Immediate/Early loading of Neoss Implants. Preliminary Results from an Ongoing Study

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This interim report of an ongoing study on immediate/early loading of Neoss implants reports a survival rate of 96.5 % for 141 Neoss implants in 33 patients after 6 months to three years of loading. All patients received and maintained a fixed bridge in spite of five failures in three patients

INTRODUCTION

The use of immediate/ early loading protocols for implant-supported crowns and bridges has obvious advantages for the patients since only one surgical procedure and no healing periods are needed. Both function and aesthetics can be immediately restored with a temporary crown or bridge. Concerns have been raised about increased failure rates, since the original concept of osseointegration prescribed a submerged and unloaded healing period of 3 to 6 months before loading (Brånemark et al. 1969, Albrektsson et al. 1981). Today, histology from experimental and clinical studies has demonstrated that implants can integrate under the influence of functional loads (Piattelli et al. 1998, Rocci et al. 2003). Moreover, clinical follow-up studies have reported similar good clinical outcomes as for two-stage procedures (Attard & Zarb 2003). In fact, immediate/early loading is now a clinical reality and a commonly used procedure. In many studies, authors have identified primary implant stability as a critical factor for success (Östman et al 2006). Inclusion criteria based on insertion torque values and RFA measurements have been used (Calandriello et al, 2003, Rocci et al 2003, Vanden Bogaerde et al 2004, Östman et al 2005). It has been shown that the use of self-tapping implants, reduced final drill diameters and tapered implants may improve primary stability (O'Sullivan et al 2001, 2004).

The aim of the present study was to report on the early experiences of an immediate/early loading protocol using a new implant designed to give firm primary stability.

MATERIALS AND METHODS

Patient group

The study group consisted of 33 patients (18 female and 15 male) from three clinics, representing consecutive treatments with immediately/early loaded implant-supported provisional bridges or crowns. The patients were totally edentulous (n= 18), partially edentulous (n=12) or treated for single tooth loss (n=3) (Table 1). The possibility of placing long implants with good primary stability was assessed in each patient on the basis of radiography and clinical examinations. A final decision was taken after discussions with the patient.

Implant surgery was performed under local anaesthesia and a total of 141 implants were inserted, 79 in the maxilla and 62 in the mandible (Neoss Ltd,

Quantity	Number of sites	Quality	Number of sites
A	10	1	3
B	104	2	81
C	26	3	48
D	1	4	9
E	-		

Table 1. Bone quantity and quality of implant sites according to Lekholm and Zarb (1985).

Table 2. Implant diameters placed in this study

Diameter	Number
3.5	18
4.0	111
4.5	12
Total	141

Table 3. Implant lengths placed in this study

Diameter	Number
7	2
9	7
11	13
13	33
15	83
17	3
Total	141

Harrogate, UK) using an insertion torque of at least 40 Ncm. Primary stability was ensured by reducing the final drill diameter in soft bone qualities. The majority of implants were 4 mm in diameter and 13-15 mm long (Table 2 and 3). Most implants had been placed in bone quantity b and quality 2 according the Lekholm & Zarb index (Table 4 and 5).

Sterile impression copings were attached directly to the implants (n=75) or to straight or angulated abutments (n=66) (Southern Implants™, Protera AB, Gothenburg, Sweden). Impressions and bite registration were taken after suturing. Healing abutments were then connected to the implants. A screw-retained laboratory-made crown (n=3) or metal-reinforced bridge (n=31) was delivered one to three days after surgery. In two patients treated in the posterior mandible, a provisional bridge was made in the mouth the same day. Altogether, 34 provisional prosthetic constructions were delivered to the 33 patients. Single and partial constructions were not in occlusion. Total cross-arch bridges were carefully adjusted with regard to occlusion, striving towards group function and contacts over implant sites.

After a period of 3 to 6 months, the provisional constructions were replaced with permanent crowns or bridges made of gold or titanium with acrylic or porcelain veneers.

Follow-up

The patients were monitored with clinical examinations controlling the occlusion during the first weeks and months. The protocol includes RFA measurements (Mentor®, Integration Diagnostics AB, Gothenburg, Sweden) at implant surgery, on delivery of the final prosthesis and after one year of loading.

