

## A Review on Immediate Implant Placement

Dr. Sivalenka Srimukhi<sup>1</sup>, Dr. Vijay Prakash<sup>2</sup>, Dr. D Sumasri<sup>3</sup><sup>1,3</sup>Post graduate students, Department of Prosthodontics and Implantology, D.J College of Dental Sciences and Research, Modinagar Uttar Pradesh, India<sup>2</sup>Professors, Department of Prosthodontics and Implantology, D.J College of Dental Sciences and Research, Modinagar Uttar Pradesh, India

### Review Article

#### \*Corresponding author

Dr. Sivalenka Srimukhi

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**Abstract:** Immediate implant placement has been a revolutionary option to replace missing teeth as it offers an excellent alternative to conventional dentures and fixed bridges. The advantages of this replacement option include fewer surgical interventions, reduction in overall treatment time, reduced hard and soft tissue loss and patient satisfaction. This article reviews on the guidelines for immediate implant placement and the complications associated with it.

**Keyword:** implants, immediate placement, extraction socket

### INTRODUCTION

Implant therapy is today widely regarded as a reliable treatment option to replace missing teeth, both for function and esthetics, as documented by recent 10-year studies conducted with current implant systems. The original treatment protocols of the 1970s and 1980s required fully healed alveolar ridges before implants were placed. In the 1990s, these protocols were modified to include implant placement in fresh extraction sockets, or in partially healed alveolar ridges predominantly for implants in the esthetic zone [1].

According to the conventional Branemark protocol, a 12-month healing period after tooth extraction is recommended before implant placement. In addition, an additional healing period of 03-06 months is recommended prior to loading of implants after insertion in a conventional two-stage protocol. In most instances, this period translates to 1-2 years from the start of treatment to completion of the restoration, which renders the patient partially or completely edentulous for an extended period of time. Attempts to shorten the overall length of treatment have focused on immediate loading, subsequent to implant placement [2].

When a tooth is extracted, bone loss predicted in the first 6 months is as much as 40% of the alveolar height and 60% of the alveolar width loss, which continues at a rate of 0.25% to 0.5% per year. This resorption could affect the availability of bone for implant placement, so clinicians began to insert dental implants immediately following tooth extraction. Immediate implant placement, defined as the placement of dental implant immediately into fresh extraction socket site after tooth extraction, has been considered a predictable and acceptable procedure [3].

### Indications

- Failed endodontic treated teeth,
- Teeth with advanced periodontal disease
- Root fractures and
- Advanced caries beneath the gingival margins

### Contraindications

- Patient with thin scalloped gingival wherein the buccal plate is lost or there are chances of resorption
- In esthetic regions where the patient has a high smile line.
- Suppuration or large periapical infection
- Close relationship to anatomic vital structures

### Advantages and disadvantages

The advantages of immediate implant placement into extraction sockets over the delayed placement are there is no need to wait for 4–6 months after extraction for the bone to form and crestal bone loss is found to be less in immediately placed implants rather than delayed placed implants. Purpose of preservation of bone at the extraction site can be achieved and with extraction sockets as a guide, appropriate parallelism and alignment relative to the

opposing and adjacent residual dentition can be determined. Disadvantages include misalignment of the extracted tooth that may lead to unfavorable angulation of the fixture; stabilization which may require more bone than is available beyond the apex and the mucogingival condition around the extraction socket may be unfavorable to primary closure.

It is important to carefully assess the type of bone defect that exists immediately after the extraction, as these will dictate the treatment required to preserve or reconstruct the alveolar ridge. When the implant can be located in an ideal position with sufficient bone volume to achieve initial stabilization, it is then feasible to place the implant and the graft concurrently and when the implant is placed at the time of extraction, osseointegration begins immediately.

#### **Classification of implant extraction site**

An easy way to categorize the defect is to determine the number and thickness of bony walls that remain after extraction. The morphological relationships by *Gelb* are as follows:

- Five wall socket (buccal, lingual, mesial, distal and apical )
- Four wall socket
- Three wall socket
- Two wall socket
- One wall socket

Each of these sockets can have a combination of thick and thin walls.

Depending on the severity of defects in recent extraction sites, particulate bone graft, a mono cortical block graft with GTR membrane is preferred. Depending on the quantity and quality of existing bone and the clinicians' preference the implant placement after tooth extraction can be immediate, delayed or staged.

