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News No.16 Dec. 2005

Different Survival Rates in Full Maxillary vs. Mandibular Immediate Restoration

- A poster presented in the
AAID congress ,Denver 2005

Different Survival Rates in Full Maxillary vs. Mandibular Immediate Restoration

- One year results.

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Aim of study

Purpose: Immediate restoration of dental implants in patients with periodontal disease was examined. We evaluated the influence of insertion torque (IT) and Implant Stability Quotient (ISQ) on the survival and success of dental implants and compared those parameters in mandibular vs. maxillary and extraction vs. non extraction site implants. **Materials and Methods:** Patients received periodontal treatment after which treatment of the implant region was performed as "all in one": hopeless teeth were extracted, periodontal surgery around remaining adjacent teeth was performed, implants were inserted, and a fixed screwed provisional restoration was delivered. IT and ISQ levels were recorded at baseline, 6 and 12 month post surgery. **Results:** Nineteen patients were treated, receiving 74 implants. Twelve implants in 4 patients failed, ten of which were maxillary. Survival rates were 93% in mandibular full arches, 52% in maxillary full arches, and 100% in partial arch restorations. Implants exhibited a decrease in ISQ at 6 months followed by an increase at 12 months. There was no statistically significant difference between failed and successful implants in IT and ISQ. Non extraction and extraction sites demonstrated no significant differences in IT, and

ISQ. Mandibular implants demonstrated a higher IT and ISQ at baseline, 6 and 12 months.

Conclusions: Immediate loading of dental implants in periodontally susceptible patients has a high survival rate in the mandible and in restoring partial edentulism. This procedure proved unpredictable in the restoration of a fully edentulous maxilla.

Introduction

The successful use of dental implants for over three decades has been extensively documented. Implant therapy has been used for full arch and partial arch as well as single tooth restorations. Implant therapy also serves as an acceptable treatment for the replacement of periodontally hopeless teeth. In a recent review of the literature (van der Weijden et al. 2005), implant patients that were previously treated for periodontitis were shown to run a greater risk for developing complications, evidenced by loss of supporting bone and implant loss, as compared to individuals without such a history. The general aim of our study was to examine immediate restoration of dental implants in periodontally susceptible patients. Specific aims were: 1) to evaluate the influence of primary stability, as measured by insertion

torque (IT) and resonance frequency analysis (ISQ)¹ on the survival and success of dental implants and 2) to compare those parameters in immediately restored vs. non restored implants, in immediate vs. delayed implants and in maxillary vs. mandibular implants.

Materials and Methods

Patients attending the Unit of Periodontology at the Rambam Medical Center were offered to participate in the study if they met the following criteria: Aged 18-75, Diagnosed as having chronic periodontitis and in need of fixed implant restorations of the entire maxilla or mandible or a fixed partial implant restoration in the esthetic zone or a single tooth implant restoration in the esthetic zone. Had no complicating systemic conditions which were contraindications for surgical periodontal treatment and implant treatment (i.e. pregnancy or uncontrolled diabetes). Patients received periodontal treatment, including oral hygiene instructions, scaling and root planning, and periodontal surgery as necessary, after which final eligibility was ascertained. The study was carried out in accordance with the Helsinki Declaration guidelines. All patients signed a consent form. Study models, periapical, panoramic and CT radiographs were used for evaluation

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Table 1
Implant distribution between jaws.

	Maxillary implants. (patients)	Mandibular implants. (patients)	Total implants. (patients)
Single Tooth	4 (4)	1 (1)	5 (5)
Partial Arch	21 (7)	13 (5)	34 (10)
Full Arch	21 (3)	14 (2)	35 (5)
Total	46 (14)	28 (8)	74 (19)

Table 2
Survival rates

Variable	N	Failed	Survival Rate
Total	74	12	84%
Maxilla full arch	21	10	52%
Mandible full arch	14	1	93%
Partial arch	34	34	100%
Single tooth	5	1	80%
Anterior	34	4	88%
Posterior	40	8	80%

Table 3
Extraction vs. Non Extraction, comparison between groups (mean±S.E.)