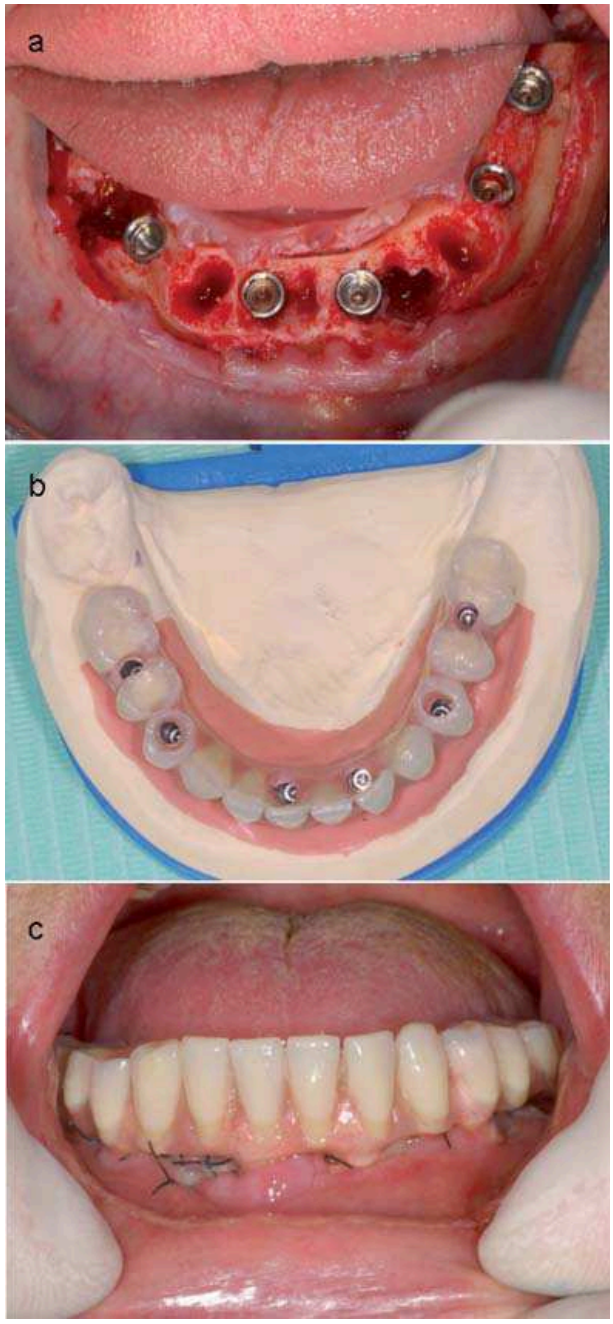

Figure 1. Immediate loading in a mandible after extraction of three teeth.
a. Six implants have been placed
b. Provisional bridge from the laboratory.
c. Showing the connected bridge

Digital or conventional intraoral radiographs were taken at baseline and after one-year of service.

RESULTS AND DISCUSSION

All 33 patients have passed 6 months of loading and 13 have exceeded one year. A total of five failures were experienced, giving a survival rate of 96.5% after 6

months to 3 years. All patients received and maintained a fixed prosthesis during the follow-up period. The failures all occurred in the maxilla within three months of surgery (Table 4). Implant stability was 73.5 (SD 7.0) ISQ at placement and 74.4 (SD9.2) ISQ at final prosthesis delivery after 4 months on average.

DISCUSSION

The use of immediate/early loading protocols conveys obvious advantages for the patient since only one surgery and no healing periods are needed. Moreover, there is no need for removable appliances; which can be difficult and uncomfortable to wear. In the present study, a fixed provisional bridge or crown was fabricated chair-side or delivered within a few days. In this interim report of an ongoing study, five of 141 implants failed after a follow-up of at least 6 months. All patients received and maintained a fixed construction throughout the study period in spite of five failed implants. The 3.5 % failure rate of this study is similar to those reported by other authors in studies on immediate loading. For instance, Glauser et al lost about 3 % of implants when used on all indications as in the present study. All failures in the present study occurred in the maxilla; a failure rate of 6.3 % which corroborates the findings of Olsson et al (2003). Consequently, the results were better in mandibular bone as no implant failures were experienced; which is also in line with the findings in the literature (Attard & Zarb 2005). It can be speculated that differences in bone density may explain this finding as implants get better primary stability in mandibular bone (Östman et al 2006). However, all but one implant showed high stability values and other factors such as unfavourable loading need to be considered.

