International Poster Journal IPJ of Dentistry and Oral Medicine

Int Poster J Dent Oral Med 2004, Vol 6 No 03, Poster 235

Oily calcium hydroxyde suspension and alpha-TCP in treating intrabony defects

Language: English

Authors:
Assist. Prof. Dr. Stefan-Ioan Stratul,
Department of Odontology-Periodontology,
Faculty of Dental Medicine,
Victor Babes University of Medicine and Pharmacy Timisoara/Temeschburg, Romania
PD Dr. Dr. Anton Sculean,
Section of Periodontology,
Department of Conservative Dentistry and Periodontology,
Johannes-Gutenberg-University, Mainz, Germany

Date/Event/Venue:
June, 19-21th, 2003
EUROPERIO 4
ICC Berlin/Germany

Poster Award
DGP Travel Grant

Introduction

Results of basic research as clinical studies have suggested 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 have recently led to attempts to use the oily Calcium Hydroxide suspension alone or under various combinations, in treating periodontal defects.

Objectives

Aim of this study was to compare the effect of a combination of an oily Calcium Hydroxide suspension with α-TriCalciumPhosphate and the α-TriCalciumPhosphate alone in the treatment of one- and two-wall intrabony defects.

Material und Methods

Twelve patients (7 male and 5 female), between 28-46 years old, with moderate to severe periodontitis, light- or non-smokers, and displaying a total of 26 deep intrabony defects, were treated either with a combination of α-TCP (BioBase® α-pore Biovision GmbH., Ilmenau, Germany) and an oily Calcium Hydroxide suspension (Osteoinductal®, Osteoinductal GmbH, Muenchen, Germany) or with the α-TCP alone. 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 Löe) < 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 Mann-Whitney U non-parametric test was used to compare the differences between baseline values and the values measured six months after. Surgery was performed under local anesthesia. 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® α-pore were mixed in a dappen-dish to a putty consistency mixture, which was placed into the defects of the first group, in direct contact with the rough, vital bone surface. The amount of mixture did not exceed the margins of the defect. The defects of the second group were filled with α-TCP alone. Post surgical care included antibiotherapy for one week (3x500 mg Amoxycilin daily) and 0.2% Chlorhexidin (Plak-Out®, Santa Balanos, Greece) mouth rinses, twice a day, for the following two weeks, as gentle debridement of the operated area every second week, during two months.

Fig.1 Case A - a) The bone defect exposed

Fig.1 Case A - b) The mixture in situ

Fig.1 Case A - Rx image before treatment (a)

Fig.1 Case A - Rx image six months after (b)

Fig.2 Case B - a) The bone defect exposed

Fig.2 Case B - b) The α-TCP in situ

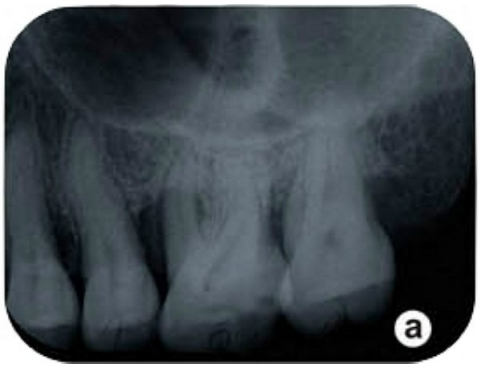

Fig.2 Case B - Rx image before treatment (a)

Fig.2 Case B - Rx image six months after (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 in the two treated groups are displayed in the table No.1 and table No.2.

		PPD	(mm)	PPD	GR	(mm)	GR	CAL	(mm)	CAL gain (mm)
Tooth type	**Defect Type< (walls)**	**Preoperative**	**After 6 months**	**Diff.**	**Preopertaive**	**After 6 months**	**Diff.**	**Preoperative**	**After 6 months**	
35	2	7	5	2	2	2	0	9	5	4
13	2	10	2	8	0	1	1	10	3	7
14	2	10	3	7	0	1	1	10	4	5
15	3	8	1	7	0	3	3	8	4	4
16	2	7	2	5	0	2	2	7	4	3
33	3	9	2	7	0	0	0	9	2	7
34	2	10	5	5	0	3	3	10	8	2
35	2	7	1	6	0	4	4	7	5	2
15	1	8	6	2	0	0	0	8	6	2
12	2	7	1	6	0	0	0	7	1	6
13	1	6	3	3	0	0	0	6	3	3
46	2	7	3	4	0	0	0	7	3	4

47	2	6	5	1	0	0	0	6	5	1
11	1	9	4	5	0	2	2	9	6	3
		7.93	3.07	4.86	0.14	1.29	1.14	8.07	4.21	3.79
		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® α-pore

