

# Masterclass in Clinical Practice

## Dental Implants

with

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## Overview of current timing concepts for implant placement and loading

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### Introduction

Dental implants have become a routine procedure for replacing missing teeth. An increase in the number of implants placed yearly has been observed.<sup>1</sup> Several factors contribute to this trend, including higher competition, greater affordability of implant procedures, and ongoing technological developments in dentistry. In other words, more and more young clinicians — often more digitally educated than their older colleagues — are adding dental implants to their treatment portfolio. However, clinical experience and theoretical knowledge cannot be replaced by any advancements offered through digital dentistry. The trend of immediacy in implant dentistry is becoming very popular. This Masterclass will cover current timing concepts for dental implant placement and loading protocols.

### Timing of implant placement and loading according to the International Team for Implantology (ITI)

Clinicians, especially inexperienced ones, frequently encounter the dilemma of determining the optimal timing for implant insertion or restoration. Both factors significantly impact the outcomes of implant treatments. To provide clarity in clinical practice, the ITI developed a consensus-based classification that categorizes the timing of implant placement and the protocols for implant loading. These recommendations are widely accepted due to their robust evidence-based approach and practical applicability.

According to the latest consensus from the ITI,<sup>2</sup> implant placement after tooth extraction is classified into three categories:

- **Immediate placement:** Implant insertion on the same day as tooth extraction, directly into the fresh socket (Figures 1-6).
- **Early placement:** Implant placement 4–8 weeks after extraction, following initial soft-tissue closure or 12–16 weeks after extraction, when partial bone regeneration has occurred.
- **Late placement:** Implant insertion more than 6 months after extraction once complete bone healing is achieved.

Implant loading protocols are also classified into three categories:

- **Immediate loading:** Dental implants are connected to the prosthesis within one week after implant placement.
- **Early loading:** Dental implants are connected to the prosthesis between one week and two months after implant placement, usually after at least 6-8 weeks of healing.
- **Conventional loading:** Dental implants are allowed a healing period of minimum two months after implant placement with no connection to the prosthesis.

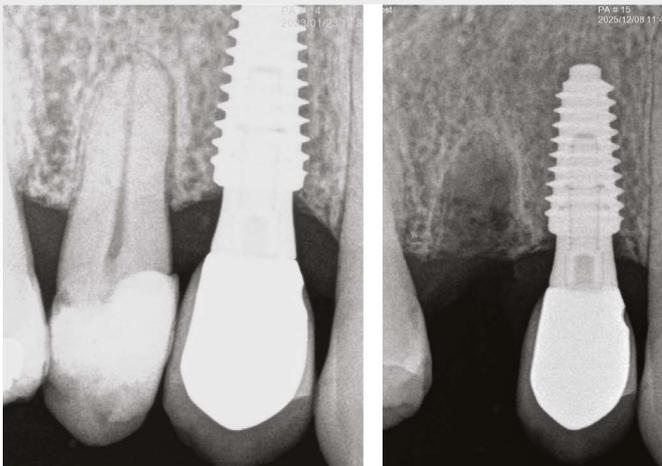


Figure 1: Case 1 - Tooth 15 has fractured the crown and is showing ideal clinical situation, with bone apical to root for primary stability.

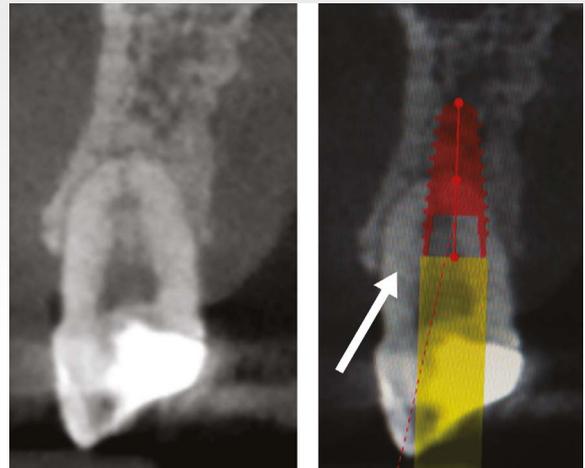


Figure 2: Case 1: Single rooted tooth in correct position within ridge for implant placement, and a buccal bone wall of sufficient thickness. The difference between the tooth diameter and implant diameter is shown by arrow. A wide diameter implant cannot be placed in most cases, due to minimum distances from either adjacent teeth or as in this case, the adjacent 14 implant that requires a 3mm distance between implants (Fig. 3).

