Consensus Conference on Immediate Loading: The Single Tooth and Partial Edentulous Areas

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Purpose: *A consensus conference was held to determine what the parameters should be for the immediate functional loading of the single-tooth implant restoration and short-span fixed implant-supported bridgework.*

Materials: *Forty-one clinicians and researchers presented cases and situations relating to the topic. A panel then distilled questions that were presented to the audience (430) at large. Answers were gleaned to formulate a consensus.*

Results: *Ten distinct answers evolved that constituted the essence of guidelines for clinicians to be aware of when undertaking immediate loading. These guidelines are contained within the body of the text.*

Conclusions: *Extreme caution and adherence to a universal generic protocol are suggested for clinicians who are involved with single-tooth and short-span multiple-teeth implant replacements as related to immediate loading as defined within this text. (Implant Dent 2006;15:324–333)*

Key Words: functional loading, implant surface, timing, proximal contacts

A consensus is a general agreement based on reports or a judgment arrived at by most of those concerned.[1] Professor Gilberto Sammartino organized this 3-day conference on the theme topic. The conference was held at the University of Federico II in Naples, Italy on May 25–27, 2006. It was designed to formulate a consensus of opinion based on reports and presentations given by 41 clinicians and researchers.* Following the presentations, judgments were arrived at by most of those in attendance so as to present to the dental implant community guidelines and parameters of practice regarding the immediate loading of single-tooth implant replacements and of partially edentulous implant restorations.

In an article titled "Value of the Evidence-Based Consensus Conference,"[2] Gary C. Armitage, DDS, MS, the R. Earl Robinson Distinguished Professor (Division of Periodontology, Department of Orofacial Sciences, UCSF School of Dentistry), stated that "a traditional consensus conference is an appropriate way to arrive at the best current way to do something if the knowledge base is insufficient to make a scientifically rigorous evidence-based analysis of the clinical problem. The result is the best opinion of experts in the field." Dr. Armitage also states that "one of the common goals of a consensus conference or an evidence-based workshop is to accurately summarize a body of information and present it to practitioners in a way that will be useful to them in the treatment of patients."

A core group of clinicians and researchers met (after the final presentation) after having culled the many concepts and practices that were woven through intense days of learning and sharing research and clinical outcomes.

A larger panel then presented the selected questions and statements to the general audience in order to formulate a consensus, which was the purpose of the meeting in the first place. It should be noted that after each and every presentation, on each day that preceded the formulation and finalization of the consensus, members of the audience of 430 individuals were encouraged to ask the presenting clinician or researcher any questions that pertained to his/her presentation. These exchanges were instrumental in helping to define the panel's salient features that were submitted before the entire audience.

What was initially required was a definition of terms. This was obtained from *The Glossary of Implant Dentistry*,[3] which was developed by the Department of Implant Dentistry at New York University College of Dentistry in combination with the International Congress of Oral Implantologists in 2004. Immediate occlusal loading is defined as "a clinical protocol for the placement and application of force on implants, with a fixed or removable restoration in occlusal contact with the opposing dentition, at the same clinical visit." It is defined as being synonymous with "immediate functional loading." On the other hand, immediate nonocclusal loading is defined as "a clinical protocol for the placement of an implant(s) in a partially

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edentulous arch, with a fixed one removable restoration not in occlusal contact with the opposing dentition, at the same clinical visit." In all cases, the advisory words of Armitage are worth noting. He voiced a phrase that was also used by many of the presenters, and that is "clinical judgement." As with any clinical procedure pertaining to implant dentistry, the use of clinical judgement is no less important when dealing with the implications of the immediate loading of either a single-tooth implant restoration or that of multiple implant teeth.

