

Immediate Implant Placement

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Abstract

The goal of anterior implant is to simulate the appearance of a natural crown adequate bone volume must be present for ideal hard and soft tissue contours, when placing an implant in an immediate extraction site, the surgeon should consider the socket dimension and the defect between the labial plate of bone and the implant. An anterior tooth has greater dimensions in the faciolingual direction, compared with its mesiodistal dimension. The thin labial bone has often been compromised and reduced in height when an anterior tooth requires extraction or during the extraction process itself. As a result, the facial cortex is most always several millimeters opical to the palatal cortical plate.

Therefore immediate implant placement in the anterior region using a round implant often requires that the osteotomy and implant insertion engage the lingual wall of the alveolus and penetrate halfway to two-thirds down the extraction site into the remaining lingual opical bone for rigid fixation. Recently, there have been changes in the protocol initially used when implants were immediately placed into extraction sockets. Researchers and clinicians are now placing implants immediately into extraction sockets and attaching abutments and provisional crowns, thereby permitting immediate loading to occur in conjunction with the bone healing.

Keywords: Immediate implant, extraction, sockets, osteotomy, bone regeneration.

The original Branemark protocol advocated placing implants into existing edentulous ridges or extracting severely diseased teeth and placing the implants 6 to 12 months later, thereby permitting bone to form in the extraction sockets. However, starting in the 1980's clinicians and researchers began to report the successful placement of titanium root form implants into bone sockets immediately after teeth were extracted.

ADVANTAGES OF IMMEDIATE PLACEMENT

When an implant is planned for an area currently occupied by a tooth that must be removed, it may be advantageous to immediately place the implant when the tooth is extracted. Immediate placement offers several advantages compared to extracting a tooth, allowing the bone to heal and then subsequently placing the implant.¹

1. The bone that originally surrounded the tooth is more likely to be preserved. Thin bone such as the facial bone of maxillary teeth and interproximal bone can rapidly disappear after tooth extraction. Placing an implant at the time the tooth is extracted helps preserve the remaining bone and decrease the need for subsequent ridge augmentation procedures.
2. More ideal implant positioning is possible. For single rooted teeth, the implant is positioned where the root of

the tooth was located which is advantageous unless the position of the tooth prior to extraction was undesirable. When implants are centered beneath the crown, there is more favorable loading. Also, screw access holes are more likely to be centrally located, with in the peripheral crown dimensions which facilitates the fabrication process.

3. The total treatment time is decreased.
4. The number of surgical procedures is reduced.
5. There is a shorter time period when the patient is subjected to the challenges of being edentulous /wearing a provisional removable prosthetics.
6. Overall cost is reduced.
7. Soft tissue contours and height are better preserved in esthetic zones.
8. There is better acceptance of the treatment plan by the patient.
9. The opportunities for Osseo integration are better due to the healing potential of fresh extraction sockets.

SCIENTIFIC BACK GROUND

In 1985 Anne Roth et al published results of titanium implants placed into the mandibular incisor sockets of 4 monkeys. Histologically, the authors demonstrated the formation of immature bone that was replaced by more mature bone in

close approximation to the implants. In 1989 Woolfe presented the successful results of immediate implantation in dogs.² In 1990 Barzilay published an abstract that reported good results in monkeys.³ In 1992 Lundgren et al presented the results of placing implants immediately in beagle dogs. After histomorphometric analysis, they reported 31% bone-to-implant contact after 2 months, 65% after 12 months, and 68% after 36 months. They indicated the bone to implant interface was the same when the implant was placed immediately and when the implantation occurred 2 weeks after root extraction.

HUMAN CLINICAL RESULTS

There have been a number of clinical papers that provide data regarding the success/failure of implants placed immediately in to extraction sockets. There are also studies that compared immediate implant placement with delayed placement after bone healing, demonstrating higher success rates with immediately placed implants.⁴⁻⁶

Clinical studies provided an indication that the success rate in the maxilla may be lower than the mandible the studies also indicate there is decreased success rate when the tooth was extracted because of periodontitis than when the tooth was extracted for other reasons such as trauma/root fracture/caries. It has been stated that implants should not be placed when purulent exudate is present and immediate implants are contraindicated in the presence of acute/sub acute periodontal or periapical infection.⁷

CLINICAL COMPLICATIONS

Several complications have been identified in the clinical studies and they include premature implant exposure through soft tissue. Fenestration/dehiscence, fistulas, postoperative inflammation, postoperative infections, membrane exposure before stage 2 surgery, and parasthesia.

