

Timing of Implant Placement in Anterior Zone: A Clinical Perspective

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ABSTRACT

The timing of implant placement after extraction of a tooth requires various factors to be taken into consideration. The decision of when to place an implant should rest with the dentist and be decided on the basis of longevity, desired clinical outcome and governing clinical situation. The debate between immediate, early or delayed implant placements continues as both procedures offer obvious advantages and disadvantages.

This article attempts to put into perspective implant placement protocols post-tooth extraction so that, clinicians may have a risk assessment strategy. Type 1 and 2 implant placement protocols based on the classification agreed upon in the 3rd ITI consensus will be discussed with clinical cases to exemplify both in the anterior zone. In conclusion, the factors favoring immediate placement and those which warrant early delayed placement are itemized.

Keywords: Implants, Sockets, Immediate placement, Early placement, Delayed placement, Anterior implants.

‘It takes less time to do things right, than to explain why you did them wrong in the first place.’

INTRODUCTION

The decision of when to place an implant after tooth extraction should rest with the dentist and be decided on the basis of longevity, desired clinical outcome and governing clinical situation. The debate between immediate or delayed implant placements continues as both procedures offer obvious advantages and disadvantages. Patient preferences, operator skill and medical conditions are some of the governing factors in this decision. This article aims to put in perspective the implant placement protocols after tooth extraction so as to enable the reader to have a risk assessment strategy¹ in place before getting in the clinical protocol.

Timing of Implant Placement²⁻⁴

Several classifications have been proposed to quantify timing of implant placement. Wilson and Weber proposed the terms immediate, recent, delayed and mature as guidelines to place implants in relation to soft tissue healing and GBR procedures carried out. However, no time frames were assigned to these terms. In a more recent suggestion by Mayfield, the terms immediate, delayed and late are used to describe implant placement at 0 week, 6 to 10 weeks, and 6 months after extraction.

In this regard, the wound healing related timing categorization as given by ITI guidelines is published in

the proceedings of the 3rd ITI consensus conference.⁵ It presents a clinical classification of the implant placement protocol based on the amount of time elapsed in weeks after the extraction has been done.

<i>Classification</i>	<i>Terminology</i>	<i>Period after extraction</i>
Type 1	Immediate placement	Immediately following extraction
Type 2	Early placement with soft tissue healing	Typically 4-8 weeks
Type 3	Early placement with partial bone healing	Typically 12-16 weeks
Type 4	Late placement	Typically > 6 months

For the sake of simplicity and understanding clinical perspectives with these protocols, we will focus only on the maxillary anterior zone with type 1 and type 2 protocols.

External Dimensional Changes in Sockets^{2,6}

In order to decide what is the best time to place an implant, we need to understand the changes that happen in dimensions of the socket after extraction.

Hard Tissue Changes

Approximately, 5 to 7 mm of reduction representing 50% of the socket buccolingual volume occurs in 12 months. Correspondingly, the apicocoronal height reduces by

2.5 to 4 mm. All this occurs mainly in the first 4 months of healing. Greater apicocoronal loss of height occurs in multiple extraction sites rather than single extraction sites.

A variety of factors influence these changes and they may be systemic or local in nature. Smoking, presence of diseases, such as diabetes, may influence the healing adversely. Local presence of infection and presence of dehiscence areas may also decrease the bone healing.

Soft Tissue Changes

The form of the mucosa is generally believed to follow the form of the underlying bone. However, it has been noticed in certain cases especially in the maxilla that the overlying mucosa may actually increase in thickness by 0.2 to 0.4 mm as healing progresses.

Even though epithelization occurs at 5 weeks, the underlying lamina propria maturation takes longer to finish and the tensile strength of the tissue is not optimum. In those circumstances, the chances of flap dehiscence are high-post-surgery. Dehiscence rates of 5 to 24% have been reported post-membrane use even though flap closure was achieved with relative ease.

Type 1 Placement Protocol¹

In this protocol, the implant is placed in the extraction socket at the time of extraction.

The advantages are as follows:^{7,8}

1. Reduced overall treatment time
2. Optimal space available to place the implant
3. Only one surgical procedure
4. Minor defects in socket may be favorable for simultaneous implant placement and grafting.

The disadvantages are as follows:

1. Lack of adequate available bone apical to socket may compromise primary stability
2. Facial malposition of implant is a common complication as the implant gets drifted toward the path of least resistance (labial cortex) during drilling. This is further complicated by presence of thick palatal cortex that pushes the drill more toward the labial side
3. Tension-free closure may be difficult to achieve in case simultaneous use of biomaterials is needed. Even, if achieved, it can lead to alteration of mucogingival junction
4. Increased risk of recession at gingival margins, especially in patients with thin tissue biotype in presence of facial bone dehiscence.

Type 2 Placement Protocol^{2,9,10}

In this protocol, the implant is placed typically at 6 to 8 weeks after the extraction.

