



Immediate load implants with prosthetic rehabilitation supported by implants in the anterior area: Clinical case presentation

Implantes de carga inmediata con rehabilitación protésica implantosoportada en zona anterior. Presentación de un caso clínico

Myriam Neblina Noriega*, Guadalupe Marín González §

ABSTRACT

One of the treatment options offered to patients requiring replacement of one or more teeth is the use of prostheses supported by implants. Patients nowadays demand greater aesthetic and functional restorations; therefore, the clinician tries to reduce implant load time. All this leads to the implementation of several modifications to the conventional surgical and prosthetic protocol leading to a reduction in the load time of the implant. The objective of this article is to present placement of immediate load implants in an aesthetic zone as an alternative for the treatment plan, as well as highlighting the importance of observing surgical-prosthetic inter-discipline to achieve greater success in treatment.

Key words: Implants, immediate load, osseo-integration.

Palabras claves: Implantes, carga inmediata, oseointegración.

RESUMEN

Una de las opciones de tratamiento para los pacientes que requieren el reemplazo de uno o varios dientes, es el uso de prótesis implantosoportadas como una alternativa de tratamiento. Una mayor demanda tanto estética como funcional por parte de los pacientes hace que se intente reducir el tiempo de carga del implante. Por lo que se han realizado varias modificaciones al protocolo quirúrgico y protésico convencional reduciendo el tiempo de carga al implante. El objetivo de este artículo es el de presentar la colocación de implantes de carga inmediata en la zona estética como una alternativa en el plan de tratamiento, y la importancia de la interdisciplina quirúrgico-protésica para lograr un mejor éxito del tratamiento.

INTRODUCTION

Usage of implant-supported prostheses is a treatment alternative for patients requiring replacement of one or more teeth. Modifications have been undertaken with respect to surgical and prosthetic protocols, by reducing the load time of the implant, so as to satisfy demands for faster treatments, and to reduce patient's discomfort during healing time.¹

Functional immediate load is the most recent concept. This describes a load, within physiological limits, applied to implants before the osseo-integration process is completed.²

According to the American Periodontics Academy, osseo-integration is the direct relationship at microscopic level between bone and the implant surface. The biological process of osseo-integration comprises 3 phases: 1) osteolytic phase, where a generalized inflammatory response is observed. In this response, numerous amounts of cytokines are released. These cytokines regulate production of

adhesion molecules and alter cellular proliferation regulating bone metabolism. During the first week, there is migration of osteoblasts derived from trabecular bone endosteum. 2) Osteo-conductive phase: Bone cells are observed around the implant. A fibrocartilaginous callous is formed. It eventually is remodeled by a bone callous. This is observed after three months. 3) Osteo- adaptive phase. This phase takes place approximately four months after implant placement. In this phase, a subsequent bone remodeling is observed after exposing and loading the implant.

* Periodontics graduate, Graduate School, National School of Dentistry, National University of Mexico (UNAM).

§ Coordinator, Periodontics Specialty, Graduate School, National School of Dentistry, National University of Mexico (UNAM).

In compact bone, after bone healing, avascular necrotic tissue, bone resorption and new bone formation are observed, while in cancellous bone, medullar bone formation is observed, for this reason, osseointegration might take place at early stages of the healing process.

Primary stability must be ensured during the process of implant insertion. This is described as a certain stability or mechanical fixation, where the marginal or apical portion of the implant must be covered with sufficient amounts of compact bone and/or cancellous bone. This is essential in order to achieve osseointegration, which will depend on the bone type present (type I, II, III and IV). Bone types II and III are the ideal ones according to their corticocancellous content.

Albrektsson et al³ presented a series of factors which must be controlled in order to achieve osseointegration. These factors are the following: 1) biocompatibility, 2) implant design, 3) implant surface, 4) state of the recipient bed, 5) surgical technique, and 6) applied loads. They showed the fact that, after the first weeks of implant placement, there were no clear signs of osseointegration. Three months after implant placement, they observed a great proportion of bone in direct contact with the implant.