CLINICAL PROTOCOL

Antibiotic Coverage

Several authors have recommended antibiotic coverage be used in conjunction with immediate implant placement. The antibiotics have typically been taken both preoperatively and postoperatively.

One regimen involved taking 2 gm of a broad spectrum antibiotic one hour before surgery and continue with 1 gm/day for 5 to 7 days after surgery.

One author administered IV penicillin preoperatively and another author included 8 milligrams of Dexamethasone along with the 1 gram of amoxicillin preoperatively. The antibiotic was continued 5 to 7 days and the dexamethasone for 2 days.

Extraction/Osteotomy

The tooth that is to be removed is carefully extracted so as to preserve surrounding bone. The usual osteotomy procedures are completed so the implant engages the walls of the extraction socket. Due to differences in the morphology of the roots and implants the implant may not achieve intimate contact with the incisal /occlusal aspect of the bony socket.

Horizontal Implant to Bone Gap

There have been multiple studies that evaluated the effect of an incisal/occlusal space between the implant and surrounding bone or when the implant is not fully encased in bone, membranes have often been used to generate new bone.

Apical Implant Extension

Multiple clinicians have indicated it is important to achieve primary stability of the implant in bone by extending the implant apical to the apex of the tooth root. It has been proposed by one author that a minimum of 5 mm of bone apical to the tooth apex is essential to ensure engagement of the implant threads into 3 millimeters of bone. Another author indicates the implant should be extended at least 4 millimeters apical to the root apex. In the anterior mandible, it has been suggested that the implant engage the interior cortex whenever possible.

Soft Tissue Coverage

Primary closure of the soft tissue over the implant has been regarded as one of the important and desirable aspects of immediate placement. However, it can be difficult to achieve because of the space left in the tissue by the extracted tooth.

Use of Chlorhexidine

The use of chlorhexidine rinses has been recommended until the sutures are removed. Its use has also been advocated for at least 3 weeks and when complications occur such as minor premature implant exposure.



Figs 1A to C: The intraoral periapical X-ray; the missing 22 and the treated 11

Healing Period

When using a two stage protocol, the implant is uncovered after an appropriate healing period so a healing abutment can be attached.

With one stage protocol, the implant is ready for placement of a definitive abutment after an appropriate healing period.

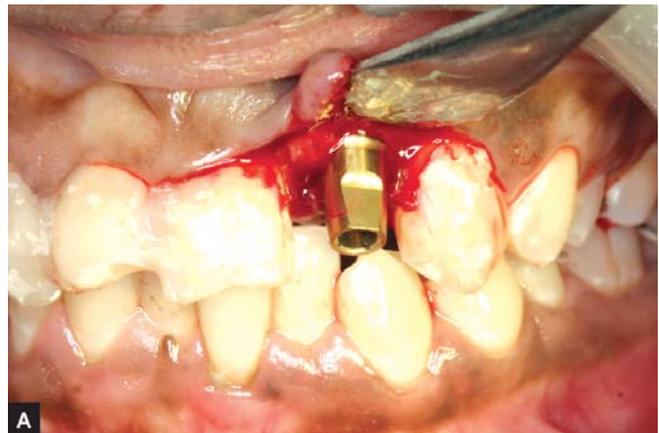
CASE REPORT

A 35 years old woman had lost her 22 in an accident and visited my clinic with mobile 11, 12 and 21 (Figs 1A to C). The mobile teeth were splinted with light cure composite supersplint (Fig. 2). The 11 was endodontically treated and immediate implant was planned to replace the lost 22. A 4 × 15 mm implant was placed in the 22 socket with 4 mm of

purchase apical to the root apex of the 22 (Figs 3A to 4). There was good primary stability and the socket was primarily closed. After four months of healing period the implant was restored (Figs 5A to D).



Fig. 2: The acrylic teeth splinted together with 11 and 12 to preserve the papilla



Figs 3A and B



Figs 3A to C: Shows the implant placed immediately in the tooth socket and primarily closed



Fig. 4: The radiograph shows the perfectly positioned implant with 3 mm of apical purchase beyond the socket depth



Figs 5A to D: The postprosthetic phase after the ceramic crowns were given for 11, 21 and 22 note the papilla preserved in the 22 region and the esthetic achieved

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