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*** Presenters**

1. C. Banzi	22. F. Graziani
2. A. Barlattani	23. F. Kistler
3. M. Bonelli	24. C. Mangano
4. E. Bruna	25. A. Ordonez
5. G. Calesini	26. Z. Ormianer
6. G. Cannizzaro	27. A. Osman
7. P. Cardelli	28. A. Palti
8. P. Casentini	29. A. Piattelli
9. A. Catarsini	30. L. Prosper
10. R. Ceccarelli	31. B. Rabie
11. S. Cei	32. R. Rodriguez
12. M. Chiapasco	33. D. Schwartz Arad
13. L. Choukroun	34. G. Seeberger
14. G. Corinaldesi	35. A. Simonpieri
15. U. Covani	36. M. Steigmann
16. M. Degidi	37. E. Tammaro
17. M.S. El Attar	38. T. Testori
18. S. Fanali	39. P. Trisi
19. P. Folegatti	40. S. Valerio
20. A. Frison	41. H.L. Wang
21. E. Gherlone	

Of the forty-one presenters, the following abstracts were selected as being samples of these presentations. The format of each abstract was left entirely to the discretion of each author.

Prosthetic Management of Peri-Implant Soft Tissue in Immediate Loading

E. Gherlone and P. Folegatti

Introduction: The evolution and development of surgical and prosthetic techniques increase the interest in immediate dental implant loading due to a number of clinical advantages this treatment modality offers. Clinical observations, supported by some recent experimental histological studies, indicate that it is reasonable to believe that successful treatment outcome can be reached with dental implants inserted in fresh extraction sockets and immediately loaded. Moreover, new surface treatments have been designed to optimize the bone-implant contact.

Objectives: Reduction of treatment time, contrast of the resorption process after tooth extraction, decreased loss of soft tissue anatomy, preservation of residual periodontal structures, and the use of removable prostheses can interfere with the healing process.

Materials: Examining cases involved in immediate post-extraction implant placement and immediate functional provisionalization to contour peri-implant tissue. The authors give particular prominence to the use of immediate loading technique in order to optimize the esthetic result. In the single-tooth rehabilitation, it is simple to obtain excellent results because the presence of adjacent teeth advantages the preservation *in situ* of biological structures (soft and hard tissues).

When multiple anterior teeth are missing, the choice of which restoration that will best provide occlusion and esthetics depends on multiple factors, including the number and location of missing teeth, the residual ridge form in relation to the replacement teeth, the relationship of the maxillary and mandibular anterior teeth, the condition of teeth adjacent to the edentulous span, and the amount of bone available for implant placement. When there is a loss of ridge contour due to residual ridge resorption or trauma, the decision becomes more complex, as not only does the tooth structure need to be replaced, the ridge form also has to be replaced. The authors demonstrate that it is possible to obtain best esthetic results with an immediate provisionalization that manages peri-implant soft tissues.

Results: Single-tooth rehabilitations included 24 patients (17 female, 7 male), 86 implants, a follow-up of 4 years, and a success rate of 98%. Full arch rehabilitations included 13 patients, 160 implants, a follow-up of 4 years, and a success rate of 97%.

Discussion: Management of peri-implant soft tissues with an immediate provisionalization is a technique that can be used in selected patients where replacement of a missing tooth is required for esthetic reasons.

Possibilities and Limits of Immediate Functional and Non-Functional Loading in the Esthetic Region: Surgical and Prosthetic Aspects

M. Chiapasco and P. Casentini

Aim of the study: To discuss possibilities and limits, and to present results of immediate function and immediate loading of dental implants placed in esthetically demanding edentulous areas.

Materials: Five totally edentulous and 45 partially edentulous patients, with edentulism involving esthetic areas of the upper jaw, have been consecutively treated by means of oral implants (92 implants). In the same surgical session, implants were connected to abutments, impressions were taken, and immediate prosthetic restorations (within 48 hours) were applied. Immediate function with no occlusal contacts was performed in 40 patients, whereas in the remaining 10 patients, full occlusal contacts were created. Patients were followed for 12–60 months after the start of prosthetic loading.

Results: No implants have been lost after 5 years of function, while only 3 out of 92 presented with peri-implant bone resorption higher than the values considered as successful by Albrektsson *et al.*[1] Therefore, survival and success rates of implants were 100% and 96.8%, respectively.

Conclusion: Immediate restoration/immediate loading of implants placed in esthetically demanding areas of the maxilla seem to be a safe and reliable protocol for the prosthetic rehabilitation of edentulous patients with results consistent with those obtained in case of delayed loading.

