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Immediate occlusal loading
of 47 SEVEN MIS Implants.
A Preliminary report after
6 months of function with
final restorations.



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Immediate occlusal loading of 47 SEVEN MIS Implants. A Preliminary report after 6 months of function with final restorations.

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Introduction

The widespread therapeutic use of dental implants over the last 20 years has led to the revision of several concepts (Szmukler-Moncler et al. 2000) of the original Brånemark protocol, developed in the early 1970s (Brånemark et al. 1977; Brånemark et al. 1985). Although this approach was found to be successful, and was the leading protocol for many years (Ledermann 1979; Schroeder et al. 1983; Babbush et al. 1986; Buser et al. 1997) other loading protocols were evaluated and published. Such was the immediate loading protocol, that was found to be viable therapeutic alternative under certain conditions (Schnitman et al. 1990; Balshi, & Wolfinger 1997; Schnitman et al. 1997; Tarnow et al. 1997; Wöhrle 1998; Brånemark et al. 1999; Ericsson et al. 2000; Jaffin et al. 2000).

The ultimate goal of the immediate loading protocol was to reduce the number of surgical interventions and shorten the time between surgery and the delivery of a prosthetic solution, without a reduction in implant success rates. These protocols are beneficial to both dentists and patients, reduce patients' reservations and result in increased acceptance of implant therapy.

A few factors were found to be associated with success of immediate loading procedures. Among these, implant's macro and micro-geometry (Szmukler-Moncler et al. 1996) as well as loading mode (Szmukler-Moncler et al. 1998) were found to be crucial during the healing phase. Based on these, our goal was to evaluate the clinical performance of MIS SEVEN implants under immediate placement and loading protocols, in partly edentulous patients.

Objective

This paper reports the results of a prospective clinical study on immediate implant placement and loading in partially edentulous maxillary and mandibular arches, using MIS SEVEN implants.

Material and methods

The study was performed in one clinical center by six investigators who followed the same clinical protocol (surgical and prosthetic).

Inclusion and exclusion criteria

Patients were included in the study according to the following criteria: (1) Partially edentulous maxillary or mandibular arches; (2) Rehabilitation with dental implants was considered treatment of choice; (3) No contra-indications related to surgical or prosthetic procedures; (4) Agreement to participate and a signed informed consent; (5) Normal to dense bone quality in the planned implant site; (6) Implants with good primary stability (torque of at least 32 Ncm). Bone quality was scored using the proposed by Trisi & Rao (1999) classification. When compared to Lekholm & Zarb's classification (1985), this classification classifies bone as dense, if it is classified as type I under Lekholm's classification, normal if it is type II or III, and soft if it is type IV bone.

Exclusion criteria included: (1) Active infection in planned sites; (2) Systemic diseases such as diabetes (all types, regardless of control); (3) Treatment with therapeutic radiation to the head within the past 12 months; (4) Severe bruxism; (5) Pregnancy; and (6) Patients consuming more than 10 cigarettes a day.

Success criteria

The following success criteria were applied in evaluating each implant: (1) No clinically detectable mobility when tested with opposing instrument pressure; (2) No evidence of peri-implant radiolucency on periapical radiographs; (3) No recurrent or persistent peri-implant infection; (4) No pain at the site of treatment; (5) No neuropathies or paraesthesia; (6) Crestal bone loss not exceeding 1.5 mm by the end of the first year of functional loading, and less than 0.2 mm/year in the following years (Albrektsson et al. 1986).

Surgical procedures

MIS Seven implants were used in all cases. The length and the diameter of each implant were determined by bone quality and quantity at each surgical site. The surgical protocol required crestal implant placement (Testori et al. 1999; Darvanapah et al. 2000), and following manufacturer's instructions. Primary stability was assessed using a torque wrench, based on Testori's scores (Testori et al. 2002a).

Prosthetic procedures

The treatment objective involved delivery of the provisional prosthesis within 4 hours of implant placement, by utilizing a prosthetic procedure that best fits the individual clinical condition. The design of the prosthesis was determined by collaboration between the treating doctors, so it is consistent with the study's objectives. A metal reinforced acrylic provisional bridge was used for cement-retained restorations. A resin hybrid restoration was used for screw retained restorations. The occlusion was carefully adjusted.

Follow-up procedures

No specific diet was recommended to the patients. The patients were on a strict recall program during the first 6 months: every week during the first month, and every month between the second and sixth months. Panoramic radiographs and radiovisiography were obtained for image analysis immediately after implant placement, so peri-implant marginal bone changes can be recorded.

Results

Enrollment and assessment of potential candidates were performed between August 2011 and March 2012. Six patients (2 male and 4 females) met the required inclusion and exclusion criteria. All patients were nonsmokers. A total of 47 implants were placed. The length and diameter of these implants is summarized in Tables 1 and 2.

