

# Consensus on Immediate Implant Function: An International Survey on Terminology, Applicability and Limits

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## Introduction

A questionnaire with 51 questions on aspects of immediate implant function was completed by 34 experienced international clinicians and scientists (Europe, North-South-America, Asia) during a meeting in Athens, Greece July 29th - 31st 2001 (FRIADENT Immediate Loading Consensus Conference). The questionnaire covered the following aspects of immediate implant function: Terminology, clinical/biological aspects, documentation, and components. The questionnaires were statistically evaluated and summarized in a consensus paper. The purpose of this meeting on accelerated implant therapy was to report and review on the clinical experience on immediate implant loading and restoration. An overview of documentation and scientific expertise enabled the group to discuss and summarize surgical, prosthetic and laboratory guidelines on immediate loading and restoration of dental implants. The format of the meeting included short presentations with interactive discussions.

Based on the pursuit of a predictable treatment alternative to simplify and accelerate implant therapy the poster will introduce a nomenclature proposal for a standardized and uniformly usable terminology for immediate implant function. Clinical and biological success and risk criteria will be summarized, and requirements for components will be discussed.

While the terminology for the delayed implant protocol has been widely accepted, a consistent nomenclature for early and immediate function is today still missing. Terminology proposals with regard to the time of loading, occlusal concept of prosthetic restoration and receptor site were intensively discussed among clinicians and researchers at the IL expert meeting. The evaluation criteria to differentiate EL from IL seemed to be controversial. Seventy-five percent of the

attendees agreed or partly agreed that IL can be defined as the delivery of a prosthetic implant restoration up to three days. Almost 50% could not agree to a definition of EL as the delivery of a prosthetic implant restoration from three days until six weeks. Twenty-five percent of the participants disagreed with or did not have enough information to accept a definition of DL within 6 weeks in non-augmented sites. Respectively, 50% disagreed with

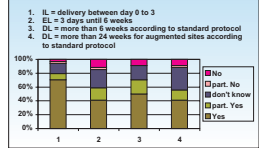
loading of augmented sites within 24 weeks (diagram 1). Splinting of four implants in the anterior mandible was accepted as the proven standard in IL. However, the success risk of the same splinting concept with eight or more implants in a full arch mandibular fixed restoration was questioned by 12% of the participants. One quarter of the Athens attendees doubted the predictability of the osseointegration

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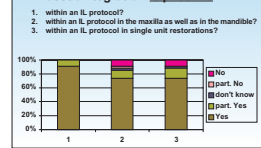
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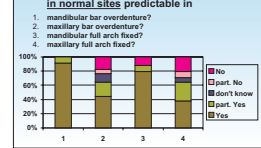
### 1. Terminology: differentiation between IL and EL?



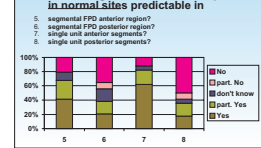
### 2. Do you believe that successful osseointegration is possible



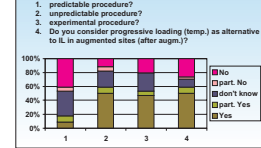
### 3.(A) Do you believe that successful osseointegration is within an IL protocol in normal sites predictable in



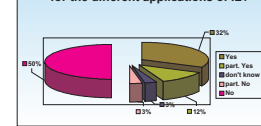
### 3.(B) Do you believe that successful osseointegration is within an IL protocol in normal sites predictable in



### 4. IL in general in augmented sites is a



### 5. Do you believe implantology possesses adequate objective armamentarium to assess risk profiles for the different applications of IL?



According to the experts, implant diameter and length within an IL protocol have a decisive influence on implant osseointegration. More than 80% would apply the same rules for IL and DL with regard to implant length, while the significance of implant diameter was unknown or relevant for one third of the participants (diagram 7A). The implant configuration (e.g. parallel/tapered) and the surgical technique influence immediate fixation. Screw-shaped implants are most effective for such a type of

fixation. Since the implant design is considered to be an important factor for a success within immediate implant osseointegration, a "3-fold-design" (machined/etch-stroke/ grit) as well as a specific thread design were mentioned by 50% to 70% of the participants as mandatory (diagram 8). It appears that rules concerning the number of implants used in DL can be applied to an IL protocol. While consistent rules for removable restorations in the maxilla or more than three implants were only accepted by every second expert

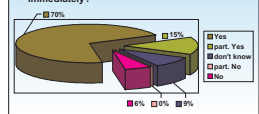
mandibular fixed restorations (> 5 implants), mandibular removable restorations (< 3 implants) and maxillary fixed restorations (> 8 implants) are preferred by more than three quarters of the attendees (diagram 7B). Primary implant stability is accepted as an important factor to ensure a predictable bone apposition. It seems that micro-movements above a certain threshold level (100 to 150 µ) prevent intimate osseointegration and rather lead to fibrous encapsulation.