Implants with modified and/or treated surfaces: 1) immediately after placing, provide better mechanical stability between bone and implant, 2) provide a surface which presents better clot retention and 3) stimulate the bone healing process.

Based on studies conducted by Branemark⁴, conventional protocol recommends loading implants at between 3 and 6 months to achieve full osseointegration.

Lederman et al⁵ were the first to introduce the concept of immediate load implants in edentulous jaws. They used implants with TPS (titanium plasma spray). They conducted an 81 month follow-up to 476 implants placed in 138 patients. Survival rate was 91.2%. Schroeder et al⁶ placed 53 implants with TPS surface. After a 48 month follow-up they achieved a 98.1% success rate.

Babbush et al⁷ used TPS surface implants in the anterior zone of the mandible. They loaded the implants within a 3 to 4 day period. They achieved a 96.1% success rate. Cochran et al⁸ informed of a 1 year longitudinal study on 383 immediate load SLA implants, where they achieved a 99.1% success rate. Cannizzaro and Leone⁹ conducted a prospective study in 18 patients where they compared immediate load versus conventional load in 46 implants. The implants they used were 3.75 mm in diameter and 13 mm in

length. These authors informed of a 100% success rate in immediate load implants, and 97.8% success rate in conventional load implants.

Protocol for immediate load implants depends on optimum primary stability with excellent bone quality and quantity.¹⁰

Criteria for patient selection were as follows: 1) non-smoking patient, 2) acceptable general health and oral hygiene, 3) bone quality and quantity compatible with primary stability, 4) relationship between dental arches must allow bilateral occlusal stability, 5) exclusion of molar areas and 6) exclusion of patients with bruxism or negative tongue habits.

The protocol proposed by Branemark for placement of an immediate load implant is as follows: 1) implant must be longer than 11 mm and platform as wide as possible, 2) load distribution onto adjacent teeth, 3) use of burr in sub-crestal area and 4) usage of rough surfaced implants.

After careful examination, temporization can be conducted 24 hours after implant placement, preserving gingival contours and therefore, a better emergency profile.¹¹ Final restoration must be performed three months after implant placement.

CLINICAL CASE

46 year old female patient attended the Periodontics Clinic of the Graduate School, National School of Dentistry, National University of Mexico (UNAM). The patient exhibited no apparent systemic history which explained her present condition. She presented a periodontal clinical diagnosis of localized chronic periodontitis. The patient showed missing upper central incisors due to a traumatic event, therefore the patient considered her aesthetic appearance of utmost importance (*Figure 1*). Intra-oral clinical and radiographic evaluation was conducted in order to assess all pre-established parameters for implant placement. Implants were selected and placed in the anterior area of the jaw. Surgical procedure was conducted following Branemark's¹² protocol for immediate load single implants.

Surgical guides were performed. After this, local anesthetic (2% mepivacaine) infiltration was carried out in the anterior region of the jaw. It was decided not to perform a flap to preserve interdental papilla of adjacent teeth in order to prevent greater tissue loss, bearing in mind this is a highly aesthetic area. Surgical guide was adjusted (*Figure 2*) to ascertain whether the implant's mesio-distal and vestibular-palatal positions were correct. At a later point, surgical use of burr was undertaken, with initial burr at 900 rpm, up to a 13



Figure 1. Acceptable gingival tissue is observed. Radiographically, suitable bone density is observed.



Figure 2. Placement of surgical guide.

mm length in both sites. Parallelism was ascertained (Figure 3). Nobel Replace® Tapered TiU NP 3.5 x 13 mm implants were placed 3 mm underneath the cement-enamel junction of adjacent teeth in both sites, with a 30 Ncm speed until obtaining desired length (Figure 4).



Figure 3. Parallelism in both sides.



Figure 4. Placement of Nobel Replace® Ti U 3.5 x 13 mm implants.

We observed that implants possessed adequate primary stability; therefore, in order to improve the emergency profile, it was decided to load them in an immediate and passive form.

