Extraction Site Management

Since osseointegration has become a highly predictable and frequently recommended procedure, implant success is now also defined by prosthetic demands — the factors that will produce a restoration in esthetic and occlusal harmony with adjacent oral structures.

The philosophy of “prosthetically-driven implant placement” requires the clinician to first envision the final restoration in its ideal position. Therefore, it is crucial that as much of the patient’s natural and healthy alveolar dimensions be preserved during extraction.

Figure 1. The upper first premolar was diagnosed with a cracked root. (See Figures 2 and 3 on page 2.)

Ridge Resorption Following Extraction

The normal post-extraction healing response of an alveolar socket is resorptive. Most of the literature suggests that the loss of alveolar ridge following tooth extraction occurs along the buccal aspect of the ridge and is greater in the horizontal dimension compared to the vertical dimension. Extraction can result in 40 to 60% of dimensional reduction within the first six months following extraction. This in turn can contribute to esthetic compromises caused by less than ideal implant placement.
Periodontal Letter, Spring

Immediate and Delayed Implant Placement

Ridge dimensions were critical in determining the ideal implant placement. Prior to extraction, the gingival biotype should be assessed to determine its type. Minimally invasive procedures and conservative tooth removal are preferred to minimize surgical stress. Studies have shown that when ridge preservation and soft tissue management can minimize extraction socket healing, implants placed immediately and immediately after extraction have a comparable success rate with a thick, flat gingival biotype. However, with a thin, highly mobile biotype, extraction sockets exhibit resorption and do not readily support the implant tissues. These findings underscore the importance of minimizing surgical stress and preserving ridge dimensions with respect to bone height.

Figure 4. The upper right central incisor was diagnosed as hopeless and needed to be extracted. When comparing mineralized to demineralized bone grafts, there was no difference in ridge dimensional changes; however, the demineralized grafts showed a higher percentage of new bone and a lower percentage of residual graft particles. (Borg and Mealey)

Provisional restorations are another way to preserve the existing architecture after extraction. Provisional restorations are another way to preserve the existing architecture after extraction.

Restoration Regeneration

Tissue Regeneration

Figure 5. Following surgical resection the anterior maxillary extraction socket was restored with a bone graft. Instead of the conventional buccal plate approach, a thin bladed knife or periotome is used to sever the gingival attachment, periodontal ligament space, initiating a process to loosen the periodontal attachment and being lost. This method of micro-instrumentation is often used to sever the gingival attachment and periodontal ligament, facilitating new bone formation within the extraction socket.

Restorations

Provisional

Figure 2. The tooth was removed. Preserving the residual alveolar bone is also critical to prevent soft tissue loss. Instead of the conventional buccal plate, a thin bladed knife or periotome is used to sever the gingival attachment and periodontal ligament. This method of micro-instrumentation is often used to sever the gingival attachment and periodontal ligament, facilitating new bone formation within the extraction socket.

Socket Repair

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Socket Repair

A typical bone grafting technique involves the use of a donor site and a recipient site. The donor site is usually the iliac crest, and the recipient site is the extraction socket. The graft material is carefully placed in the socket and secured in position. Various types of bone grafting materials are available, including autogenous grafts (bone from the same individual) and allografts (bone from a different individual). Synthetic bone substitutes are also commonly used.

Techniques

Tooth Removal

Minimal invasive techniques offer several advantages over conventional methods. These include reduced bleeding, decreased postoperative pain, and faster recovery times. Minimal invasive techniques may also be used for both single and multiple tooth extractions.

Socket Grafting

The Role of

Socket Grafting

Socket grafting is a technique used to preserve the surrounding bone and soft tissue after tooth extraction. The goal is to maintain the ridge height and width, which is important for future implant placement. Various types of grafting materials are used, including bone grafts, soft tissue grafts, and synthetic materials. The choice of material depends on factors such as the size of the extraction site and the amount of bone loss.

Figure 1. The tooth was removed.
tissue preservation and esthetics.

An immediate implant is initially mechanically stabilized in the bone by the implant shape and thread design. Usually the site is grafted at the same time with a resorbable or non-resorbable membrane that excludes soft tissue, allowing the bone grafted socket site to heal normally with the newly forming bone around the implant thus providing biologic stability.

Occasionally, an early “delayed” implant placement protocol (four to six weeks after extraction) is used to allow initial soft tissue healing or reduction of infection within the socket. Bone augmentation is deferred until the time of implant placement within the socket as the short delay does not impact bone resorptive changes.

**Conclusion**

Resorption of the residual ridge begins once the tooth is extracted, and it is in the best interest of our patients that prior to extraction we have a management strategy in place.

Working in concert with our restorative dental colleagues, we can preserve sufficient alveolar bone to place an implant in a position to facilitate a functional and cosmetically acceptable tooth replacement.

Regardless of the clinical situation, the bony and soft tissue foundations for dental implants should be evaluated prior to the removal of teeth.

Management strategy should be discussed with the patient before treatment begins in addition to determining realistic expectations from the treatment.

Certain medical conditions, tobacco use and adverse pressure from interim prostheses may result in compromised healing response and surgical results.

Each step during treatment should be regarded as part of a continuum. When multiple practitioners are involved, each should be kept informed of treatment decisions as well as treatment progress.

The most cost-effective and time-efficient bone augmentation procedure available remains the preservation of the alveolar dimensions at the time of extraction.

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**Figure 7.** The maxillary left central incisor had a cracked root and an extremely large apical infection.

**Figure 8.** The tooth was removed atraumatically and the apical defect exposed and debrided without involving the interproximal papillas.

**Figure 9.** The apical defect and socket were grafted to prevent collapse of the labial-lingual dimension.

**Figure 10.** Final healing prior to implant placement.