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Immediate Loading of Immediate Dental Implants

D. Schwartz-Arad

Immediate implant placement into fresh extraction sites is considered a predictable and acceptable procedure to preserve bone height and width. Preservation of the alveolar dimensions is the main rationale and one of the most important reasons for immediate implantation immediately after tooth extraction. Early extraction and immediate implantation could lead to favorable crown-implant ratio, better esthetics, and a favorable interarch relationship.

Time of loading has been rigidly controlled in clinical investigations to allow implants to heal under unloaded conditions. The reason for this control is the critical association between achieving osseointegration and the absence of loading. For the purpose of provisionalization, some clinicians immediately load implants, which results in a high percentage of osseointegration of these implants. After several implants were immediately loaded with a bar overdenture in the mandible, the concept of immediate loading evolved to include loading multiple implants with a fixed prosthesis in the mandible and maxilla. Once the success parameters were defined, implants loaded immediately proved to be at least as successful as implants placed under a standard protocol. The objective of immediate loading of immediate dental implants is to combine bone preservation following immediate implantation together with tissue preservation by immediate loading. Furthermore, immediate loading provides less surgical interventions, an easier and faster solution for the patient, and an enlarged surface area for the implant-bone contact.

According to our preliminary data, the procedure of immediate loading of immediate implants was predictable, with a high survival rate (97.6%) after a mean follow-up of 15.6 months. This treatment alternative provides a rapid and comfortable solution for both the patient and dental practitioner.

Successful immediate implantation and loading are based on several clinical parameters. Therefore, this treatment concept can be used successfully in daily clinical practice in properly selected cases that include only sites where the extraction socket is fully preserved, with no bone dehiscence and when good primary stability is achieved. Immediate provisional crowns should only be proposed with early loading if an appropriate initial insertion torque has been applied (>40 N).

Further studies are needed to determine the long-term success of immediate loading of immediate implants. Additional data are needed to determine the minimal bone quality, quantity, minimal insertion torque, and maximal occlusal loading for predictable immediate loading-immediate implantation protocols.

Immediate Implant Loading in Single-tooth Restoration: Scientific Evidence

F. Graziani

Immediate implant loading is an increasingly popular and effective technique in implant dentistry. However, a general agreement on implant survival after this procedure is still lacking. The objective of this study was to review systematically implant survival following immediate implant loading on a single tooth compared with conventional implant placement. Following the production of a detailed protocol, screening and quality assessments of clinical trials were conducted in duplicate and independently. To be eligible, articles had to be clinical prospective trials with at least 20 patients per group, comparing immediately loaded implants with implant loaded conventionally on single-tooth restorations followed for at least 3 years. The search yielded 10 abstracts, and 4 were selected for full text screening. Another 4 were retrieved with a manual search. None of the selected papers fulfilled all the inclusion criteria and were relevant to the study. Thus, no restrictions on follow-up were applied. Three articles were selected. Heterogeneity of the selected papers prevented meta-analysis. Implant survival ranged from 56% to 99% for immediately loaded implants and 95% to 99% for conventionally loaded implants. Implant survival appears to show greater variability in immediately loaded implants in single-tooth implants than conventionally loaded implants. Predictability of this procedure appears feasible if applied in selected cases performed by skilful clinicians. Clinicians should be cautious in applying this technique in a routine treatment plan. Prospective clinical trial studies with larger patient numbers and control of confounding factors are urgently needed to provide definitive data on the predictability of this promising procedure.

Primary Stability, Insertion Torque and Micromovements. Mechanics or Biology?

P. Trisi

Many factors are involved in successful osseointegration under immediate loading dental implants. Between these, the implant micromotion plays a major role. Micromotion thresholds have been presented in orthopedic studies between 50 and 100 μm.

In vitro studies showed that high insertion torques, above 100 N/cm, increase the primary stability of different implant systems by reducing the amount of micromotion underneath the threshold of 30–50 μm. In an animal study, it was observed that nonloaded implants placed in dense cortical bone using high insertion torques (>100 N/cm) showed an increased remodeling rate compared to implants placed in with low insertion torque (10 N/cm), and up to 6 weeks, no implant failed or became fibrous integrated. Moreover, the high-torque group showed at all the time frames a much higher resistance to removal torque and a higher BIC compared to the low-insertion torque group. This study allows assuming that an increased insertion torque may be helpful in reducing the micromotion in the initial healing period, before the osseointegration is achieved in cortical bone.

