International Poster Journal IPJ of Dentistry and Oral Medicine

Int Poster J Dent Oral Med 2004, Vol 6 No 01, Poster 216

Treatment of intrabony defects with Alpha-TCP and an oily Calcium Hydroxide suspension. A 14-case-report

Language: English

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Date/Event/Venue:
October 19th, 2002
10. Jahrestagung der Neuen Arbeitsgruppe Parodontologie e.V.
Giessen/Germany

Introduction

Results of basic research as clinical studies have proven the influence of an oily Calcium Hydroxide suspension on bone regeneration in closed defects. Its osteostimulative effect seems to rely on many factors, as the deposit action of the Calcium Hydroxide, which sustains the bone metabolism in a constant, mild alkalic environment, the stimulation of the angiogenetic bone growth with concentration of the growth factors next to the defect wall, and the reduction of the inflammation in the operated site, which enhances the wound healing. Histological and radiological analysis, both in animals and humans seem to indicate a predictable regeneration of closed bone defects. Such results lead recently to attempts to use the oily Calcium Hydroxide suspension, alone or under various combinations, in treating periodontal defects.

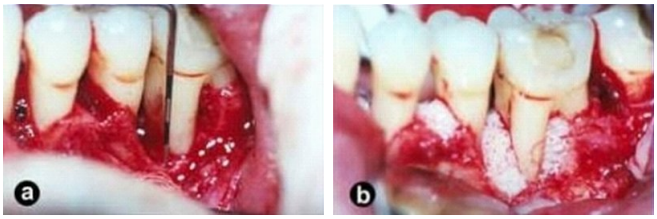
Objectives

Aim of the study is the presentation of the surgical technique and of the clinical results after the treatment of intrabony defects with a combination of Alpha-TCP and an oily suspension of Calcium Hydroxide.

Material and Methods

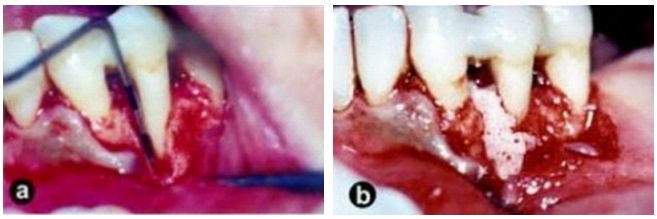
Fourteen patients (9 male and 5 female), between 26-42 years old, non-smokers, each displaying one deep intrabony defect, were treated with a combination of alpha-TCP (BioBase® Alpha-pore Biovision GmbH., Ilmenau, Germany) and an oily Calcium Hydroxide suspension (Osteoinductal®, Osteoinductal GmbH, Muenchen, Germany). All patients underwent initial therapy one month prior to surgery. All patients were instructed and motivated to maintain a good oral hygiene level, verified by a reduction of the PI (Silness and Loe) < 1. Before surgery and six months after, the following clinical parameters were registrated: the periodontal pocket depth (PD), the gingival recession (GR) and the clinical attachment level (CAL).
All measurements were performed with a rigid periodontal probe (PCP 12, Hu-Friedy), at six sites per tooth (buccal: mesiobuccal, central, distobuccal; oral: mesiooral, central, distooral). Radiographic examination was performed using the conventional RIO technique. For each patient, the highest measured value was taken into account and the mean PD, GR and CAL were calculated. The paired Student t-test was used to compare the differences between baseline values and values measured six months after. Surgery was performed under local anaesthesia. A full thickness flap was raised after intrasulcular incision, without using release incisions. After removal of the granulation tissue, the exposed roots underwent thorough S/RP using ultrasonic devices and curettes.
No resective surgery was performed, nor any root conditioning. Equal amounts of Osteoinductal® and Biobase® alpha-pore were mixed in a dappen-dish to a putty consistency mixture, which was placed into the defects in direct contact with the rough, vital bone surface. The amount of mixture did not exceed the margins of the defect. Post surgical care included antibiotherapy for one week (3x500 mg Amocycilin daily) and 0.2% Chlorhexidin (Plak-Out®, Santa Balanos, Greece) mouth rinses, twice a day, for the following four weeks, as gentle debridement of the operated area every second week, during two months.

Fig. 1, Case A



a) The bone defect exposed b) The mixture in situ

Fig. 2, Case B



a) The bone defect exposed b) The mixture in situ

Results

The healing phase progressed uneventful. No signs of inflammation, infection, allergy or severe pain were present. Pre-and postoperative mean values of the PD GR and CAL are displayed in the table No 1.