		PPD	(mm)	PPD	GR	(mm)	GR	CAL	(mm)	CAL gain (mm)
Tooth type	**Defect Type (walls)**	**Preoperative**	**After 6 months**	**Diff.**	**Preoperative**	**After 6 months**	**Diff.**	**Preoperative**	**After 6 months**	**Diff.**
34	2	6	5	1	0	-1	-1	6	4	2
36	2	6	3	3	0	2	2	6	5	1
36	2	6	3	3	0	2	2	6	5	1
33	1	5	4	1	0	1	1	5	5	0
37	2	5	4	1	2	2	0	7	8	1
35	1	6	4	2	0	0	0	6	4	2
33	2	12	6	6	0	6	6	12	12	0
24	3	7	10	-3	0	1	1	7	11	-4
23	1	7	2	5	0	1	1	7	3	4
24	2	8	2	6	0	1	1	8	3	5
35	2	5	3	2	0	1	1	5	4	1
38	1	7	5	2	0	0	0	7	5	2
		6.67	4.25	2.42	0.17	1.33	1.17	6.83	5.58	1.25
		1.92	2.18	2.50	0.58	1.72	1.75	1.85	2.91	2.22

Table 2. Six months clinical results of treatment of intrabony defects with Biobase® α-pore alone

The clinical measurements six months after treatment revealed in the group of defects treated with the combination of Osteoinductal® and α-pore (Table 1) 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 ± 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 combination group resulted in significantly higher CAL gains ($p=0.003$) than the group treated with α-TCP alone (Table 3). Examination of Rx reveals a visible defect fill in all treated cases.

Parameter	**Osteoinductal® + Biobase® α-pore**		**Biobase® α-pore**		**Difference**	**p**
	Mean	SD	Mean	SD	Mean	
PPD	4.86	2.18	2.42	2.50	2.44	.020
CAL	3.79	1.89	1.25	2.22	2.53	.003
GR	1.14	1.41	1.17	1.75	-0.03	.98

Table 3.

Discussion and Conclusions

The results demonstrate that both treatments may result in significant PD reduction and CAL gain over a period of six months. The combination of Osteoinductal® and α-TCP may, however, additionally improve the healing process.

Abbreviations

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

This poster was submitted by Assist. Prof. Dr. Stefan-Ioan Stratul.

Correspondence address:
Assist. Prof. Dr. Stefan-Ioan Stratul
Str.Em.Gojdu 5
300176 Timisoara
Romania

Poster Faksimile:

OILY CALCIUM HYDROXYDE SUSPENSION AND ALPHA-TCP IN TREATING INTRABONY DEFECTS

Stefan-Ioan Stratul
Dept. of Odontology-Periodontology, Faculty of Dental Medicine, Victor Babes Medical and Pharmaceutical University of Timisoara/Temeschburg, Romania

Anton Sculean
Section of Periodontology, Department of Conservative Dentistry and Periodontology, Johannes Gutenberg-University, Mainz, Germany

ABSTRACT

An oily Calcium Hydroxide suspension has been shown to enhance healing of various types of bone defects. The aim of this study was to evaluate the effect of a combination of an oily Calcium Hydroxide suspension (Osteoinductal® - Osteoinductal GmbH, Muenchen, Germany) with α-TCP (BioBase® α-pore, Biovision GmbH, Ilmenau, Germany) vs. α-TCP alone in the treatment of one- and two-wall intrabony pockets. 12 patients with moderate to severe chronic periodontitis and displaying a total of 26 intrabony defects were included in the study. The intrabony defects were randomly treated with either α-TCP alone or with the combination of α-TCP and Osteoinductal®. The following parameters were evaluated at baseline and at six months after surgery: probing depth (PD), gingival recession (GR) and clinical attachment level (CAL). Postsurgical care included administration of antibiotics (Amoxycillin) 3 x 500mg daily for one week and 0.2% chlorhexidine rinses twice daily for two weeks. At six months after surgery the results revealed in the combination group a mean CAL change from 8.07 ± 1.44 mm to 4.21 ± 1.81 mm (p<0.001). In the α-TCP alone group the mean CAL changed from 6.83 ± 1.85 mm to 5.58 ± 2.91 mm (p<0.05). The combination group resulted in significantly higher CAL gains (p=0.003) than the group treated with α-TCP alone. The results demonstrate that both treatments may result in significant PD reduction and CAL gain over a period of six months. The combination of Osteoinductal® and α-TCP may, however, additionally improve the healing process.

INTRODUCTION

Results of basic research as clinical studies have suggested 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 have recently led to attempts to use the oily Calcium Hydroxide suspension, alone or under various combinations, in treating periodontal defects.

OBJECTIVE

Aim of this study was to compare the effect of a combination of an oily Calcium Hydroxide suspension with α-TriCalciumPhosphate and the α-TriCalciumPhosphate alone in the treatment of one- and two-wall intrabony defects.