Variable	Non Extraction	Extraction	P
Insertion Torque	38.7±1.6	38.3±1.2	0.8362
Insertion ISQ	63.8±2.2	61.8±1.7	0.475
ISQ 6m	59.7±2	60.3±1.7	0.8195
ISQ 12m	66.1±1.6	65.7±1.3	0.8382
Δ ISQ 6-0m	-4.72±2.63	-2.29±2.13	0.4726
Δ ISQ 12-6m	6.45±1.99	5.63±1.79	0.8471
Δ ISQ 12-0m	1.68±2.53	4.15±1.95	0.445

Table 4
Maxillary vs. Mandibular implants, comparison between groups (mean±S.E.)

Variable	Maxilla	Mandible	P
Ins. Torque	36.44±1.17	41.60±1.5	0.0085
Insertion ISQ	60.64±1.64	65.89±2.29	0.0601
ISQ 6m	57.97±1.42	62.81±2.23	0.0601
ISQ 12m	64.06±1.08	70.23±1.46	0.001
Δ ISQ 6-0m	-3.79±1.84	-3.04±3.07	0.8253
Δ ISQ 12-6m	6.09±1.32	7.42±2.37	0.6029
Δ ISQ 12-0m	2.38±1.83	4.38±2.55	0.5154

Table 5
Survival rates according to loading categories.

Variable	No. Total	No. Failed	Survival Rate
R non extraction	16	1	94%
R extraction	26	9	65%
S non extraction	9	0	100%
S extraction	14	2	86%
NSNR non extraction	8	0	100%
NSNR extraction	1	0	100%

R-Restored implants S-Submerged implants
NSNR-Non Submerged Non Restored implants

a consent form. Study models, periapical, panoramic and CT radiographs were used for evaluation and treatment planning. A surgical stent and a provisional fixed restoration were fabricated prior to commencement of the combined implant-prosthetic treatment. All provisional restorations were screw retained. For the region where implants were planned in conjunction with tooth extraction, this was performed as "all in one" in which hopeless teeth were extracted, periodontal surgery around remaining adjacent teeth was performed where necessary and implants MIS Implants Technologies Ltd. P.O.B. 110, Shlomi 22832, Israel, were inserted, guided by the surgical stent. In partial cases 2-4 implants were selected and in full arch cases 3-4 implants were selected as abutments for a provisional restoration. The restoration was prefabricated in the laboratory and adapted to those implants. Briefly, conical abutments were screwed in with a 20Ncm torque. Gold cylinders were screwed to the conical abutments, the restoration was connected to the gold cylinders with acrylic resin and screwed out to be adapted and finished extra-orally. Finally, the restoration was delivered to the patient, occlusally adjusted and screwed into the conical abutments with a 20 Ncm torque. Single implants were similarly restored with a screwed in crown restoration fabricated from acrylic. The following guidelines were used: 1. a passive fit to the implants, 2. no contact of the restoration with adjacent teeth, 3. single and partial arch restorations were delivered with no occlusal contact of the restoration with the opposing arch in IC and no contact in lateral and protrusive movements, 4. full arch restorations had a balanced occlusion. The rest of the implants either received a healing abutment and left to heal as non submerged one stage implants or received a cover screw and were submerged for a period of 6 months. Patients were prescribed a postoperative CHX 0.2% mouthwash, amoxicillin 500mg TID for seven days and analgesic therapy as necessary. Patients were examined 7-10 days after surgery for suture removal and then after two, 4 and 8 weeks and 3 months. At 6 months

the restoration was removed, interim implant success was evaluated, second stage surgery was performed for the submerged implants, ISQ was recorded, periapical radiographs taken and patients were referred for final prosthetic restorations. Failed implants were removed and additional implant surgery was provided as necessary to enable successful prosthetic restorations. ISQ measurements and periapical radiographs were again taken 12 months post surgery.

Results

Results are presented in the following tables. Briefly, nineteen patients were treated, receiving 74 implants. Twelve implants in 4 patients failed, ten of which were maxillary. Survival rates were 93% in mandibular full arches, 52% in maxillary full arches, and 100% in partial arch restorations. Implants exhibited a decrease in ISQ at 6 months followed by an increase at 12 months. There was no statistically significant difference between failed and successful implants in IT and ISQ. Non extraction and extraction sites demonstrated no significant differences in IT, and ISQ. Mandibular implants demonstrated a higher IT than maxillary implants at baseline and a higher ISQ at 12 months. ISQ at baseline and 6 months was also higher though not statistically different.