The advantages are as follows:

1. Additional soft tissue volume enhances chances of tension-free closure and thus allows use of regenerative materials with simultaneous implant placement
2. Resolution of pathology associated with extracted tooth can be assessed
3. Flattening of facial bone wall facilitates external surface grafting with low substitution rate bone fillers
4. Dehiscence defects on facial wall present as 2 or 3 walled defects at this stage as compared with 6 months after extraction. They are thus more conducive to regenerative techniques.

The disadvantages are as follows:

1. Two surgical procedures
2. Need for adjunctive CT grafts in most cases
3. Morphology of socket may compromise implant stability.

The placement of implants with both these protocols requires a certain degree of operator skill to get the implant perfectly positioned from a prosthetic point of view. Labiolingual, occlusocervical and mesiodistal position of the implant has to be within the comfort zone to achieve long-term esthetics.

The type 1 protocol for immediate placement has to be avoided in case of any acute infection in relation to the tooth in question. Needless to say that, if the socket integrity is jeopardized, it is better to wait for 8 weeks and perform the placement of implants after soft tissue healing is stable so that biomaterials can be protected with primary closure.

Clinical case report (Figs 1 to 13) illustrates the use of immediate extraction protocol (type 1).

DISCUSSION

Based on literature reports and clinical experience, we can summarize criteria for selection of case for immediate or early placement protocols.



Fig. 1: Preoperative status showing fractured no. 21 that was unrestorable



Fig. 2: Diagnostic wax up depicting proposed final tooth form of no. 21



Fig. 5: Nonfunctionally restored no. 21 with screw-retained provisional restoration at time of implant placement



Fig. 3: Implant placement immediately following extraction of no. 21



Fig. 6: Healing around implant at 4 months



Fig. 4: Implant placement immediately following extraction of no. 21

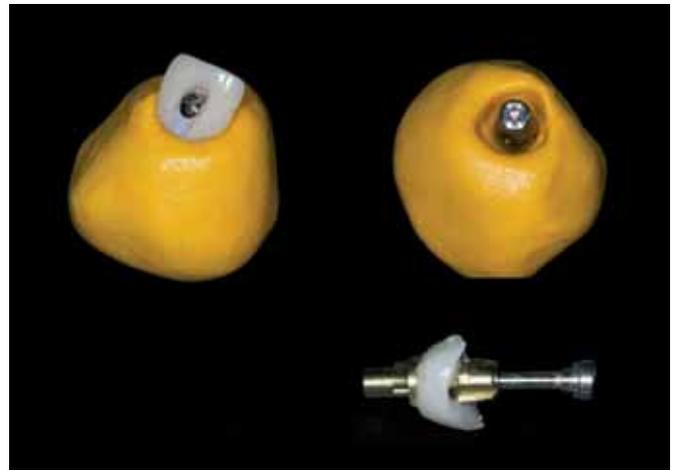


Fig. 7: Impression for customization of closed tray impression copings

Type 1 or immediate extraction and implants can be considered in following favorable situations:^{1,2}

1. Intact socket wall after extraction
2. Single-rooted teeth
3. Absence of infection

4. Thick tissue biotype
5. Rectangular tooth form
6. Low lip line
7. When the interproximal height of bone is 5 mm or less than the proposed final contact point.



Fig. 8: Customized closed tray implant level impression coping



Fig. 11: Retracted frontal view of final restorations on nos 12 to 22



Fig. 9: Custom zirconia abutment on working model



Fig. 12: 1:1 view of final restorations



Fig. 10: Custom abutment torqued on implant



Fig. 13: Postoperative X-ray at 18 months

These are only guidelines and clinicians have to check individual cases for suitability of the protocol.

When unfavorable situations are present clinically, such as stated below, it is prudent to delay the placement of implant in the extraction socket to 8 weeks or even more in case partial bone healing is desired in the extraction socket.

These unfavorable conditions^{1,2} for type 1 immediate placement protocols are as follows:

1. High lip line
2. Thin tissue biotype
3. Triangular tooth form
4. Bone loss due to periodontal disease

5. Thin facial bone (< 1 mm), defects in facial bone (Figs 14 and 15)
6. Multiple tooth gaps
7. Presence of local infection.

CONCLUSION

The question whether immediate and early single-implant therapies would result in better treatment outcomes remained



Fig. 14: Preoperative status of fractured nos 13 and 15



Fig. 15: Bone profile after extraction of nos 13 and 15

inconclusive due to lack of well-designed controlled clinical studies.¹⁰

In hands of a skilled operator in a motivated patient both approaches, immediate placement as well as early placement can have good results. In many of these cases, patients' expectation and motivation for multiple procedures to achieve the desired esthetics can become the determining factor. However, a novice clinician is cautioned against immediate extraction and placement in the anterior zone as complications can be very hard to manage.

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