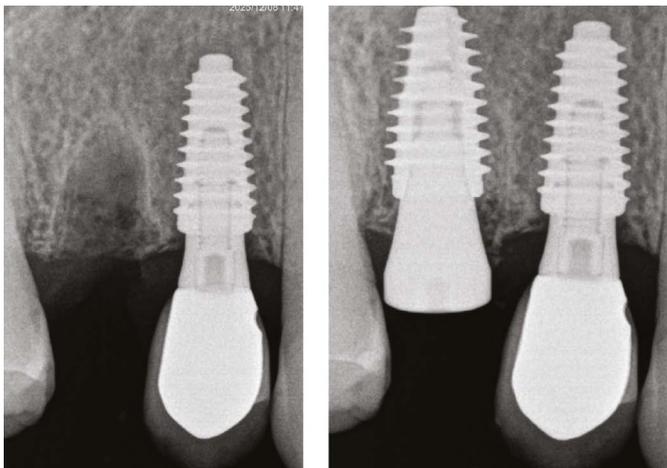


Figure 3: Case 1: The 15 implant was angled towards the distal aspect of socket to have a sufficient 3mm distance from 14 implant. The jump-gap was augmented with a particulate bone graft.

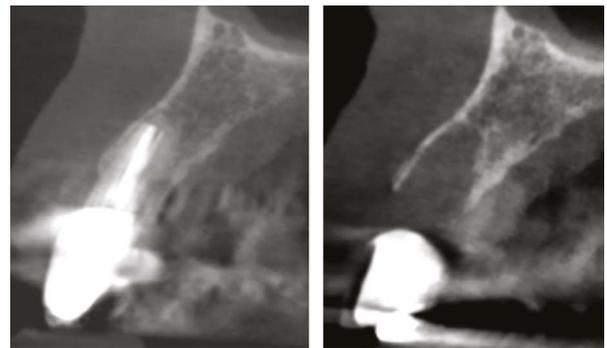


Figure 4: Case 2-Immediate placement in the anterior maxilla requires a thorough knowledge of the anatomy and there should be at least 5mm of bone apical to the socket for primary stability. Primary stability cannot be obtained by placing a large diameter implant as it will not have the required 2mm bone buccal and palatal of implant and may then cause bone resorption and recession.

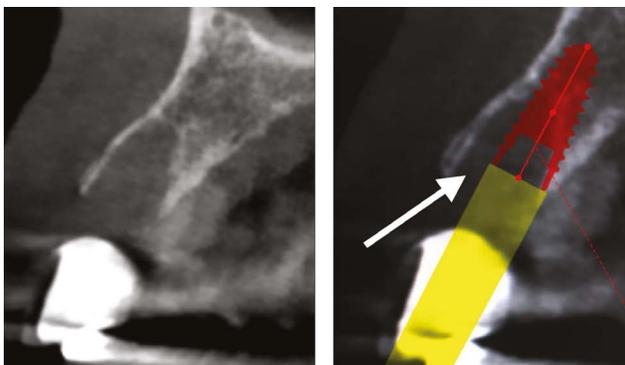


Figure 5: Case 2-The implant will have to be placed towards the palatal aspect to stay away from thin buccal bone and prevent perforation of buccal bone. The difference in diameter between tooth and implant (called the jump-gap and indicated by arrow) will be augmented with particulate bone. In the case of a central incisor, one has to be very careful not to perforate into the Maxillary Incisive canal.

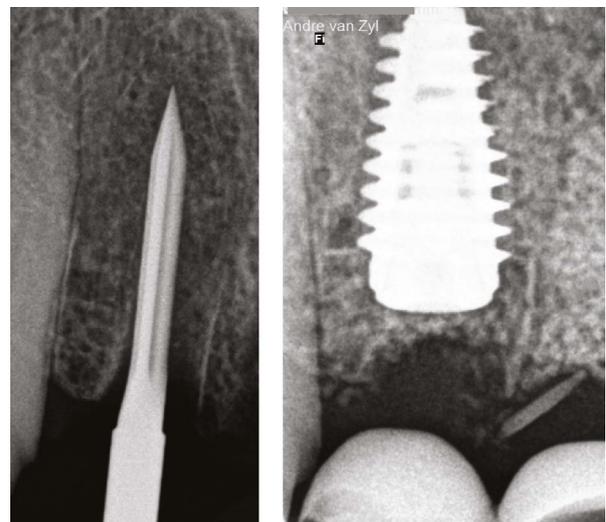


Figure 6: Case 2- implant in 12 position for bridge anchor. The 12 jump-gap and 11 socket was grafted to prevent ridge collapse.

**Table 1.** Classification combining implant placement and loading time<sup>2</sup>

Implant placement protocol	Immediate restoration/loading (type A)	Early loading (type B)	Conventional loading (type C)
Immediate placement (type 1)	Type 1A	Type 1B	Type 1C
Early placement (type 2/3)	Type 2/3A	Type 2/3B	Type 2/3C
Late placement (type 4)	Type 4A	Type 4B	Type 4C

To enhance understanding, the relationship between the above-mentioned treatment concepts is combined into one classification system (see **Table 1**). This approach acknowledges that implant placement and loading are two events that occur for every implant, and it emphasizes that they are interdependent variables that influence the success and outcomes of implant therapy. In total, twelve different combinations of implant placement and loading can be described. At first glance, this may seem confusing, but once understood, the classification becomes highly practical and intuitive.