Implant site preparation with drills and burs is estimated to have a significant impact on primary implant stability. A non-ablative implant site preparation with osteotomes or conical expanders with resulting micro-furcations of bone could be harmful for the undisturbed and intimate bone apposition. Over-compression may lead to necrosis in dense bone. Therefore, the majority of the group would not use a bone condensing technique. In addition, reliable study results are demanded: A "Compressing Fit" concept by

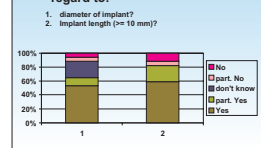
means of an undersized preparation or oversized implant diameter is, however, viewed as beneficial for primary implant stability. This initial stability may help to overcome a potential loss of early stability caused by bone remodeling. The non-importance of bi-cortical stabilization seems to be accepted by the majority of the experts (diagrams 9 A+B). Implant insertion torque correlates with primary stability and is therefore seen as a significant factor for initial implant success. Although published data on implant torque value

do not allow any conclusion on the minimum value necessary for primary stability, the majority of experts recommends 35 Ncm. However, there is still a need for a reliable measuring device (diagram 9 B).

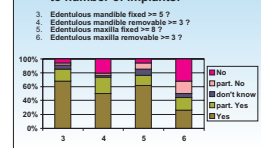
### 6. If adequate objective instruments become available that tell you when you are treating a single unit that has the same low risk profile as a mandibular fixed implant restoration, do you believe you would be able to successfully and predictably load it immediately?



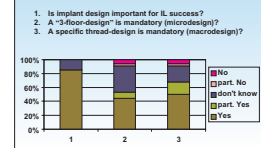
### 7.(A) Same rules for IL and DL with regard to:



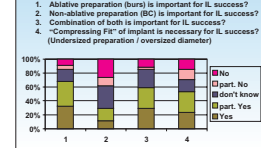
### 7.(B) Same rules for IL and DL with regard to number of implants:



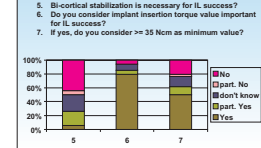
### 8. Implant design:



### 9.(A) Primary stability



### 9.(B) Primary stability



Risk factors, such as mal-occlusion, high masticatory forces, low bone volume and density, as well as poor bone vitality seem to be the reasons for failure in immediate function. A consensus was reached on the occlusion pattern for immediately loaded single tooth restorations. Contacts in

centric occlusion and dynamic movements on single tooth restoration should be avoided (diagram 10 D). Compared to the anterior region, single units in the posterior region are of higher risk to fail as a result of lower bone density and higher masticatory forces. A clear consensus on the

occlusion pattern for FPD and RPD in the edentulous maxilla and mandible as well as on segmented FPD in the residual denture as well as on the implant-bone interface within an IL protocol studied (diagram 10 A to C).

The question about the necessity of a "damping effect" (veneering, abutment, cement) allowing an undisturbed bone apposition at the implant-bone interface within an IL protocol studied (diagram 10E).

For improving and simplifying the current provisional techniques, Copings and temporary abutments should be optimized for easy and fast clinical handling at immediate function (diagram 10E). The main goal of an accelerated implant protocol is to

provide the best treatment option to the patient, with regard to safety and comfort. Although the majority of experts would actively inform their patients about IL, 40% would not perform this treatment modality on patients' request (diagram 11).

## Summary

**Terminology**  
► Based on the nomenclature proposals of the attending experts, a consensus on a standardized and uniformly used terminology for immediate implant function is needed.  
► Risk and success criteria have to be further evaluated.

**Clinical and biological aspects**  
► The influence of low bone volume and density as well as poor bone vitality on the success rate of immediate loading of implants has to be determined.

► Proven occlusal concepts for immediate implant loading are demanded with regard to single units, segmented FPD, full arch restorations in the mandible and maxilla.  
► Implant configuration, number, design and surface morphology have a significant influence on immediate implant function.  
► A bone condensing technique seems to be of higher risk within an immediate implant protocol.

► A "Compressing Fit" concept (internal condensation) by means of an undersized preparation or oversized diameter is beneficial for primary implant stability.  
► Bi-cortical stabilization is not a prerequisite for primary implant stabilization.

► An insertion torque of 35 Ncm seems to be an adequate and safe value to load implants immediately.  
► Current prosthetic techniques for implant temporization have to be improved and simplified.

**Documentation**  
► Immediate bar-supported loading on four implants in the mandible is the only proven and documented treatment modality in long-term studies with regard to immediate implant function.

► There is not enough documentation on immediately loaded implants to recommend a general protocol.  
► Prospective studies are needed to provide an objective armamentarium to assess risk profiles for the different applications of early and immediate loading.

**Components**  
► A reliable measuring device to evaluate the implant insertion torque and, consequently, primary implant stability is needed.  
► Copings and temporary abutments should be optimized for easy and fast clinical handling at immediate function.

**Abbreviations**  
IL: Early Loading  
EL: Early Loading  
DL: Delayed Loading  
PL: Progressive Loading  
FPD: Full Arch Partial Denture  
RPD: Removable Partial Denture



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