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

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 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 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 registered: 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 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®, 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.
**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.

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<th>Tooth type</th>
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<th>After 6 months</th>
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Table 1. Six months clinical results of treatment of intrabony defects with Osteoinductal® and Biobase® α-pore

<table>
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<tr>
<th>Tooth type</th>
<th>Defect Type (walls)</th>
<th>PPD (mm)</th>
<th>PPD GR (mm)</th>
<th>GR CAL (mm)</th>
<th>CAL gain (mm)</th>
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<td>Preoperative</td>
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<td>1.92</td>
<td>2.18</td>
<td>2.50</td>
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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.

Table 3. Comparison of clinical outcomes between Osteoinductal® + Biobase® α-pore and Biobase® α-pore

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Osteoinductal® + Biobase® α-pore</th>
<th>Biobase® α-pore</th>
<th>Difference</th>
<th>p</th>
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<tr>
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<td>Mean (± SD)</td>
<td>Mean (± SD)</td>
<td>Mean</td>
<td></td>
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<tr>
<td>PPD</td>
<td>4.86 (± 2.18)</td>
<td>2.42 (± 2.50)</td>
<td>2.44</td>
<td>.020</td>
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<tr>
<td>CAL</td>
<td>3.79 (± 1.89)</td>
<td>1.25 (± 2.22)</td>
<td>2.53</td>
<td>.003</td>
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<tr>
<td>GR</td>
<td>1.14 (± 1.41)</td>
<td>1.17 (± 1.75)</td>
<td>-0.03</td>
<td>.98</td>
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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

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

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ABSTRACT

Objective: The aim of the study was to evaluate the effect of a combination of oily calcium hydroxyde suspension (OCS) and alpha-tricalcium phosphate (TCP) in the treatment of intrabony defects.

Introduction: The use of OCS in combination with TCP in the treatment of intrabony defects has shown promising results. However, further studies are needed to evaluate the effectiveness of this combination.

Materials and Methods: A total of 20 patients with intrabony defects were enrolled in the study. The defects were treated with a combination of OCS and TCP. The patients were followed up for a period of 6 months.

Results: The results showed significant improvement in the probing depth and clinical attachment level in the treated group compared to the control group. The bone levels also showed an increase.

Discussion & Conclusion: The combination of OCS and TCP was effective in improving the clinical parameters of intrabony defects. Further studies are needed to confirm these findings and to determine the optimal treatment protocol.

Table 1: Probing depth and clinical attachment levels before and after treatment

<table>
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<tr>
<th>Group</th>
<th>Before Treatment (mm)</th>
<th>After Treatment (mm)</th>
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<tr>
<td>OCS</td>
<td>4.5</td>
<td>2.5</td>
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<td>TCP</td>
<td>4.2</td>
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Table 2: Bone levels before and after treatment

<table>
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<tr>
<th>Group</th>
<th>Before Treatment (mm)</th>
<th>After Treatment (mm)</th>
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<td>TCP</td>
<td>0.6</td>
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Fig. 1: Case A

Fig. 2: Case B

Fig. 3: Case C

Fig. 4: Case D

Fig. 5: Case E

Fig. 6: Case F

Fig. 7: Case G

Fig. 8: Case H

Fig. 9: Case I

Fig. 10: Case J

Fig. 11: Case K

Fig. 12: Case L

Fig. 13: Case M

Fig. 14: Case N

Fig. 15: Case O

Fig. 16: Case P

Fig. 17: Case Q

Fig. 18: Case R

Fig. 19: Case S

Fig. 20: Case T

Fig. 21: Case U

Fig. 22: Case V

Fig. 23: Case W

Fig. 24: Case X

Fig. 25: Case Y

Fig. 26: Case Z

Fig. 27: Case AA

Fig. 28: Case BB

Fig. 29: Case CC

Fig. 30: Case DD

Fig. 31: Case EE

Fig. 32: Case FF

Fig. 33: Case GG

Fig. 34: Case HH

Fig. 35: Case II

Fig. 36: Case JJ

Fig. 37: Case KK

Fig. 38: Case LL

Fig. 39: Case MM

Fig. 40: Case NN

Fig. 41: Case OO

Fig. 42: Case PP

Fig. 43: Case QQ

Fig. 44: Case RR

Fig. 45: Case SS

Fig. 46: Case TT

Fig. 47: CaseUU

Fig. 48: CaseVV

Fig. 49: Case WW

Fig. 50: Case XX

Fig. 51: Case YY

Fig. 52: Case ZZ

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