#### **Guidelines for immediate implant placement**

The most predictable methods of successful immediate implant placement are maintenance of the soft tissue architecture with conservative tissue manipulation to preserve blood supply, maintenance of the buccal plate and firm implant stability with a minimum torque value of 30Ncm and an implant stability quotient of at least 60.

#### **• Surgical considerations**

Using an atraumatic extraction technique that results in minimal trauma to hard and soft tissues is a key factor in immediate or delayed implant placement. Atraumatic extraction may include placing an intrasulcular incision 360 degrees around the tooth to cut the connective tissue fibres above the bone and to detach the connective tissues fibres from the cementum. The interproximal contact surfaces should be trimmed to facilitate the application of the periosteum and the

elevator and to clear the path of tooth removal. The periosteum is usually pushed into the periodontal ligament space with light mallet tapping along the crestal third of the interproximal bone. This process should take 10 to 30 seconds, after which a forceps is used with controlled force to luxate the tooth before extraction. The osteotomy for an immediate placement of anterior implant could be initiated more palatally, whereas for premolars and molars the osteotomy could be initiated toward the center of the socket. For adequate primary stability, immediate implants should be placed few millimetres beyond the socket or 3 to 5 mm past the apex. The implant must be placed at least 1 mm subcrestally, especially if the buccal or lingual plates are thin, or 2 to 3 mm below the gingival margin [4].

#### **• Placement considerations**

##### **Micromovement**

Micromovement of the implant can grind and slowly smooth the bone surface, thereby reducing the interlock between bone and titanium and ultimately resulting in a loss of primary stability. It is critical that there are no occlusal implant overloads during the early healing stage. Primary stability is important during the first days after implant installation. The first weeks are a crucial period because primary stability can decrease to critical levels before secondary stability develops. Any micromotion of more than 150  $\mu$ m causes fibrous encapsulation of the implant. Therefore, patients should be compliant and should avoid high masticatory forces by eating only soft foods for at least for 6 weeks postoperatively [4].

##### **Implant design**

Tapered implants are narrow apically and wide coronally due to which they have the advantage of filling the gap between the implant body and the socket wall at the crest level. It also improves the implant's primary stability, avoiding buccal wall engagement in the anterior region thereby reducing the need for jumping distance augmentation. Sanz and colleagues reported less vertical and horizontal space using tapered implants than of cylindrical implants after immediate implant placements [5]. However, Lang and colleagues [6] found in a clinical trial that both cylindrical and tapered implants have shown similar short term outcomes with regard to wound healing and primary stability. That implants with roughened and microthreaded neck would cause less resorption of the crestal bone than implants with roughened and not microthreaded neck. The use of tapered platform-switched internal connection implants at the implant shoulder is usually recommended for immediate implant placement as these implants can allow rapid rehabilitation with no adverse impact on implant survival. Increased surface roughness of an implant can also help to improve the primary stability.

### Horizontal bone defect or jumping distance

In 2003, Botticelli and associates [7] introduced the term jumping distance at implant sites with a horizontal defect dimension; the jumping distance is the horizontal distance between the implant surface and the surrounding bony wall of the socket. Bone grafting is frequently used to prevent collapse and minimize resorption of the thin labial plate, regardless of the gap size. Bone grafting helps in osteoconduction and promoting the formation of new bone which is termed the scaffold effect. Studies report that in implant sites with a horizontal defect dimension of 2mm or less, spontaneous bone regeneration and osseointegration can occur, if it is larger than 2mm the use of a barrier membrane with or without membrane supporting bone grafting material is indicated. . Botticelli and colleagues reported that no bone grafting is needed even if the jumping distance is greater than 2 mm.

### Complications

Thought immediate implant placement is associated with high success rates complications can occur out of which few listed are:

- Fenestration or dehiscence
- Surgical trauma
- Implant stability and malpositioning of implant
- Unesthetic outcome
- Systemic factors
- Quality and quantity of bone

### CONCLUSION

The main conclusions drawn in this review are:

- The minimum insertion screw has to be equal or superior to 32N/cm and the micromovement of the implant should not exceed 150um.
- Implants with a rough surface have a higher success rate than machined surfaces.
- Immediate implant placement should always follow the rule of restorative-driven 3 dimensional placements.
- For adequate primary stability these implants should be placed 3 to 5 mm beyond the apex.

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