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- Periodontics and Dental Implants
- Comprehensive Treatment Planning with Team Approach to Dental and Implant Therapy

Inside this issue:

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A Methodical Approach to Implants Placement in The Esthetic Zone

The use of dental implants has become the first choice for the replacement of missing dentition in modern dentistry. A fixed partial denture is a second choice in most situations, while a removable partial denture remains a distant third.

In order to achieve predictable and esthetic outcome In the esthetic zone, certain principles have to be known before attempting to place a dental implant. In addition, specific steps have to be taken throughout the surgical and restorative treatment to ensure the success of the restoration. Here are some of the principles and steps that have to be known and observed before and during the treatment:

1. Tissue Biotype: Patients with missing anterior teeth will have one of two tissue biotypes: Thin or Thick. Patients with thick biotype (Figure 1) have thick gingival tissues, wide zone of keratinized gingiva and thick alveolar bone. Patients with thin biotype (Figure 2) tend to have thinner gingival tissues and alveolar bone. They are also more susceptible to gingival recession, fenestration and dehiscence. In general, it is easier to achieve a good esthetic outcome in patients with thick biotype due to diminished risk of gingival recession. Thick gingival tissues can also mask the gray metal of the implant eliminating the risk of the gray gingival hue that affects some implant restorations. Patients with thin biotype have to be warned about those challenges and often gingival grafting is necessary at or prior to the time of implant placement.

Figure 1: Thick Gingival Biotype.

Figure 2: Thin Gingival Biotype.

2. Interdental Distance: The width of the space available for the placement of the implant and the restoration has to be carefully evaluated and compared to the space on the opposite side (Figure 3A). Orthodontic intervention should be considered in the presence of discrepancy. Radiographic evaluation of the distance between the roots of the adjacent teeth should also be performed. If the patient is in the process of having orthodontic treatment, the available space should be evaluated before completing the treatment. Orthodontic intervention may be needed if the roots of the adjacent teeth

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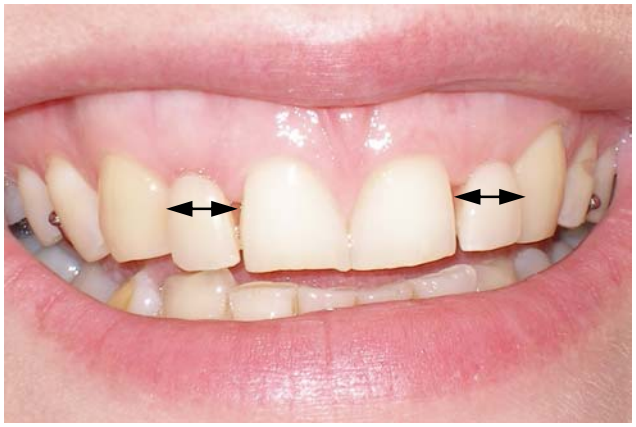

Figure 3 A: Interdental space has to be carefully evaluated before the placement of dental implants.

are converging. Minimum interradicular distance needed for the placement of a dental implant in the lateral incisor position is 7 mm (Figures 3A and 3B).

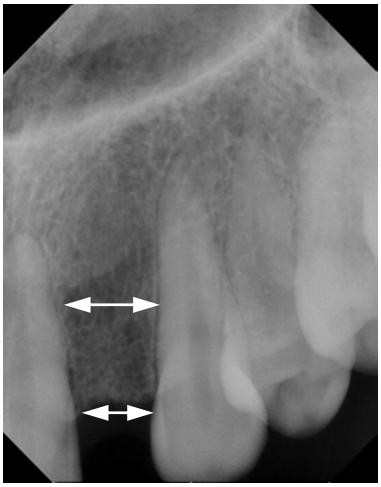

Figure 3 B: Interdental space has to be evaluated radiographically before the placement of dental implants

3. <u>Tissue Volume</u>: The volume of hard tissues available for the placement of implants is THE most important factor in determining the success and the complexity of implant therapy. The evaluation process varies depending on whether the placement of the implant is going to be immediate or delayed. In case of an immediate placement of an implant after an extraction, the presence of acute and periapical lesions plays a major role in whether the implant can be immediately placed or delayed. The most common reason for delaying the placement of implants after an extraction is the loss of the buccal plate which should be determined prior to the extraction if possible. The presence or the absence of interproximal bone can determine whether the papillae are going to be present after the extraction (Figure 4). Careful probing of the teeth adjacent to the hopeless tooth can determine if bone loss has taken place due to periodontal disease and will predict the outcome of the papillae. If bone loss has indeed taken place due to periodontitis, the papilla will disappear after the extraction and the gingival architecture on the implant restoration and the adjacent teeth will be flat. In order to gain the papilla back, a maximum distance of 5 mm should exist between the interproximal crestal bone and the interproximal contact (*1*). On the other hand, in case of a delayed implant placement, the volume of bone available can be accurately determined by performing a CT Scan (Figure 5). With the availability of Cone Beam Technology for CT scans, obtaining such an image is becoming widely available and relatively inexpensive. The fee for a single quadrant scan is less than $200.