After implant placement, a gingivectomy procedure was performed on the implant periphery in order to be able to place straight prosthetic devices. As supplementary surgical procedure an upper lip frenectomy was performed. Control x-rays were taken after implant placement (Figure 5).

POST-OPERATIVE CARE

Post-operative care consisted in 0.12% chlorhexidine mouth rinse, twice a day for 15 days, avoiding mechanical brushing in surgical areas.



Figure 5.
Control
dento-alveolar
x-ray after
implant
placement.



Figure 6. Healing after one week. Acceptable gingival architecture can be observed.

Amoxicillin 750 mg every 12 hours for 7 days was prescribed, as well as 400 mg ibuprofen every 8 hours for three days. In the surgically treated area, after two weeks, conventional dental brushing was resumed. Post-operative controls were conducted two weeks after surgical event. Monthly visits were observed for 6 months.

RESULTS

A week after post-operative control, after placing the implants (*Figure 6*), the frenulum area suture points were removed since there were no signs of healing alteration in the surgical wound. Healing was deemed adequate. During the two-week post-operative control (*Figure 7*) almost complete healing of the frenulum



Figure 7. Healing after two weeks.

area was observed. In the implant zone, clinically and radiographically, tissue surrounding implants appeared healthy. Patient reported total lack of symptomatology. Periodic revisions were conducted at one and three months (*Figure 8*) after placement of permanent (final) dental prostheses.

A control dento-alveolar (*Figure 8*) x-ray was taken. It revealed adequate bone density surrounding the implant. The marginal bone was adequately placed with respect to the implant and the prosthetic device.

Seven months after implant placement (*Figure 9*) tissues surrounding the implants exhibited harmony as well as appropriate height in the inter-dental papillae. X-ray examination revealed acceptable bone quality surrounding the implants. Implants were asymptomatic and lacked any type of mobility.

All expectations of the patient were met. Aesthetics and function were restored. It was recommended to the patient she should attend periodic revisions every four months.

DISCUSSION

Implants were compromised due to the placement time, since osseointegration process was not completed and implant success could be affected.

Very few studies endorse this procedure. Rocci et al¹³ conducted a histological study of 9 immediate load implants. Two implants were loaded on placement day and seven implants were loaded two months after placement. In the case of two implants they observed 92.9% osseointegration. In the case of seven implants, 81.4% osseointegration was observed.

Chiapasco¹⁴ reviewed seven articles where a survival rate of 87.5% to 100% was found, in a 1 to 5 years range.

Testori et al¹⁵ demonstrated, from the histological point of view, the fact that osseointegration can



Figure 8. Three months after placement.

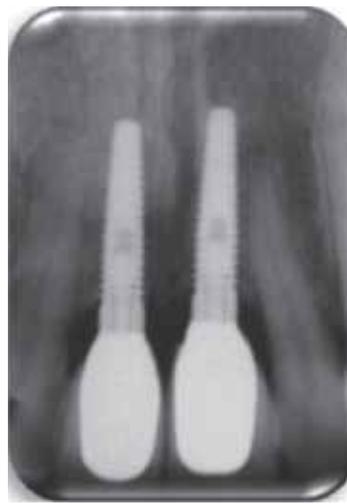


Figure 9. Seven months after implant placement, with permanent zirconia crowns.

take place in immediate load implants. They placed in one patient 11 implants: of those, 6 were immediate load implants and 5 were conventional implants. Two months after placement, histological analyses were conducted which revealed that in conventional implants bone-implant inter-phase was 38.9% while in immediate load implants it was 64.2%.

Tarnow et al¹⁶ concluded that immediate load can be a viable treatment option. Nevertheless, other authors, like Schnitman¹⁷ obtained poor results with immediate load implants when compared to conventional ones. They concluded that bone quality is more important than implant length and surface.

CONCLUSIONS

According to performance of this procedure and to literature review, it can be concluded that this procedure is an immediate treatment option with respect to immediate rehabilitation, since there is literature which endorses it at short, medium and long term. This procedure equally provides a treatment

mode which yields favorable results able to meet patients expectations.