MATERIALS AND METHODS

Twelve patients (7 male and 5 female), between 28-46 years old, with moderate to severe periodontitis, light- or non-smokers, and displaying a total of 26 deep intrabony defects, were treated either with a combination of alpha-TCP (BioBase® α-pore Biovision GmbH, Ilmenau, Germany) and an oily Calcium Hydroxide suspension (Osteoinductal®, Osteoinductal GmbH, Muenchen, Germany) or with the α-TCP alone. 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 the 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 RID technique. For each patient, the highest measured value was taken into account and the mean PD, GR and CAL were calculated. The Mann-Whitney U non-parametric 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 SRP using ultrasonic devices and curettes. No resective surgery was performed, nor any root conditioning. Equal amounts of Osteoinductal® and Biobase® α-pore were mixed in a dappen-dish to a putty consistency mixture, which was placed into the defects of the first group, in direct contact with the rough, vital bone surface. The amount of mixture did not exceed the margins of the defect. The defects of the second group were filled with α-TCP alone. Post surgical care included antibiotherapy for one week (3x500 mg Amoxycilin daily) and 0.2% Chlorhexidin (Plak-Out, Sarris Balanos, Greece) mouth rinses, twice a day, for the following two weeks, as gentle debridement of the operated area every second week, during two months.

a) The bone defect exposed

b) The mixture in situ

RX images before treatment (a)

and six months after (b)

Fig 1. Case A

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 in the ten treated groups are displayed in the table No.1 and table No.2

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

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

Table 2 *Six months clinical results of treatment of intrabony defects with Biobase® α-pore alone*

		PPD	(mm)	PPD	GR	(mm)	GR	CAL	(mm)	CAL gain (mm)
Tooth Type	Defect Type (walls)	Preoperative	After 6 months	Diff.	Preoperative	After 6 months	Diff.	Preoperative	After 6 months	Diff.
34	2	8	5	1	0	-1	-1	6	4	2
36	2	9	3	6	0	2	2	6	5	1
36	2	8	3	5	0	2	2	6	5	1
33	1	5	4	1	0	-1	-1	5	5	0
37	2	8	4	1	3	2	5	7	6	1
35	1	8	4	2	0	0	0	8	4	2
10	3	12	6	6	0	4	4	12	12	0
24	3	7	10	-3	0	1	1	7	11	-4
23	1	7	2	5	0	1	1	7	3	4
24	2	8	2	6	0	1	1	8	3	5
36	2	8	3	5	0	1	1	8	4	4
38	1	7	3	4	0	0	0	7	5	2
		6.67	4.25	2.42	0.17	1.33	1.17	6.83	5.58	1.25
		1.92	2.18	2.50	0.58	1.72	1.75	1.86	2.91	2.22

The clinical measurements six months after treatment revealed in the group of defects treated with the combination of Osteoinductal® and α-TCP (Table 1) 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 ± 0.53 mm to 1.29 ± 1.38 mm. Both the PPD and CAL changes were statistically significant compared to baseline (p<0.001). In the α-TCP alone group (Table 2) the PPD changed from 6.67 ± 1.92 mm to 4.25 ± 2.18 mm, and the CAL from 6.83 ± 1.85 mm to 5.58 ± 2.91 mm (p< 0.05). The combination group resulted in significantly higher CAL gains (p=0.003) than the group treated with α-TCP alone (Table 3).
Examination of Rx revealed an incomplete defect fill in all treated cases.

Table 3

Parameter	Osteoinductal® + Biobase® α-pore		Biobase® α-pore		Difference	p
	Mean	SD	Mean	SD	Mean	
PPD	4.86	2.19	2.42	2.50	2.44	.020
CAL	3.79	1.86	1.25	2.22	2.53	.003
GR	1.14	1.41	1.17	1.75	-0.03	.96

a) The bone defect exposed

b) The α-TCP in situ

RX images before treatment (a)

and six months after (b)

Fig 2. Case B

DISCUSSION & CONCLUSIONS

The results demonstrate that both treatments may result in significant PD reduction and CAL gain over a period of six months. The combination of Osteoinductal® and α-TCP may, however, additionally improve the healing process.

Authors:

Ass. Prof. Dr. Stefan-Ioan Stratul DMD, Medical Primarius, PhD, MDH
Dept. of Odontology-Periodontology, Faculty of Dental Medicine, Victor Babes Medical and Pharmaceutical University
P-ta Eftimie Murgu 2, 1900 Timisoara, Romania
Email: stratul@umft.ro

Priv.-Doz. Dr. Anton Sculean DMD, MS
Section of Periodontology, Department of Conservative Dentistry and Periodontology
Johannes Gutenberg University, Augustusplatz 2, D-55131 Mainz, Germany
Email: anton.sculean@gmx.de