The implants used in the present study have a surface topography modified by blasting. It is known from animal experiments that such surfaces seem to integrate faster and with more bone contacts than implants with a smooth surface. It is also possible that this contributed to the good outcome of the present study. The RFA measurements revealed firm primary stability

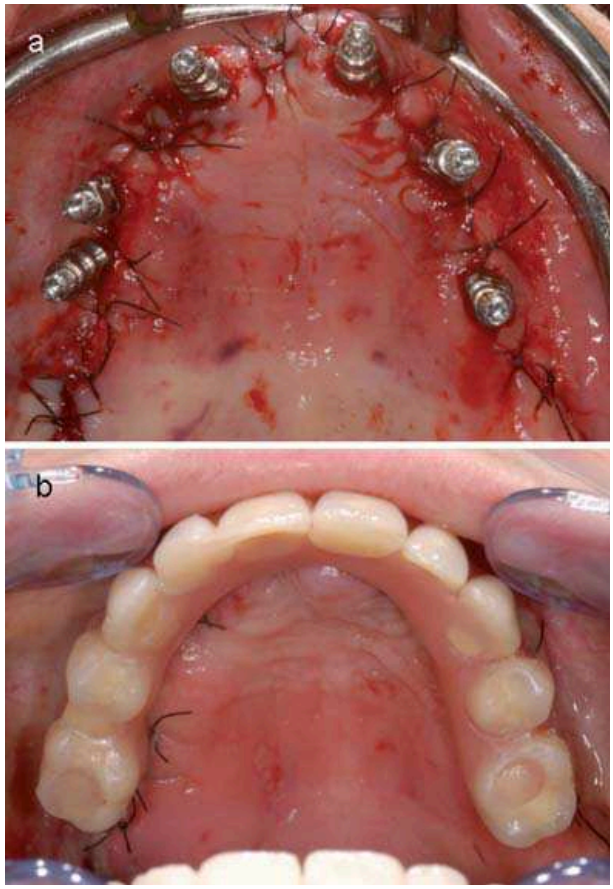

Figure 2. Immediate loading in a maxilla.
a. Six implants have been installed in an arch-form
b. The laboratory-made provisional bridge has been connected to the implants

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Table 4. Characteristics of implant failures.

Patient	Position	Case	Diameter /Length	Quantity /Quality	Primary stability (ISQ)	Time of failure
1	16	Partial	4/15	C/3	44	3 months
2	13	Total	4/13	B/3	75	3 months
3	14	Total	4/13	B/2	75	3 months
3	11	Total	4/13	B/2	66	3 months
3	26	Total	4/15	B/3	77	3 months

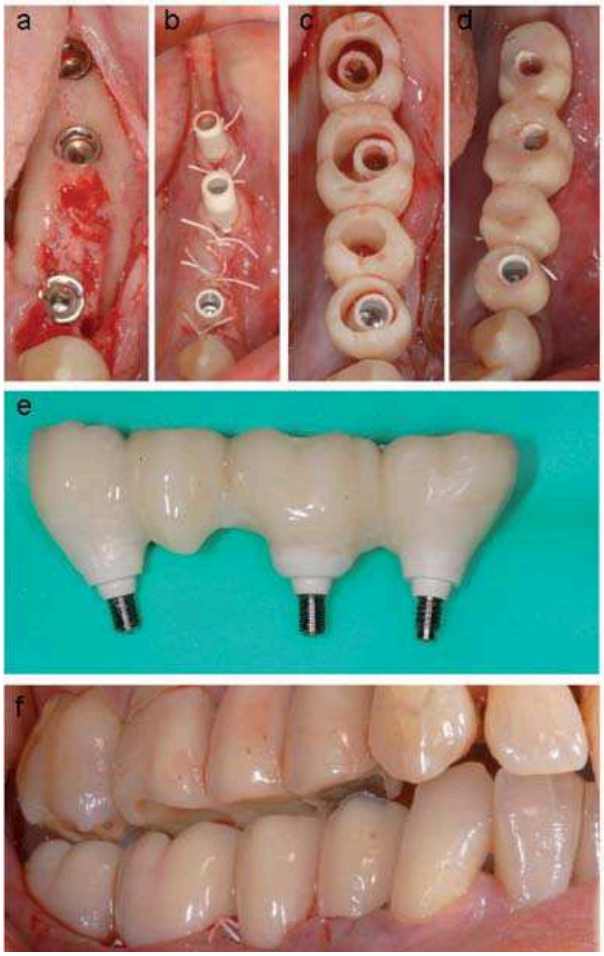

Figure 3. Immediate loading in a posterior mandible using a chair-side made bridge
a. Three implants have been placed
b. Temorary PEK abutments connected to the implants
c. The pre-fabricated bridge is tried on the abutments and adjusted.
d. The bridge after setting of the resin.
e. The finalized provisional bridge
f. The bridge in position.

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