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Treatment outcomes of early functional loading of a Toronto prosthesis after placement of postextractive dental implants. A case report

ABSTRACT

Aim To report a case of early functional loading of a Toronto prosthesis after the placement of postextractive implants, analyzing aesthetic and functional outcomes; moreover an investigation of the recent literature is performed about the outcomes of immediately loaded Toronto prostheses, in order to provide information about success rates of this treatment and to define remaining questions for future research.

Materials and methods A case of immediate functional loading of a Toronto prosthesis after the placement of dental implants is reported. Teeth extractions and dental implants positioning were performed at the same time. The prosthetic procedures with dental implants loading have been completed after 24 hours.

Results The 18 months follow up radiograph showed no bone loss around the implants and the patient was satisfied with both the aesthetic and functional conditions. Clinical trials show that the respective overall implant survival and success rates are influenced by implant design, surface characteristic, bone properties, implant area placement (upper or lower jaw) and postextraction conditions. Before early loading of dental implants for Toronto prostheses all these parameters have to be considered.

Conclusion This case report and the literature review confirm that the influence of timing of loading on implant survival is rather debated. There are not yet clinical guidelines in order to obtain predictable results, though factors such as bone quality and post-extraction conditions should be analyzed before treatment. Future researches should analyze how immediate loading can influence the implant rehabilitation success.

Keywords Toronto prosthesis, load, early, treatment outcomes.

INTRODUCTION

Several recently published studies focused on treatment outcomes of implant treatment and the influence of implant design and surface characteristic, bone properties and bone augmentation, implant area placement, implant length and diameter and immediate loading. All those parameters are significant in implant rehabilitation.

For this paper selected publications focusing on Toronto prosthesis and early functional loading of postextraction implants were reviewed.

Problems related to lack of stability and retention of a lower denture can often be solved with the use of dental implants to which an overdenture can be connected. One of the first studies about implant-retained overdentures was published by van Steenberghe et al. in 1987 (1). Since then many studies have appeared dealing with this successful treatment option (2-9). Dental implants have often been used in clinical routine to restore completely edentulous mandibles.

A recent systematic review describes the 5-year cumulative survival rate of mandibular fixed and removable prostheses ranging between 83% and 100% with corresponding levels of crestal

bone loss up to 1,1 mm the first year and 0,4 mm per year thereafter (10). This review is mainly based on studies using the conventional two-stage surgical approach, whereby the implant is initially covered by the mucosa and kept unloaded for 4–6 months before loading (11). Over the last decade, however, the changes in implant design and surface configuration together with a better understanding of biological and biomechanical aspects have been improving the clinical outcome of implant treatment. All the more, the one-stage procedure in conjunction with earlier loading is applied, especially in the completely edentulous mandible.

Today there is a growing evidence, although based on a small number of studies and relatively low patient numbers, that immediate loading can lead to similar survival rates comparable with conventionally loaded implants (12).

The use of titanium as a biomedical material has been well documented in many applications, such as orthopaedics and oral surgery. Currently, titanium is the standard material for dental implants due to its excellent biocompatibility and osseointegration properties (11, 13). From the outset, there have been constant efforts to improve osseointegration by modifying the surface properties of titanium, because this is where early interactions occur between the implant and the surrounding tissues.

Cases of immediate or early loading in the mandible were reported by Babbush et al. and Schnitman et al. (14, 15); immediate implant loading in the edentulous mandible and maxilla was described by Tarnow et al. (16), and immediate loading of SLA and TPS implants was described by Jaffin et al. (17), with a success rate 95%. Immediate or early loading of Straumann SLA implants has shown clinical outcomes similar to those of conventional loading (18, 19) in terms of success and survival rates in single-tooth replacement (20), splinted crowns and fixed prostheses (21, 22), full-arch prostheses (23) and overdentures (24).

Early or immediate loading can have several advantages, first of all the patient is restored his/her masticatory function very quickly after surgery (25, 26); moreover, removable prostheses are no more required, treatment efficiency is improved and aesthetic appearance is enhanced.

CASE REPORT

A 46 year old man was referred by a general dentist to the Oral Surgery and Implantology Department at the ICP Dental School of Milan University to consider implant treatment for his edentulous lower jaw (Fig. 1). The patient had no relevant medical history. Clinical examination showed that the residual teeth had a severe mobility due to periodontal disease. Important parameters, such as quality and quantity of soft and hard tissues, were evaluated by the surgical team and the patient was informed that he could undergo immediate post-extractive dental implants placement and loading with a Toronto prosthesis.

The suggested treatment plan consisted of the extraction of the residual teeth and the immediate insertion of dental implants with provisional Toronto prosthesis restoration and functional loading.

Surgery was performed under local anaesthesia under aseptic conditions in an outpatient environment. Teeth were extracted and implants (Global; Sweden & Martina) were placed in the fresh extraction sockets according to the alveolar dimension with a 50 N*cm final torque (Fig. 2, 3). A radiograph was taken.

Implants placemenmt was prosthetically

Fig. 1 Preoperative clinical evaluation of failing residual teeth of the lower jaw. Frontal and occlusal views.