On the other side, the compression in cancellous bone impairs the achievement of the osseointegration compared to the noncompressed implants and does not influence significantly the micromotion. For this reason, it may be assumed that in soft bone, the primary stability must be achieved trough splinting.

In conclusion, *in vivo* and *in vitro* studies suggest that caution is needed when immediately loading implants in soft bone, particularly for a single nonsplinted tooth. Conversely, in compact bone, an increased insertion torque allows to reduce the micromotion underneath the risk threshold.

Immediate Loading on Single-Tooth Implants

M. Steigmann

Classic protocol of delayed loading has been demonstrated to be very efficient over time. Dentists and patients became very trustful of implant placement procedures having a staged loading approach. For different bone qualities, different loading time frames were described: shorter for the mandible (better bone quality) and longer for the maxilla (softer bone quality). Classical implant loading time frame also brings with it the problem of temporization.

However, due to evolution of implant design regarding the development of improved surfaces and connections with the purpose of achieving a better primary stability and osseointegration, immediate loading became more and more popular, representing nowadays an important issue, what is demonstrated in the fact that many research plans and protocols are moving in this direction. With the help of computerized tomography scan prosthetic planning, immediate loading gives even more attention to implant therapy. Immediate loading has been a very popular procedure in the last couple of years. It gives the patient the possibility to benefit sooner from the advantages of implant treatment. For the edentulous mandible, immediate loading was performed already for many years with predictable results. Most of immediate loading cases in the mandible on 4 implants connected with a bar for immediate stability. In the maxilla, less evidence is found in the literature. However, in these cases, connecting multiple implants for increased stability from the beginning was advocated. Cross-arch stabilization for immediate functional loading in the maxilla was recommended. Sometimes a metal reinforced temporary is helpful.

The single implant treatment in the anterior maxillary or mandibular region is more challenging, having also an esthetic component. Immediate restoration in the esthetic zone gives the patient a temporary prosthetic reconstruction avoiding removable flippers or Maryland bridges. In some cases, however, fixed provisionals can have a better prognosis for implant survival.

Not loading implants immediately could lead to tissue collapse. Some authors describe immediate tooth replacement to overcome the soft tissue deficiencies that sometimes follow late loading in the esthetic zone. More than that, immediate nonfunctional loading after implant placement was described. Immediate implant placement can prevent bone from resorption, and immediate stabilization of the soft tissue with immediate nonfunctional loading can prevent rescission of the soft tissue. Special surgical modalities were described for guided bone regeneration simultaneously with immediate loading in the esthetic zone with the goal of soft tissue development.

Esthetic and Prosthetic Considerations for Immediate Implant Placement and Loading

Z. Ormianer

The objective of implant dentistry is to provide the patient with an esthetic and functional prosthesis. Augmentation procedures and a "stress free" healing period extend the treatment time required to restore these patients.

Various attempts at immediate implant loading have been made over the years in response to patients' desires to shorten treatment time. The first protocol for the immediate loading of osseointegrated implants involved the placement of 3–4 implants in the anterior mandible to support an overdenture. A later protocol involved the placement of 6–10 implants evenly distributed in the mandible and maxillae. Each alternate implant was used to support immediately a screw-retained provisional prosthesis, and the remaining implants were allowed a traditional submerged healing protocol. Other attempts at immediate loading of single-tooth implants in fresh extraction sites were reported with high survival rates. In this presentation, the team approach to single-tooth replacement and full mouth rehabilitation with various immediate loading protocols will be demonstrated regarding the aspects that influence long-term success results.

Immediate Nonocclusal Loading *Versus* Early Loading in Partially Edentulous Patients

T. Testori

In implant dentistry, immediate loading is an emerging treatment alternative that may provide a tremendous benefit to patients. They can enjoy immediate function, esthetics, increased self-confidence, health, and acceptance of implant dentistry. Until recently, undisturbed healing of 3 months in the mandible and 6 months in the maxilla were considered prerequisites for the osseointegration of dental implants. The relevance of these healing periods has been questioned, since the latter were determined empirically rather than based on evidence. Subsequently, validation of early loading and immediate loading protocols are viable, and predictable therapeutic alternatives have opened an active research field in modern implant dentistry.