When taking into consideration bone quality, implant surface and implant primary stability, in some cases we can elect immediate load option. Multiple teeth replacement in the anterior area of the jaw has been poorly documented, therefore, a greater number of clinical studies and research would be required.

REFERENCES

1. Schnitman PA, Wohrle PS, Rubinstein JE et al. Ten-year results for Branemark implants immediately loaded with fixed prostheses at implant placement. *Int J Oral Maxillofac Implants* 1997; 12: 495-503.
2. Branemark PI. *Introduction to osseointegration in: tissue integrated prosthesis*. Chicago. Quintessence Publishing; 1985: 11-76.
3. Albrektsson T, Branemark PI, Hansson HA, Lindstrom J. Osseointegration titanium implants. Requirements for ensuring a long-lasting, direct bone anchorage in man. *Acta Orthopaedica Scand* 1981; 52:155-170.
4. Branemark PI. Osseointegration and its experimental background. *J Prosthet Dent* 1983; 50: 399-410.
5. Lederman PD, Schenk RK, Buser D. Long-lasting osseointegration of immediately loaded, bar-connected TPS

- screws after 12 years of function. A histologic case report of a 95-year-old patient. *Int J Periodontics Dent* 1980; 18: 518-563.
6. Schroeder A, Maeglin B, Sutter F. Das ITI- Hohlzylinderimplant Typ F zur Prothesenretention beim zahnlosen Keifer. *Schweiz Mschr Zahnheilk* 1983; 93: 720-733.
 7. Babbush CA, Kent J, Misiak D. Titanium plasma-sprayed (TPS) screw implants for the reconstruction of the edentulous mandible. *J Oral Maxillofac Surg* 1986; 44: 274-282.
 8. Cochran DL, Buser D. The use of reduced healing times on ITI implants with a sandblasted and acid-etched (SLA) surface: early results from clinical trials on OTI-SLA implants. *Clin Oral Implants Res* 2002; 13: 144-153.
 9. Cannizzaro G, Leone M. Restoration of partially edentulous patients using dental implants with a microtextured surface: a prospective comparison of delayed and immediate full occusal loading. *Int J Oral maxillofac Implants* 2003; 18: 512-522.
 10. Meredith N, Alleyne D, Cawley P. Quantitative determination of the stability of the implant-tissue interface using resonance frequency analysis. *Clin Oral Implant Research* 1996; 7: 261-267.
 11. Belser U, Buser D, Higginbottom F. Consensus statements and recommended clinical procedures regarding esthetics in implant dentistry. *The International Journal of Oral & Maxillofacial Implants* 19; 2004: 73-74.
 12. Hui E, Chow J, Li D, Lui J, Law H. Immediate provisional for single-tooth implant replacement with Branemark System: preliminary report. *Clin Implant Dent Relat Res* 2001; 3: 79-86.
 13. Rocci A, Martignoni M, Burgos PM, Glttlow J, Sennerby L. Histology of retrieved immediately and early loaded oxidized implants: light microscopic observation after 5 to 9 months of loading in the posterior mandible. *Clin Implant Dent Relat Res* 2003; 5: 88-98.
 14. Chiapasco M. Early and immediate restoration and loading of implants in completely edentulous patients. *Int J Oral Maxillofac Implants* 2004; 19: 76-91.
 15. Testori T, Szmuckler-Moncler S, Francetti L. Healing of osseotite implants under submerged and immediate loading conditions in a single patient: a case report and interface analysis after 2 months. *Int J Periodontics Restorative Dent* 2002; 4: 345-353.
 16. Tarnow DP, Emtiaz S, Classi A. Immediate loading of the threaded implants at stage 1 surgery in edentulous arches: ten consecutive case reports with 1 to 5 years data. *Int J Oral Maxillofac Implants* 1997; 12: 319-24.
 17. Schnitman PA, Wohrle PS, Rubenstein JE. Immediate fixed interim prostheses supported by two-stage threaded implant: methodology and results. *J Oral Implantol* 1990; 2: 96-105.

Mailing address:
Myriam Neblina Noriega
E-mail: neblinanm@hotmail.com