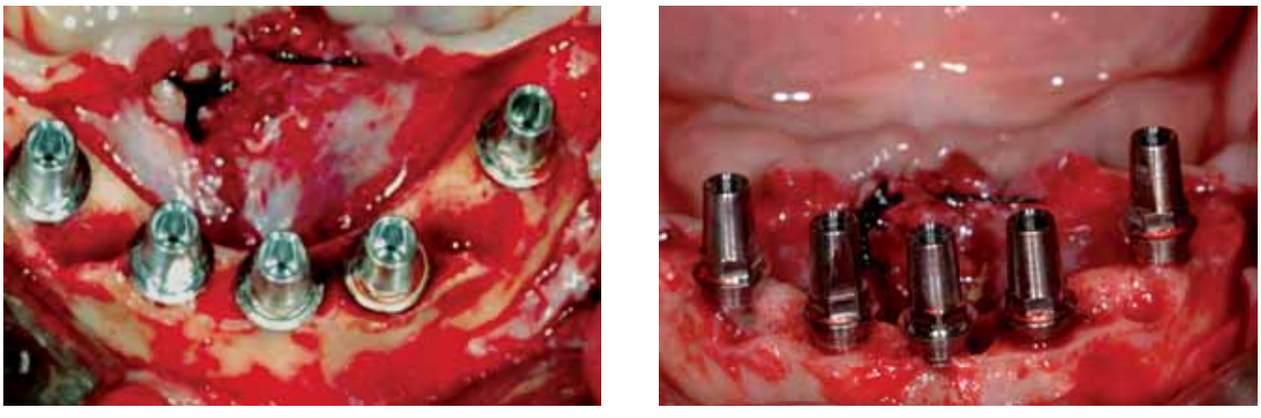


Fig. 2, 3 Tooth extraction and immediate implant placement.

guided; 4.3 mm Ø and 13 mm long dental implants were placed anterior to the mental foramen. This length was chosen because it offered primary stability, as the preparation is extented of about 4 mm at the apical level of the extracted teeth.
Provisional titanium abutments (Sweden & Martina) were used. Uniabutments were inserted immediately after implant placement and torqued according to the manufacturer's guidelines at 20N*cm. Abutment height was chosen according to the mucosal thickness. The aim was to have no visible titanium after healing (Fig. 4).
The appropriate impression copings were connected to the abutments and the gingival tissues were sutured around them, in order to avoid impression material to be in full contact with the alveolar bone. The impression, taken with the guiding denture

Fig. 4 provisional abutments and healing screws.

in correct occlusion, was sent to the dental technician. The patient received a post-surgical analgesic (ibuprofen 400 mg or paracetamol 500 mg) and was supplied with an ice pack to reduce postsurgical swelling. A screw retained, provisional Toronto bridge was manufactured in the dental laboratory (Fig. 5).

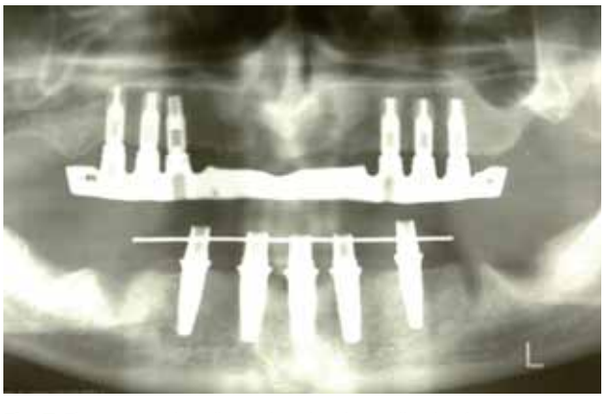
The occlusal contacts were evenly distributed on all teeth including those on the cantilevers, which were one tooth long in order to minimize the risk for fractures.

Within 6 hours after surgery, the provisional bridges were screwed in place. Minor adjustments were needed in order to achieve maximal occlusal contacts and bilaterally balanced group function in articulation.

The final screw-retained cantilever bridge was placed at the 3-month recall (Fig. 6). The patient returned for the 18 months control. A radiographic examination was performed (Fig. 7).

Fig. 5 The provisional Toronto bridge in situ.

Fig. 6 The final screw-retained cantilever bridge was fabricated after a 3-month interval.



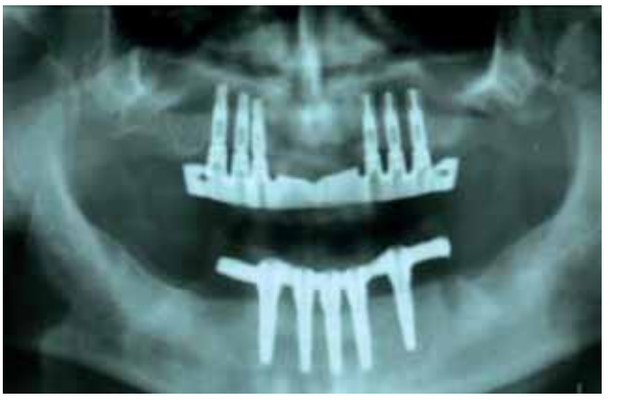


Fig. 7 The panoramic radiographs taken immediately after surgery and 18 months postoperatively.

CONCLUSION

The present clinical report clearly demonstrates how the use of early functional loading on dental implants for Toronto prostheses can be considered a valid treatment option. This surgical solution is well documented in the literature and many clinical trials show that overall implant survival and success rates are satisfactory.

Usually, conventional implant loading protocols recommend a 12-week or longer period of undisturbed healing following implant placement, in order to minimize the risk of complications. Much shorter restoration times have become more widely accepted and practiced in recent years, owing to the reported success and patient demands to recover aesthetics and function soon after surgery (27). There is extensive literature documenting long-term clinical and radiographic outcomes of dental implants following the conventional guidelines for an unloaded healing period of 3–6 months. The long-term success of immediate-loading procedures depends on maintenance of peri-implant health and control of occlusion and articulation. This implies a strict maintenance protocol and regular check-ups, at least once a year.

Today, many case reports demonstrate that the healing time from surgery to implant loading can be reduced and that osseointegration can still be achieved without fibrous tissue encapsulation or infection (28, 29).

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