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Success rate

None of the patients dropped out from the study. None of the implants failed. All implants were clinically stable and met the success criteria. The overall success rate was 100%.

Discussion

Immediate placement and loading protocols reduce overall treatment time and simplify treatment (Schnitman et al. 1990; Balshi & Wolfinger 1997; Schnitman et al. 1997; Tarnow et al. 1997; Wöhrle 1998; Bränemark et al. 1999; Jaffin et al. 2000; Malo et al. 2000; Chaushu et al. 2001). Immediate occlusal loading procedures can be successful only when the amount of micro-motion at the bone-implant interface is kept beneath a certain threshold during the healing phase (Szmukler-Moncler et al. 1998; Szmukler-Moncler et al. 2000). Several studies had reported higher implant failure rates when compared to delayed-loaded ones (Schnitman et al. 1997; Ericsson et al. 2000; Jaffin et al. 2000; Chaushu et al. 2001). These studies conclude that these procedures, although predictable, are technique-sensitive and should be applied cautiously. The literature also demonstrates that

most failures occur during the first 6 months of function (Babbush et al. 1986; Schnitman et al. 1990; Balshi & Wolfinger 1997; Schnitman et al. 1997; Ericsson et al. 2000a; Jaffin et al. 2000; Szmukler-Moncler et al. 2000; Chaushu et al. 2001). A gradual and progressive approach to immediate loading is therefore recommended.

In the present prospective clinical study, the standard SEVEN implants with diameters of 3.75 or 4.20mm was used since they offer great surgical and restorative flexibility. The technique utilized in this study avoids excessive obligatory osteoplasty. The decision to use more than three implants was based on the assumption, that even in a case of an implant failure, the prosthesis will be salvaged.

A preliminary evaluation of data collected in this study suggest that five to six SEVEN implants in the mandible and eight to ten SEVEN implants in maxilla can maintain a level of micro-motion beneath the critical threshold required to ensure implant success. In addition, the study demonstrates that the delivery of immediate provisional restoration within 48 hours, as introduced in our practices as a routine treatment protocol for the partially

edentulous maxillary and mandible, is a valid treatment option.

Conclusion

Rehabilitation of the partially edentulous maxilla and mandible with immediately placed and loaded MIS SEVEN implants is a viable alternative treatment to classical placement and loading protocols.

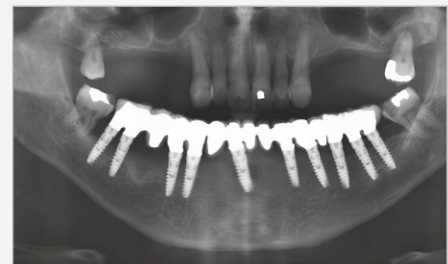
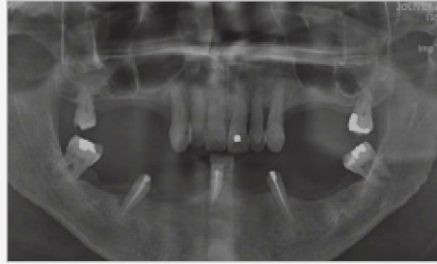
Case 1

Immediate loading



Case 2

Immediate loading

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Table 1:
Clinical cases

Localization	Cases	No. of Implants	Placement of implants Follow up	Provisional Restoration	Final Restoration		Execution Time
					Ceramo - Metallic Restoration	Hibryd Restoration	
Maxillary	3	Case 1	31/08/2011 - 05/03/2012	Acrylic Crown Cemented	1	1	3 months
		Case 2					
		Case 3					
Mandible	3	Case 1	31/08/2011 - 15/03/2012	Hibryd Restoration Screwed	1	3	3 months
		Case 2					
		Case 3					

Tables 2 and 3:
Characteristics of the 47 immediately loaded implants

Maxillary *					Mandible			
Length, mm	Diameter, mm			Total	Length, mm	Diameter, mm		Total
	3.75	4.20	5.0			3.75	4.20	
10	2	1	1	4	10			0
11.5		5		5	11.5	3	7	10
13	2	12		14	13	4	10	14
Total	4	18	1	23	Total	7	17	24

Total Implants	47
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* Number of non-loaded implants
4.2 x 11.5 (1)
4.2 x 13 (1)

Table 4:
Diagram illustrating the cumulative implant success rate vs time.

Interval time (months)	No. Patients	No. Implants	Implant Duration (months)	Failed Implant	Interval Survival Rate (%)	Cumulative Survival Rate (%)
0 - 6	6	47	0	0	100	100