### The biological rationale behind timing in implant dentistry

Following tooth extraction, the alveolar socket undergoes dimensional changes during healing, with significant reductions in ridge width (up to 50%) and height occurring within the first year in the molar and premolar region, with most of the reduction within the initial three months. These alterations reflect the normal sequence of healing: initial stabilization of the blood clot, inflammatory activity, replacement by granulation tissue, and the gradual transition from woven to mature lamellar bone. This process is guided by a coordinated biological response involving a range of signalling molecules.<sup>3</sup> These events occur predictably yet vary in extent from patient to patient, so the timing of implant placement becomes an important variable in treatment planning. Placing implants while the alveolar ridge is still undergoing active remodelling—whether immediately or at an early stage—may lead to aesthetic or functional complications, particularly when the buccal bone wall is thin or missing. Therefore, a solid understanding of biology is essential to recognize and address the limitations inherent in implant dentistry.

### Clinical considerations for different timing and loading protocols<sup>2</sup>

#### 1. Plan implant placement timing and loading protocols prior to tooth extraction:

Treatment planning should begin once the indication for tooth extraction has been defined. Both implant placement timing and restoration/loading protocols must be established prior to extraction. The selection of the protocol should be based on identifying the approach that ensures the most predictable clinical outcomes: long-term hard and soft tissue stability, optimal aesthetic results, reduced risk of complications and fulfilment of patient-specific and site-related factors.

#### 2. Include alternative treatment options in the planning and consent process:

Alternative treatment modalities should be considered in case intra-operative procedural criteria cannot be met. Should an immediate loading be planned, but the implant does not reach a high enough placement torque, then immediate loading should not be used. In the worst-case scenario of a primary stability of less than 15Ncm, the implant may have to be covered and exposed after a suitable healing period. Implant protocols vary in complexity and associated risk. The selected protocol should fit with the clinician's level of skill and experience.

#### 3. Consider patient-centred benefits and associated risks across different protocols:

The implant placement and loading protocol can negatively impact the survival and success of the implant if specific selection criteria are not met and/or if the clinical procedure is executed with insufficient quality. Therefore, it is crucial to carefully consider the patient-centred benefits of the various implant placement and loading protocols, along with the associated risks.

#### 4. Type 1A Protocol should be considered only if it provides patient-centred benefits.

Type 1A (immediate placement and immediate restoration/loading) is a very popular and yet a complex procedure. It should be performed only by experienced clinicians and considered when patient-centred advantages exist, such as aesthetic needs or reduced morbidity. Clinical prerequisites for Type 1A are very strict and rarely met and include:

- intact socket walls,
- facial bone wall  $\geq 1$  mm,
- thick gingival phenotype,
- no acute infection at the site,
- sufficient apical and palatal/lingual bone for primary stability,
- insertion torque of 25–40 Ncm and/or ISQ  $> 70$ .

In addition, an occlusal pattern that protects the provisional restoration in function and high patient compliance. It is clear from the list above that these criteria are rarely met.

#### Early implant placement and conventional loading are well documented.

Early implant placement could be considered in most cases, especially when thin facial walls or defects are encountered that necessitate simultaneous bone augmentation. Conventional loading (Type 2–3C) is well documented and recommended to be used in combination with early implant placement. However, immediate (Type 2–3A) and early loading (Type 2–3B) protocols with early placement lack sufficient evidence to be a routine treatment modality.

#### Late implant placement is the least preferred protocol.

Late implant placement is associated with higher risks of alveolar ridge resorption, bone volume loss, and prolonged treatment time. However, when late placement is indicated due to patient or site factors, alveolar ridge preservation can be performed to mitigate these effects. Also, early loading (Type 4B) and conventional loading (Type 4C) are well-

supported and may be routinely applied together with late implant placement, while immediate loading (Type 4A) may be considered if patient-centred benefits are present and clinical criteria for immediate restoration are met.

#### Conclusion

The timing of implant placement should be individualized based on bone and soft tissue quality, medical history, aesthetic demands, and patient preferences. Immediate implant placement is appropriate in ideal cases with sufficient hard and soft tissue support but requires careful case selection and precise surgical technique to achieve predictable outcomes. This should not be used in multi-rooted molar teeth. When the Type 1A protocol is not indicated, early placement allows for initial healing and helps minimize ridge resorption. Delayed implant placement remains a reliable option in compromised sites, enabling complete tissue healing before implant insertion.

Future advances in digital planning, guided surgery, and implant engineering continue to enhance protocols and outcomes. Better understanding of oral biology will provide clinicians with more predictable implant treatments tailored to the individual clinical situations.

#### Literature

1. Buser D, Sennerby L, De Bruyn H. Modern implant dentistry based on osseointegration: 50 years of progress, current trends and open questions. *Periodontol* 2000. 2017;73(1):7-21.
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