			PPD	(mm)	PPD	GR	(mm)	GR	CAL	(mm)	CAL gain (mm)
Patient Nr.	Tooth type	Defect type	Preoperative	After 6 months	Diff.	Preoperative	After 6 months	Diff.	Preoperative	After 6 months	
1.	35	2	7	5	2	2	2	0	9	5	4
2.	13	2	10	2	8	0	1	1	10	3	7
3.	14	2	10	3	7	0	1	1	10	4	5
4.	15	3	8	1	7	0	3	3	8	4	4
5.	16	2	7	2	5	0	2	2	7	4	3
6.	33	3	9	2	7	0	0	0	9	2	7
7.	34	2	10	5	5	0	3	3	10	8	2
8.	35	2	7	1	6	0	4	4	7	5	2
9.	15	1	8	6	2	0	0	0	8	6	2
10.	12	2	7	1	6	0	0	0	7	1	6
11.	13	1	6	3	3	0	0	0	6	3	3
12.	46	2	7	3	4	0	0	0	7	3	4
13.	47	2	6	5	1	0	0	0	6	5	1
14.	11	1	9	4	5	0	2	2	9	6	3
Mean			7.93	3.07	4.86	0.14	1.29	1.14	8.07	4.21	3.79
SD			1.44	1.69	2.18	0.53	1.38	1.41	1.44	1.81	1.89

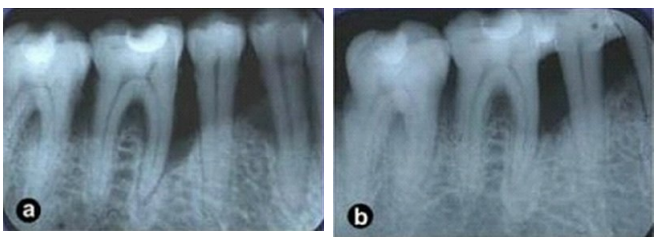
Table 1. Six months clinical results of treatment of intrabony defects with Osteoinductal® and Biobase® alpha-pore

The clinical measurements six months after treatment revealed a reduction of the probing pocket depth (PPD) from 7.93 ± 1.44 mm to 3.7 ± 1.69 mm, and a change of the mean clinical attachment level (CAL) from 8.07 ± 1.44 mm to 4.21 ± 1.81 mm, while the mean gingival recession (GR) increased from 0.14 ± o.53 mm to 1.29 ± 1.38 mm. Both the PPD and CAL changes were statistically significant compared to baseline ($p < 0.001$). (Table 2)

Difference	**mean**	**SD**	***p***
PPD	4.86	2.18	*0.00*
GR	1.14	1.41	*0.17*
CAL	3.79	1.89	*0.00*

Examination of Rx reveals a visible defect fill in all treated cases

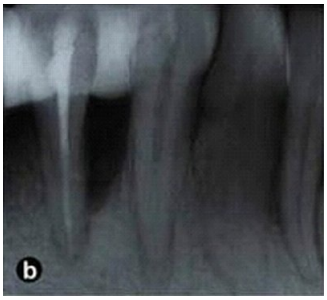
Fig. 3, Case A



RX images before treatment (a) RX images six months after (b)

Fig. 3, Case B

RX images before treatment (a)



RX six months after (b)

Discussion and Conclusions

The results of the case report indicate that treatment of deep intrabony defects using an oily Calcium Hydroxide suspension combined with alpha-Tricalcium Phosphate can lead to a statistically and clinically significant reduction of the PD and CAL gain. The lack of allergical or infectious reactions indicates that the combination of the two materials, while stable and very well tolerated, benefits from the anti-inflammatory and possible osteostimulative action of the oily suspension of Calcium Hydroxide. As histological evidences of the healing obtained by this therapy are still expected, further validation of this combination in treatment of deep intrabony lesions will need controlled clinical studies, in order to elucidate whether this approach can improve the clinical outcomes, when compared to each single treatment.

Abbreviations

- alpha -TCP: Alpha-Tricalcium Phosphate
- PD: periodontal pocket depth
- PPD: probing pocket depth
- GR: gingival recession
- CAL: clinical attachment level

This Poster was submitted by Stefan-Ioan Stratul.

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Poster Faksimile:

TREATMENT OF INFRABONY DEFECTS WITH ALPHA-TCP AND AN OILY CALCIUM HYDROXIDE SUSPENSION. A 14 CASE REPORT.