Discussion

Overall survival rate in the literature ranges between 80% and 100% Survival rates were 93% (13/14 implants) in full arch mandibular cases, while it was 52% (11/21 implants) in full arch maxillary cases, and 100% (34/34 implants) in partial cases. Several factors may contribute to this phenomenon. First, it might possibly be related to the lower mechanical stress that the maxilla can withstand because of its lower density and thinner cortical plates. We would speculate that a micro-motion exceeding the critical threshold of 150µm can partly explain failures in the present study. Second,

the patient group of our study was periodontally susceptible. It has been shown that periodontally susceptible patients exhibit greater failure rates. Hardt described 8.0% failures for perio patients vs. 3.3% for non-perio patients and Evian described 21% vs. 8% failure rates for perio vs. non perio cases, respectively.

Conclusions

Immediate loading of dental implants in periodontally susceptible patients has a high survival rate in the mandible and in restoring partial edentulism. This procedure proved unpredictable in the restoration of a fully edentulous maxilla.

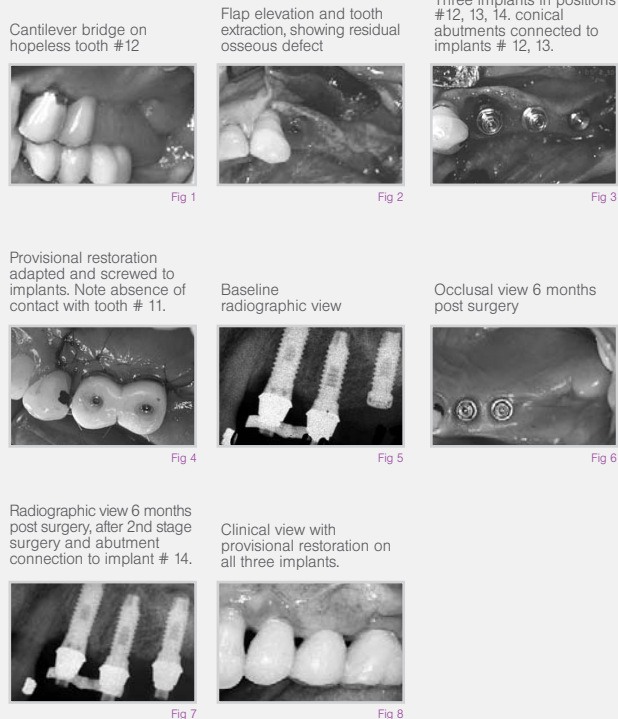
Acknowledgement

This study was supported by a scientific grant from MIS ltd. ISRAEL.

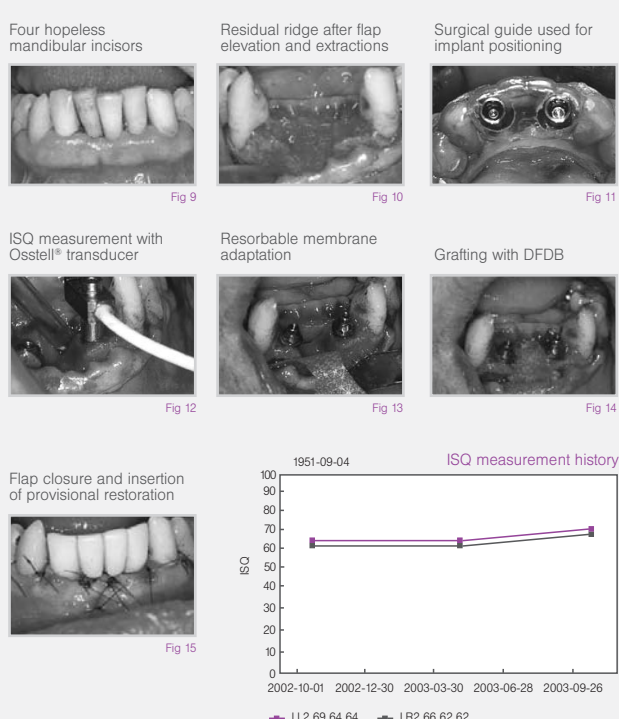
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Case 1



Case 2





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