Figure 4: Loss of the alveolar bone is evident in this situation around tooth # 9 making it a poor candidate for an immediate implant placement.

4. <u>Site Development</u>: Most site development, whether it is soft or hard tissue development, must be done before the placement of the implant. It is very unpredictable to attempt to place the implant and perform hard tissue development simultaneously.

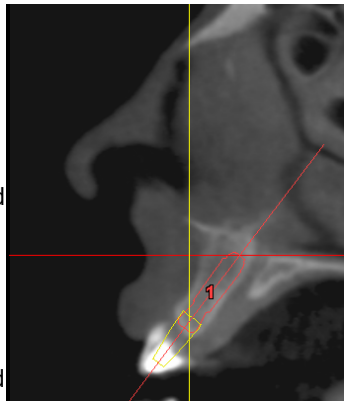

Figure 5: The use of CT scan is instrumental in determining the amount of bone available for implants placement.

5. <u>Use of Appropriate Implant Design</u>: When placing an implant in the esthetic zone, the design of the implant plays a role in the success of the treatment. The ideal implant will allow for bone preservation at the crest of the bone and minimize the trauma to the soft tissue during the different steps leading to the final restoration.
6. <u>Soft Tissue Development After Implant Placement</u>: After the successful integration of the implant and prior to final impression, all soft tissue development has to be completed. The placement of an immediate non– functional provisional restoration at the time of implant placement can reduce the time needed prior to the final impression. On the other hand, if a provisional restoration can not be placed at the time of implant placement, soft tissue development will have to take place after the integration of the implant and additional time up to twelve weeks may be needed before taking the final impression. The goal of the soft tissue development is to develop the papillae and establish the height of the gingival tissues on the facial of the implant at the appropriate level. All that is achieved by placing a provisional restoration on the

Figure 6 A (Case 1) : A preoperative photo showing tooth # 9 with significant bone and soft tissue loss. Site Development is necessary.

Figure 6 B (Case 1) : Provisional restoration on implant after site development on site # 9.

Figure 6 (Case 1) : Final restoration on implant on site # 9. Significant gain in hard and soft tissues was achieved. (2)

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implant for a period of 8-12 weeks (Figure 6A, 6B, 6C).

7. Final Restoration: The restoration is the final piece of the puzzle in the replacement of missing dentition in the esthetic zone. Although excellent esthetic outcome can be achieved with traditional restorative materials on dental implants, the results can be made superior by using zirconium abutments and all porcelain restorations. It is important to make sure that a zirconium abutment is commercially available for the implant placed in the esthetic zone (Figure 8C).

By knowing and following the principles outlined here, the dental practitioner should be able to approach dental implants in the esthetic zone with confidence.

References:

1- Tarnow DP, et al. The effect of distance from the contact point to the crest of cone on the presence or absence of the interproximal dental papilla. J Periodontol 1992;63(12):995-6.

Acknowledgment:

2- Restoration by: Dr. Bobby Childree
3- Restoration by Dr. Scott Merritt
4- Restoration by: Dr. Eric Duncan

Figure 7 A (Case 2): Implant restoration on # 10: The restoration was completed without the proper soft tissue development leading to short

Figure 7 B (Case 2) : After soft tissue development, a crown with the proper proportions was placed on the same implant on site # 10. (3)

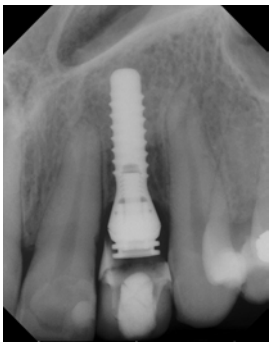

Figure 8 A (Case 3): Radiograph of implant on site # 10. Provisional restorations were placed for soft tissue development before the final impression.

Figure 8 B (Case 3): Provisional restoration on implant # 10.
Figure 8 C (Case 3): Final restorations on # 7 and 10 after tissue development. Zirconium abutments were used on both implants.(4)

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