This paper reports on the author's preliminary experiences with partially edentulous patients who received nonocclusally loaded provisional restorations within 24 hours after surgery as opposed to patients treated according to an early loading protocol (IE, loaded after 8 weeks of healing).

From September 2001 to May 2003, 32 patients were enrolled in the study, with 101 implants supporting 38 FPPs. In the immediate loading group, the cumulative implant survival rate up to 24 months of loading was 96.15%. In the early loading group, the cumulative survival rate was 97.96% for up to 2 years of observation.

According to the preliminary results of this clinical study in partially edentulous patients, a nonocclusal immediate loading protocol might be considered a viable approach in selected clinical cases. The overall shortening of the treatment time can be extremely advantageous for the patients and the clinicians. A gradual and progressive approach to immediate loading should be recommended, however, and further investigations and long-term evaluations are necessary to confirm the encouraging results of this clinical study before this protocol is introduced in everyday clinical practice.

Immediate Placement and Restoration of Single-Tooth Implants—Long-Term Success and Esthetic Results

A. Palti

The expectations of patients concerning perfect esthetics, functionality, and phonetics demand a high standard of implant skills. Today's patients also expect to have an immediate restoration after losing their teeth.

Looking at the literature, the bone resorption between 40% and 60% in the first 3–5 years shows us that immediate implant placement on the ideal position, and with proper length and diameter can give best esthetic and functional results, with a very high acceptance due to the immediate replacement of the missing teeth.

We have been following this technique nearly 10 years, and more than 1000 implants have been placed under these circumstances. The predictability and the esthetic results are proving that this technique is the right way to approach implant dentistry.

The maxillary posterior quadrant is generally recognized as the most challenging area for implant placement. This region presents poor bone quality (D4–D5) with a thin cortical plate around the maxillary sinus. In order to place implants with sufficient stability in this region, techniques utilizing autogenous bone grafts to stabilize the implant in the sinus have been developed. In addition, bone splitting, bone spreading, and subantral augmentation techniques can now provide ample bone in localized alveolar ridge deficiency and offer greater predictability for dental implants. The bone spreading technique especially improves the quality of bone at the implant site. With special instruments for this procedure, implants can be inserted into the posterior maxilla without sinus elevation. Case reports will demonstrate the procedure's efficacy, especially in esthetic sites where ideal implant positioning is mandatory, and clinical results will be presented.

Immediate Loading of Dental Implants in Partially and Fully Edentulous Jaws

E. Tammaro and M. Piombino

Introduction: The immediate loading of endosseous dental implants has the advantage of significantly reducing the entire duration of the treatment, which has a positive effect on the patient from a social and psychological point of view. Several requirements need to be present to ensure long-term success of immediately loaded implants. These include high primary stability of the implant, excellent bone density, and elimination of micromotion in the bone-implant interface during the healing period.

Purpose: The authors report on the clinical success of immediate loading of dental implants in edentulous jaws and partially edentulous jaws.

Methods: Edentulous jaws. A total of 168 ankylose implants were placed in 23 maxillary and 19 mandibular edentulous jaws (4 implants in each jaw). Thirty-seven patients were monitored in this study. Five of them received the same treatment in both jaws. Sixty-two implants were immediately inserted into fresh extraction sockets, after preparation of implant bed to achieve primary stability. Thirty-three were delayed implants. Autogenous bone graft, without barrier membrane, was used to fill the original peri-implant bone defect that occurs frequently when placing immediate or delayed implants. Following surgery, all implants were immediately loaded using SynCone components (manufactured by Dentsply-Friadent GmbH: Mannheim, Germany). Panoramic radiographs, mSBI, and mPI[I] were recorded in different time intervals. Patient satisfaction was also evaluated.

Partially edentulous jaws. A total of 11 single anky lose implants were placed in 9 patients to restore 7 central incisors and 4 lateral incisors. Five implants were immediately inserted after tooth extraction without flap elevation. Following surgery, all implants were immediately restored with temporary resin crown but without occlusal contact (nonfunctional immediate loading). After the healing period, the gold ceramic crown was cemented. Periapical radiographs, mSBI, and mPlI were recorded in different time intervals. Patient satisfaction was also evaluated.

