

# IMMEDIATE LOADING OF DENTAL IMPLANT “A SUCCESS”- A REVIEW

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## INTRODUCTION:

Two stage surgical protocol was given by Branemark, but it has several pre-requisites(1)-

1. Countersinking the implant below crestal bone.
2. Obtaining and maintaining the soft tissue covering over the implant for 3-6 month.
3. Maintaining a non-loaded implant environment for 3-6 months.

The Reason For Countersinking The Implant Below Crestal Bone Are-

- i. To reduce and minimize the bacterial infection.
- ii. To prevent the apical migration of oral epithelium along the body of implant.
- iii. To reduce and minimize the risk of early implant loading during bone remodelling.

## DISADVANTAGES OF 2-STAGE PROTOCOL

A second stage surgery is necessary to uncover these implants and place a prosthetic abutment.

## ADVANTAGES

A high degree of long term, clinical rigid fixation has been reported after 2-stage surgery.

But during the last 15-years several authors have reported that root form implants may Osseointegrate even though they reside above the bone and through the soft tissues during early bone remodelling. This surgical approach has been called as one-stage or non-submerged implant procedures and this eliminates the second-stage implant uncover surgery.

## HISTORICAL BACKGROUND OF IMMEDIATE LOADING

- Since long, dentists were experimenting with

numerous designs and materials for early implant prototypes.

- In 1963 Lincow introduced root form implants for immediate occlusal load which were named as vent -plants.
- In 1970's Ledermann used titanium plasma sprayed implants and immediately loaded them with mandibular overdenture.
- In 1970's Schroeder(1976,1978,1981) showed that the submerged technique was not a prerequisite for success of implants.
- However, success came for immediate loading in 1980's(Schroeder and Babbush)(2).

## THEN CAME THE BIG QUESTION: WHY THE NEED FOR IMMEDIATE LOADING?

The answer to this was associated with lot of studies which were being carried out and was concluded that first and foremost reason was Psychological then was Esthetics then Functional and last but not the least was Economics involved.(1,3,14,16)

## Indications

- Single tooth replacement.
- Partial edentulism.
- Full edentulism.

## Contraindications

- Bruxism
- Smoking.
- Reduced bone quality & quantity.
- Short length implants.

## ADVANTAGES:

- This eliminates the second –stage implant uncover surgery.
- As a result the tissue discomfort and healing associated with second-stage surgery are

eliminated.

- The dentist also eliminates the surgical time for uncovering and suture removal.
- In addition the soft tissue is already mature before fabrication of final Prosthesis.
- Immediate loading of implants loads the implant with a provisional restoration at the same appointment or shortly thereafter.

#### **DISADVANTAGES:**

- High chances of failure.  
More bone loss compared to delayed loading.  
Peri-implantitis due to loading.
- Post operative complications.
- Patient cooperation mandatory

*Precise and strict following of protocol for implant surgery may take care of above mentioned disadvantages.*

#### **PROTOCOL FOR COMPLETELY EDENTULOUS PATIENTS (8,11,13) 2 DIFFERENT APPROACHES ARE THERE**

First approach- involves placing several more implants than the usual treatment plan for a conventional healing period and out of them only selected implants in an arch (around 3 or more) are only immediately loaded with a transitional prosthesis. Other implants are left submerged for delayed loading. This approach was given by Schnitman et al in 1990. This approach can be used only in edentulous mandible where abundant bone is present. Tarnow et al (1997)-also followed this approach. He did a study in 10 consecutive completely edentulous cases over 5-years, Out of them 6 were mandibular arches and 4 were maxillary arches, 10-13 implants were used in each arch for final prosthesis, 66 out of 69 implants integrated. Failure rate was 4% and success rate was 96%.

Second approach- This includes immediate occlusal loading of all the implants inserted. The implants are splinted together which decreases the stresses on all the developing interfaces and increases the stability, retention and strength of the transitional prosthesis during the initial healing

phase.

#### **GUIDELINES FOR IMMEDIATE LOADING(6,7,8,11)**

1. The bone should be of good quality.
2. The implant should engage strong cortical bone with initial stability.
3. The type of implant should be screw type with rough surface.
4. Cantilever should be avoided.
5. An occlusal scheme that promotes axial loading rather than horizontal stress must be designed.
6. Night guards in patient's with parafunctional habits.

#### **FACTORS MODIFYING IMMEDIATE IMPLANT LOADING**

- Surgical factors included- primary implant surgery and surgical technique being used.
- Host related factors included- quantity and quality of bone; type of wound healing
- Implant related factors included- implant design, surface coating and length of implant
- Occlusion related factors included- quantity and quality of force; prosthetic design.

**Finally the need for re-evaluation of BRANEMARK PROTOCOL was done and concluded that loading per se does not impede the healing process to occur thus Prematurely loaded implants are capable of integration.**

#### **APPROACHES TO REDUCE LOADING PERIOD**

Careful patient selection, Non-functional loading of the implants, to identify an effective way to reduce micro-motion beneath the critical threshold of deleterious micro-motion.

#### **A NEW PROTOCOL FOR IMMEDIATE FUNCTIONAL LOADING**

Fabrication of a provisional restoration prior to surgery, Immediately after the last implant is placed convert a previously constructed provisional prosthesis into an immediate implant supported non-removable prosthesis, Impressions

for the final restoration is made. Opportunity to evaluate the esthetics/phonetics and functional loading during the normal osseointegration healing period. This prosthesis appears to have a splinting effect, locking the implants in place as bone heals around them.

#### **STUDIES ON IMMEDIATE LOADED IMPLANTS WITH FIXED PROSTHESIS(3,17,18)**

Author	Patients	Implants	Success Rate
Ericsson	16	88	100%
Chow	27	123	98.3%
Collaert	25	114	98%
Testori	15	103	98.4%

Anterior zone of mandible provided success rates of >90% but lower success rates were observed for short implants placed in unfavourable bone morphology and distal positions. Most studies (Jaffin and Berman, Misch and Degidi) suggested that a high number of implants(8-12) are required in maxilla.

#### **OUTCOMES OF IMMEDIATE LOADING PROTOCOLS**

**Primary stability of the implant was the underlying requisite for predictable results. The role of implant length on implant success was limited. Short to medium term studies suggest that treatment with fixed prosthesis in the anterior mandible is predictable irrespective of implant type, surface topography and prosthesis design. At least 4 implants should be placed in the edentulous anterior mandible to support a fixed prosthesis. To achieve results in extraction sites, implant placement should be restricted to sites without a history of periodontal involvement.**

Finally, the marginal bone loss measured, irrespective of prosthesis design, was of the same magnitude as presented for the conventional loading approach.

#### **SUMMARY**

Immediate implant loading achieved similar success rates as those reported in the delayed 2-stage approach. Primary implant stability is a key factor to consider before attempting immediate implant loading.

Surgery-, Host-, Implant-, and Occlusion

related factors may influence the outcomes of immediate implant loading. Studies are needed to understand the possibility of immediate implant loading in patients who are diabetics, osteoporotics and smokers as well as those who have other systemic compromising diseases.

Long term, prospective studies particularly in Indians are still needed to evaluate other potential determining factors on this technique.

#### **CONCLUSION**

The level of predictability and high success of current implant therapy has provided reasons to reassess the guidelines.

With the trend of shortening treatment time and reducing patient discomfort, immediate loading implants has emerged as an alternate approach.

However, meticulous selection is needed to integrate this treatment into daily practice.

Regular maintenance is the key factor to ensure long term success of immediately loaded implants.

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