

From Our Office to Yours...

Creating an esthetic implant-supported restoration with gingival architecture that harmonizes with the adjacent dentition presents a formidable challenge.

Now more than ever, clinicians are faced with the need to combine form with function, art with science to meet patient demands for restorations that mimic the natural dentition.

Thanks to considerable scientific and technical leaps in this field, this goal is now more predictable.

This current issue of **The PerioDontaLetter** addresses some common esthetic problems in implant dentistry and how to avoid them.

As always, we look forward to working with you in providing our mutual patients with the most esthetic implant restorations possible and welcome your comments and suggestions.

Avoiding Esthetic Problems in Implant Dentistry

In order to achieve an esthetic implant outcome, there are several factors which must be considered:

- Three-dimensional implant positioning
- Distance between an implant and an adjacent natural tooth

- Distance between two adjacent implants
- Biotype of the periodontium
- Tooth shape in relation to the tissue biotype

Creation of an esthetic implant restoration is markedly influenced by the patient's existing anatomy.



Figures 1 and 2. Improper oversized abutment selection set the stage for a highly inflamed tissue response with consequent gingival recession.

In the esthetic zone, when implant placement follows quickly after tooth loss, esthetic results are easier to achieve because the normal anatomy is more likely to be preserved. Additionally, the contours of provisional restorations may be modified to produce optimal soft tissue contours.

At its foundation, successful implant restoration involves a team approach with detailed frequent communication between the restorative dentist, the periodontist, the laboratory and the patient.

Implant Size

The ideal size of the implant body should be determined by the anatomy of the area, the tooth it is replacing and the desired form and function of the final restoration.

As a general rule, implant sizes tend to be narrower in the anterior region and become progressively wider toward the posterior. The

sizes are related to the tooth the implant is replacing. As a general rule, the diameter of the implant should be slightly narrower than the tooth it is replacing to provide the restorative dentist with the flexibility to establish good emergence profile for the proposed restoration.

Implant Position

Achieving an optimal esthetic outcome depends on proper implant positioning in all three planes of space.

The three dimensions which must be considered are the buccal-lingual, mesial-distal and apical-coronal position of the implant within the alveolus.

An implant placed too far buccally often results in dehiscence of the buccal cortical plate, resulting in a high potential for gingival recession. Conversely, an implant placed too far to the palatal can

result in the need for an unesthetic ridge-lap pontic or restoration. Proper buccal-lingual positioning results in a proper emergence profile.

Appropriate mesial-distal positioning of the implant in an edentulous space is critical to developing proper tooth shape, size and inclination. It is also critical to determining the relationship of the implant to adjacent teeth.

Appropriate apical-coronal positioning can be used to help mask the appearance of metal through the tissue. Furthermore, the relative depth of the implant can support the development of favorable emergence profile of the restoration.

Ideally implants should be placed so the abutment resembles the preparation of a natural tooth. Adjacent teeth in good position can help guide the surgeon in the proper positioning of the implant for optimal esthetics.



Figure 3. These implants were too large for this patient's tissue biotype and caused post-restorative gingival recession.



Figure 4. Failure to countersink this implant at the time of surgery left little room for proper emergence profile and ultimately caused gingival recession and exposure of the implant fixture.

Resorption of the residual alveolar ridge often hinders ideal implant placement and may result in excessively long teeth. Consequently, before placing an implant it is advisable to redevelop the site. This may require the regeneration of lost hard and soft tissue.

Placing an immediate implant may be beneficial because it preserves the volume of soft and hard tissues, including the papillae, thus making an esthetic result easier to achieve. Additionally, when possible, an immediate provisional restoration permits the clinician to modify tissue contours by modifying the shape of the provisional.

Orthodontic tooth eruption, socket preservation and guided bone regeneration are three site development techniques commonly used to overcome deficiencies caused by loss of hard and soft tissue due to disease or trauma. Consequently, implant plan-

ning and timing of placement is critical prior to tooth extraction. Another effective technique for regaining a substantial volume of lost tissue is distraction osteogenesis.

A careful diagnostic wax-up indicating the optimum position for the restored tooth is an invaluable guide to achieving the proper implant positioning. A surgical guide fabricated from the wax-up provides the clinician with an incomparable “road map” for proper implant positioning during the surgical procedure.

Today, with the aid of CT scanning and interactive software, the clinician and the laboratory technician can precisely simulate the placement of implants in optimal positions, assisting the clinicians in determining that the sites chosen will provide esthetic restorations indistinguishable from the teeth they are replacing.

Distance Between Implants and Adjacent Natural Teeth

Placing an implant too close to an adjacent tooth may result in interproximal bone loss as well as subsequent loss of papillary height. In the esthetic zone this loss of height may be accompanied by the appearance of unesthetic “black triangles.”

Tarnow and others have postulated that the ideal distance between an implant and a tooth is a minimum of 1.5mm.

When in doubt about the potential relationship of an implant to an adjacent tooth, a narrower implant should be selected.

Distance Between Adjacent Implants

Retention and reformation of papillae between implants is



Figure 5. Inappropriate site development prior to surgery resulted in the emergence of the implant abutment at the height of the gingival margin on the adjacent canine.



Figure 6. The final restoration resulted in a compromised smile line which at this point could only have been corrected by crown lengthening and placing new crowns on the central incisors.

arguably the most challenging aspect of adjacent implant esthetics.

When implants are placed too close to each other, the risk of soft and hard tissue loss increases exponentially. It has been postulated, based on clinical measurements that the ideal space to preserve interimplant bone and soft tissue heights is 3mm.

Biotype of the Periodontium

Gingival recession is the most common complication of implants in the anterior (esthetic) zone. A thin, highly scalloped gingival biotype is more prone to recession than a thick, flat biotype. This is true in implant-supported restorations as well as tooth-supported restorations.

When encountering a thin scalloped biotype, the implant should be placed in a slightly more

palatal position to reduce the chance of recession and a metal “shadow” from showing through the gingival cuff. Because patients with minimal gingival thickness are at higher risk of esthetic failure, it may be wise to thicken the tissue with a connective tissue graft concomitant with implant placement or to enhance the proposed site prior to implantation.

Another strategy for ensuring optimum cosmetics in patients presenting with a thin gingival biotype is to use a ceramic implant abutment or a metal abutment with a gingival hue.

Tooth Shape in Relation to Tissue Biotype

Three basic tooth shapes influence peri-implant esthetics. The three basic tooth shapes are square, ovoid and triangular.

Tarnow has shown that the distance between the most apical portion of the interproximal tooth contact and the crest of the bone must be less than 5mm in order to ensure the reformation of the gingival papilla. Triangular tooth shapes generally have the greatest risk of an esthetically compromised papilla because its location is closer to the incisal edge of the tooth.

Regardless of which tooth shape is chosen, the clinician cannot lose sight of this critical measurement in order to reduce the risk of black holes.

Conclusion

Esthetic outcomes for implant restorations are based on many variables, including preoperative assessment, initial site integrity, management of the hard and soft tissue, the success of augmentation procedures, the artistry of the dental technician and patient expectations.

More than any other single factor, the quantity, quality and volume of available hard and soft tissue has the greatest impact on the production of optimal esthetics when associated with implant-supported prostheses.

A careful assessment of the role of these factors is every bit as important as the clinical skills of the dentist in achieving acceptable cosmetic outcomes.



Figure 7. A thin biotype and the placement of too wide an implant contributed to this gingival fenestration.

