnow's⁷ rules for contact length, which state that the distance from the bone to

the contact points must be no more than 5 mm to allow for papilla growth, may cause papilla death. If there is more than 5 mm of space from the bone to the contact point, the papilla may not grow back. The aesthetics rules should be followed, because ultimately the temporary will be judged by the patient's personal success scale. As shown in Figures 5 and 6, following all of the aesthetic rules achieved an excellent result for this patient.

The aesthetics rules should be followed, because ultimately the temporary will be judged by the patient's personal success scale.

Once the temporary phase of an AL case is completed, I follow the healing protocol outlined by Brånemark.⁸ That protocol recommends allowing 3 months of healing for the mandible and 6 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.

CONCLUSION

In presenting this case, I deliberately omitted the term *immediate loading*, as 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 aesthetics.

Given the misleading implications of *immediate loading*, coining the term *aesthet-*



heine

AD INFO for CG ONLY

ic loading is, I believe, a more accurate description of cases performed in the aesthetic zone; and Ericsson's⁹ term *individual functional loading* can be used for cases in nonaesthetic zones. Both terms are far more descriptive and give patients a more accurate picture of purpose and final results.

AL implants are becoming increasingly mainstream. The AL case demonstrated here was a successful one. The patient was happy, and the final restorations (Figure 7) 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 offices and demand AL implants. As the number of AL implants increases, a more precise definition of the AL implant—one that goes beyond simply describing the placement of an implant in an aesthetic zone—will continue to emerge. As more AL procedures are performed, we will also eventually know what impact bone type, both at the surgical site and in adjacent teeth, has on aesthetics. We will also know what effect implant design has on aesthetics, both with regard to papilla growth and post placement bone loss.

Understanding these principles and others will make aesthetic loading of dental implants more predictable and cost-efficient for patients. ♦

References

1. Schnitman PA, Wöhrle PS, Rubenstein JE, et al. Ten-year results for Branemark implants immediately loaded with fixed prostheses at implant placement. *Int J Oral Maxillofac Implants.* 1997;12:495-303.
2. Becker W, Becker BE, Huffstetler S. Early functional loading at 5 days for Branemark implants placed into edentulous mandibles: a prospective, open-ended, longitudinal study. *J Periodontol.* 2003;74:695-702.

Dr. Stadeker is a board-certified periodontist who practices in the Atlanta metropolitan area. His practice focuses on all aspects of periodontics and surgical placement of dental implants. He lectures to local study clubs and teaches periodontics at several hygiene schools in Georgia. He can be reached at (678) 354-5119 or periowilk@aol.com.

Disclosure: Dr. Stadeker has no financial interest in any of the products mentioned in this article.

3. Esposito M, Hirsch JM, Lekholm U, et al. Biological factors contributing to failures of osseointegrated oral implants. (II). Etiopathogenesis. *Eur J Oral Sci.* 1998;106:721-764.
4. Garber DA, Salama MA. The aesthetic smile: diagnosis and treatment. *Periodontol 2000.* 1996;11:18-28.
5. Lekholm U, Zarb GA. Patient selection. In: Branemark P-I, Zarb GA, Albrektsson T, eds. *Tissue-Integrated Prostheses: Osseointegration in Clinical Dentistry.* Chicago, IL: Quintessence; 1985:199-209.
6. Ottoni JM, Oliveira ZF, Mansini R, et al. Correlation between placement torque and survival of single-tooth implants. *Int J Oral Maxillofac Implants.* 2005;20:769-776.
7. Tarnow DP, Magner AW, Fletcher P. The effect of the distance from the contact point

to the crest of bone on the presence or absence of the interproximal dental papilla. *J Periodontol.* 1992;63:995-996.

8. Branemark PI. Osseointegration and its experimental background. *J Prosthet Dent.* 1983;50:399-410.
9. Ericsson I, Nilner K. Early functional loading using Branemark dental implants. *Int J Periodontics Restorative Dent.* 2002;22:9-19.

microbrush

AD INFO for CG ONLY