Results: Edentulous jaws. During the healing period, 2 fixtures in maxilla and 1 in mandible were removed for mobility. After a total observation period of 31.6 months (range 20–48), all other implants presented healthy peri-implant hard and soft tissue conditions showing low values of clinical parameters (mSBI>1; mPlI=1) and stable bone level. The cumulative success rate was 98.2%. Swelling or suppuration was not observed. All patients appreciated function, esthetic, and retention of the restoration.

Partially edentulous jaws. After a period of 8–50 months of follow-up, no implant was lost, and the cumulative success rate was 100%. The result produced excellent healing of the soft and hard peri-implant tissues (mSBI>1; mPlI>1). Swelling or suppuration was not observed. One patient was not satisfied with the esthetic result.

Conclusion: Many clinical studies reported high success rates using immediately loaded implants.

Experimental studies have demonstrated histologically that osseointegration occurs after immediate loading of titanium implants.

Primary stability of implants is a prerequisite to achieve osseointegration. The implant design makes a significant contribution to the initial stability of the implant during placement surgery. In general, when implants must be loaded immediately, a screw-thread implant design with rough surface is recommended.

The results show that functional or nonfunctional immediate loading is a technique that seems to give satisfactory results in selected cases.

Immediate Implant Loading on Single Tooth: Open and Closed Approach

H.-L. Wang

Studies in the area of immediate loading have been proposed and have shown encouraging results. However, achievement of predictable outcomes in a single tooth remains to be determined. Therefore, the purposes of this presentation are to present the results of 2 recent studies that we conducted: (1) the effect of immediate loading on 1-stage implant; and (2) the soft tissue profile changes under flapless implant surgery, compared between immediate and delayed loading, on single-tooth implants in the premaxillary region.

Immediate Implant Loading for Single Tooth

H.L. Wang, J. Shotwell, E. Billy, K. Al-Shammari, K. Kiyonobu, M. Layher, C. Baldwin, S. Webb, and W. Giannobile

This 12-month study monitored 34 patients, each receiving 1 ITI SLA implant (4.1 mm), and crevicular fluid samples were collected from the peri-implant sulci of each study implant at baseline (immediately after fixture placement, and at 1, 3, 6, and 12 months). Osteocalcin levels were analyzed using a Mid-Tact Human Osteocalcin EIA Kit (Biomedical Technologies Inc.) and for pyridinoline cross-linked carboxy-terminal telopeptide of type I collagen (ICTP) using a radio-immunoassay. Patients were randomly assigned to 3 groups: immediate loading, progressive loading, or delayed loading. The implant prostheses were fabricated and loaded 2–3 days, 1 month, or 3 months, respectively, following fixture placement. A fourth group, default load, consisted of immediate load patients who were changed to the delayed load group due to possibility of the implant failing. A 100% success rate was achieved in all 4 groups. There was no difference noted in clinical parameters (eg probing implant sulcus depth, clinical attachment level, gingival index, plaque index, as well as wound healing index). The biological marker (eg ICTP) showed the trend of higher bone remodeling in the immediate loading and default groups when compared to progressive/delayed loading groups. However, a direct pattern between osteocalcin and ICTP was not observed.

Effect of Flapless Implant Surgery on Soft tissue Profile: A Randomized, Controlled Clinical Trial

T.-J. Oh, J. Shotwell, E. Billy, and H.-L. Wang

Twenty-four patients with a missing tooth in the premaxillary region were randomly assigned to 1 of 2 groups (12 each): immediate or delayed loading (loading after 4 months). An endosseous implant was placed in each patient *via* a flapless surgery. Clinical measurements, including the papillary index (0, no papilla; 1, less than half; 2, more than half, but not complete fill; 3, complete fill; and 4, overfill), marginal levels of the soft tissue, probing depths, modified bleeding index, modified plaque index, and the width of the keratinized mucosa, were performed at baseline (at the time of loading), and 2, 4, and 6 months.