Stefan-Ioan Stratul *Department of Odontology-Periodontology, Faculty of Stomatology, "Victor Babes" Medical and Pharmaceutical University of Timisoara/Temeschburg, Romania*

ABSTRACT

An oily Calcium Hydroxide formulation proved over the last years to be highly efficient in promoting bone regeneration in closed defects (Sigusch: Parodontologie 2000 ; 3:243-250). Aim of the study is the presentation of the surgical technique and of the clinical results after the treatment of intrabony defects with a combination of Alpha-TCP and an oily suspension of Calcium Hydroxide. Fourteen patients, each with a deep intrabony defect were treated with a combination of Alpha-Tricalcium Phosphate (BioBase® α-pore, Biovision GmbH., Ilmenau, Germany) and oily Calcium hydroxide supension (Osteoinductal®, Osteoinductal GmbH, Muenchen, Germany). An excellent postoperative healing was noticed. The clinical measurements six months after treatment revealed a reduction of the probing pocket depth (PPD) from 7.93 ± 1.44 mm to 3.7 ± 1.69 mm, and a change of the mean clinical attachment level (CAL) from 8.07 ± 1.44 mm to 4.21 ± 1.81 mm, while the mean gingival recession (GR) changed from 0.14 ± 0.53 mm to 1.29 ± 1.38 mm. Both the PPD and CAL changes were statistically significant compared to baseline (p < 0.001). The clinical results indicate that the combination of the two materials may lead to significant PPD reductions and CAL gains. As histological evidences of the healing obtained by this therapy are still expected, further validation of this combination in treatment of deep intrabony lesions will need controlled clinical studies, in order to elucidate whether this approach can improve the clinical outcomes, when compared to each single treatment.

INTRODUCTION

Results of basic research as clinical studies have proven the influence of an oily Calcium Hydroxide suspension on bone regeneration in closed defects. Its osteostimulative effect seems to rely on many factors, as the deposit action of the Calcium Hydroxyde, which sustains the bone metabolism in a constant, mild alkalic environement, the stimulation of the angiogenetic bone growth with concentration of the growth factors next to the defect wall, and the reduction of the inflammation in the operated site, which enhances the wound healing. Histological and radiological analysis, both in animals and humans seem to indicate a predictable regeneration of closed bone defects. Such results lead recently to attempts to use the oily Calcium Hydroxyde suspension, alone or under various combinations, in treating periodontal defects.

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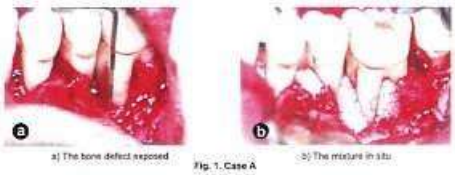

a) The bone defect exposed b) The mixture in situ

Fig. 1. Case A

a) The bone defect exposed b) The mixture in situ

Fig. 2. Case B

RESULTS

The healing phase progressed uneventful. No signs of inflammation, infection, allergy or severe pain were present. Pre- and postoperative mean values of the PD, GR and CAL are displayed in the table No.1:

Table 1. *Six months clinical results of treatment of infrabony defects with Osteoinductal® and Biobase® α - pore*

			PPD	(mm)	PPD	GR	(mm)	GR	CAL	(mm)	CAL gain (mm)
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5.	16	2	7	2	5	0	2	2	7	4	3
6.	33	3	9	2	7	0	0	0	9	2	7
7.	34	2	10	5	5	0	3	3	10	8	2
8.	35	2	7	1	6	0	4	4	7	5	2
9.	15	1	8	6	2	0	0	0	8	6	2
10.	12	2	7	1	6	0	0	0	7	1	6
11.	13	1	6	3	3	0	0	0	6	3	3
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Difference	mean	SD	p
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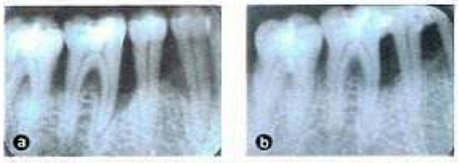

Fig. 3. Case A. Rx images before treatment (a) and six months after (b)

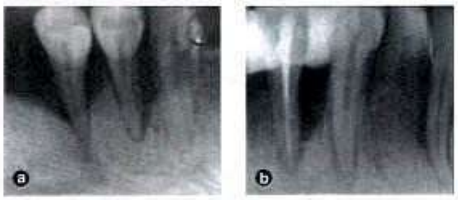

Fig. 4. Case B. Rx images before treatment (a) and six months after (b)

DISCUSSION & CONCLUSIONS

The results of the case report indicate that treatment of deep intrabony defects using an oily Calcium Hydroxyde suspension combined with α - TCP can lead to a statistically and clinically significant reduction of the PD and CAL gain. The lack of allergical or infectious reactions indicates that the combination of the two materials, while stable and very well tolerated, benefits from the antiflammatory and possible osteostimulative action of the oily suspension of Calcium Hydroxyde. As histological evidences of the healing obtained by this therapy are still expected, further validation of this combination in treatment of deep intrabony lesions will need controlled clinical studies, in order to elucidate whether this approach can improve the clinical outcomes, when compared to each single treatment.

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