Immediate/Early Loading of Dental Implants: a Report from the Sociedad Espanola de Implantes World Congress Consensus Meeting in Barcelona, Spain, 2002

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ABSTRACT

Background: Immediate/early loading protocols are becoming frequently used in implant dentistry, but the prerequisites for achieving good results and the limitations of such protocols are not fully known. Moreover, the terminology used in immediate/early loading is still confusing.

Purpose: The purpose of this article is to present the outcome of a consensus meeting on immediate/early loading.

Materials and Methods: A consensus meeting was organized during the Sociedad Espanola de Implantes World Congress in Barcelona on May 23, 2002, with the objective to present and discuss the experiences from immediate/early loading protocols in dental implant treatment. The purpose was also to discuss definitions of the terminology used in immediate/early loading. The consensus meeting agenda included presentations from invited experts, followed by a consensus discussion.

Results: A consensus statement was agreed on.

Conclusions: Multiple independent investigators have demonstrated that immediate/early loading of implants is possible in many clinical situations; however, additional documentation is required.

KEY WORDS: consensus report, dental implants, immediate/early loading

Currently two-stage implant therapy with a healing period before loading is a well-documented and widely used treatment modality for prosthetic reconstruction of the edentulous patient. The clinical outcome is generally highly successful, and risk factors leading to increased implant failure rates have been identified. Based on the experiences of two-stage implant therapy, clinicians, researchers, and companies are now seeking new ways of treating patients to shorten and simplify routine implant procedures. The high activity in applying immediate/early loading protocols is indicated by an increasing number of publications and conference abstracts in this field. The use of such protocols has obvious advantages for the patient, because, for example, treatment time and the number of surgical interventions are reduced. However, the concepts of immediate/early loading challenge previous theories and understanding of implant integration, in which healing and osseointegration before loading was anticipated as a precondition for a successful outcome. It cannot be ruled out that application of immediate or early loading may pose an increased risk of implant failure. The available literature (see Bibliography) demonstrates the possibility of achieving good results with immediate/early loading, at least in good-quality bone, which supports the idea that this concept may serve as a viable option in implant dentistry. However, the prerequisites for achieving and maintaining acceptable results and the limitations of immediate/early loading are not fully known. In light of this, it is important that clinicians and researchers exchange information about their published and unpublished experiences. Moreover, the terminology used in immediate/early loading protocols is confusing and needs to be defined.

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For these purposes a consensus meeting on immediate/early loading was organized. The objective of this report is to present the outcome of this consensus meeting.

CONSENSUS MEETING

A consensus meeting was organized during the Sociedad Espanola de Implantes World Congress in Barcelona on May 23, 2002, with the objective to present and discuss the experiences from immediate/early loading protocols in dental implant treatment. The consensus meeting agenda included presentations from the participants (Table 1), followed by a consensus discussion, which resulted in this report.

CONSENSUS REPORT

Terminology for the Timing of Implant Loading

- *Immediate loading*: The prosthesis is attached to the implants the same day the implants are placed.
- *Early loading*: The prosthesis is attached at a second procedure, earlier than the conventional healing period of 3 to 6 months; time of loading should be stated in days/weeks.
- *Delayed loading*: The prosthesis is attached at a second procedure after a conventional healing period of 3 to 6 months.

Terminology for Implant Loading

- *Occlusal loading*: The crown/bridge is in contact with opposing dentition in centric occlusion.
- *Nonocclusal loading*: The crown/bridge is *not* in contact in centric occlusion with opposing dentition in natural jaw positions.

TABLE 1 Participants at the Concensus Meeting

Chairmen and moderators	Carlos Aparicio (Spain)
	Bo Rangert (Sweden)
	Lars Sennerby (Sweden)
Invited experts and presenters	William Becker (USA)
	Winston Chee (USA)
	Matteo Chiapasco (Italy)
	Lino Esteve Colomina (Spain)
	Lyndon Cooper (USA)
	Luis Fujimoto (USA)
	Roland Glauser (Switzerland)
	Paulo Malo de Carvalho (Portugal)
	Carl Misch (USA)
	Peter Moy (USA)
	Dennis Tarnow (USA)
	Dietmar Weng (Germany)
	Peter Wöhrle (USA)

Documentation of Immediate/Early Loading

Few multicenter studies on immediate and early loading have been presented.

Multiple independent investigators have demonstrated that immediate and early loading of implants is possible in many clinical situations; however, additional investigation and documentation is required.

Documentation of Different Indications

- Immediate/early loading of *full-arch mandibular fixed prostheses* and *overdentures* supported by implants placed in healed sites are accepted clinical procedures with adequate clinical documentation.
- Immediate/early nonocclusal loading of *single-tooth replacements and short-span bridges in the esthetic zones* may be accepted clinical procedures with further research.
- Immediate/early occlusal/nonocclusal loading in other regions are still under development.

Considerations for Immediate/Early Implant Loading

- Adequate initial implant stability is considered important for a successful outcome.
- Controlled occlusal loads for full-arch cases and nonocclusal loads for short-span bridges and single-teeth replacements are considered important for a successful outcome.
- Site evaluation for bone density/volume and controlled infection and inflammation are considered important for a successful outcome.

Stability Enhancement at Immediate/Early Loading

Implant surface modifications might be beneficial in soft bone qualities and extraction sites for maintaining implant stability during the early healing period, but further research is needed.

Implant Placement in Fresh Extraction Sites with Immediate/Early Loading

- When the drill diameter is larger than the extraction site, the situation is similar to that of a healed site.

- Discrepancies between implant dimension and the osteotomy must be reconciled.
- In the case of active periodontal/periapical disease, there is a risk for an increased inflammatory response, which may jeopardize the osseointegration.
- Placement of implants in fresh extraction sites is possible, but elucidation of risk factors is necessary.

Patient Selection for Immediate/Early Loading

Patient selection for immediate/early loading is not significantly different than for conventional implant treatment protocols.

Risk Factors at Immediate/Early Loading

High masticatory or parafunction forces, low bone volume and density, poor bone vitality, and infection are risk factors; in combination they seem to be the reasons for failures at immediate/early loading.

Treatment Planning at Immediate/Early Loading

- Ensure sufficient number and spread of implants.
- Ensure stable adjacent teeth.
- Minimize or reduce occlusal tables.
- Use rigid splinting whenever possible.
- Maximize the spread and distribution of contacts.
- It is important to recheck the occlusion during the first days and weeks after immediate/early loading.
- Use the best positions for the permanent implants, and place any provisional or reserve implants in the "leftover" sites.

Diagnostic Tools for Immediate/Early Loading

Primary Stability Measurement

- *Resonance frequency analysis (RFA)*: RFA gives objective measurements of initial implant stability. However, there are insufficient data at this time to provide definitive values of what are safe initial stability measurements.
- *Insertion torque values*: A value between 30 and 50 Ncm before the implant is fully seated appears to provide required stability.

Follow-Up of Implant Stability during Loading. Resonance frequency analysis: Failing implants normally show a continuous decrease of stability until failure when measured with an RFA device, and can be detected from 1 to 3 months after loading.

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