Results: The soft tissue profile remained stable up to 6 months, without significant differences between the 2 groups (mean papillary index and marginal levels of the soft tissue at 6 months: 2.16 and 0.30 mm, respectively). Mean papillary index in the immediate loading group significantly increased from 1.50 at baseline to 2.09 at 2 months, and the significance remained up to 6 months (2.30 at 6 months) ($P < 0.05$), while in the delayed loading group, no significant changes were found from baseline to 6 months in mean papillary index (2.06 at both time points). Mean papillary index increased over time when 2 treatment groups were combined; however, no statistical significance was found. In marginal levels of the soft tissue, the difference at baseline between the 2 groups (−0.28 mm for delayed loading *vs.* 0.17 mm for immediate loading, $P < 0.05$) was no longer significant at 2 months (0 *vs.* 0.08 mm for delayed loading and immediate loading, respectively) and thereafter ($P > 0.05$). No significant differences were detected between groups at each time and over time in other clinical parameters: probing depths, modified bleeding index, modified plaque index, and width of the keratinized mucosa ($P > 0.05$).

Conclusion: The results of this study indicated that creeping attachment (ie soft tissue recovery) might occur within 2 months after immediate loading. The study suggests that flapless implant surgery provides esthetic soft tissue results in single-tooth implants either immediately or delayed loaded. Other long-term randomized, controlled clinical trials with a large sample size and comparison group (ie implant surgery with flap) are recommended to verify the conclusions drawn in this preliminary study.

Consensus Results

The authors developed a distillation of research, clinical situations, concepts, and thoughts. A larger panel then presented these 10 questions to the audience as a whole. A discussion then ensued from the floor. A consensus of 10 answers was thus developed, the results of which are:

1. ***Question: What is the current definition of immediate implant loading?***
   Answer: Immediate loading is defined as an implant-supported restoration placed into occlusal load within at least 48 hours after implant placement.
2. ***Question: What is the current implant survival rate for an immediate loaded implant?***
   Answer: Within the limitation of current evidence (up to 2 years), a predictably high success rate was found.
3. ***Question: Is there any difference upon implant survival rates between tooth type/location for immediate implant loading on a single tooth?***
   Answer: A. Premolars (either maxillary or mandibular) had the highest success rates. B. Incisors and molars may not be the best candidates for immediate implant occlusal loading, but they are suggested for immediate nonocclusal (restoration) loading.
4. ***Question: What is the primary factor to determine if an implant can be immediately loaded or not?***
   Answer: Implant primary stability as detected by insertion torque (final abutment torque force of 35 or 32 Ncm, or dependent upon implant design required torque force is mandatory. Other methods, such as RFA, reverse torque... etc.) may be used to detect the primary implant stability; however, more evidence is needed. In an area where bone augmentation is needed, although primary implant stability can be achieved, caution should be taken when attempting to load such an implant immediately.
5. ***Question: What implant length is better suited for immediate load?***
   Answer: ≥10 mm.
6. ***Question: What implant design is better suited for immediate load?***
   Answer: The thread design, such as a tapered screw.
7. ***Question: What implant diameter is better suited for immediate load?***
   Answer: At this time, it appears that a minimum of 3.5-mm implant diameter is required. Future data are needed to verify if a smaller diameter could be used for immediate load or not.
8. ***Question: What implant surface texture is better suited for immediate load?***
   Answer: Rough titanium implant surface.
9. ***Question: What type of occlusion should an immediate loaded implant possess?***
   Answer: Nonocclusal contact in full closure (maximum interocclusal contact) without any lateral (proximal) contacts.
10. ***Question: What are the conditions that are not recommended for implant immediate load on a single tooth restoration?***
    Answers: Heavy occlusion (eg bruxism, parafunctional habits); lack of primary implant stability (poor quality bone; eg D4); shorter implant length; smooth surface; press-fit implants; poor crown/implant ratio (<1:1); and poor oral hygiene.

Conclusion

Clinicians are urged to become cognizant with, and aware of, research-oriented and clinically mitigating factors that prescribe parameters of functional occlusal loading either single-tooth implant replacements or short span implant fixed restorations. It is imperative to note that this in no way implies that submerged is no longer necessary.

Disclaimer

Readers are reminded that this piece is strictly a consensus and is not evidence-based. The ICOI, the DGOI, and SENAME promote education, and want readers to use discretion realizing that any of the results contained herein are consensus-based and not evidence-based.

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