

치조골 결손부 치료시 calcium carbonate와 calcium sulfate 혼합물의 임상적 효과

1,2, 1,2, 1,2, 1,2, 1,2, 1,2, 1,2, 1,2*

- 1.
- 2.

The clinical effects of Calcium Sulfate combined with Calcium Carbonate in treating intrabony defects

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ABSTRACT

Purpose: If bone grafts and guided tissue regeneration are effective individually in treating osseous defects, then the question is, what would happen when they are combined. Bone grafts using Calcium Carbonate(Biocoral) and Guided Tissue Regeneration using Calcium Sulfate(CALMATRIX) will maximize their advantages and show the best clinical results in intrabony defects. This study was to compare the effects of a combination of CS and CC with control treated only with modified widman flap in a periodontal repair of intrabony defects.

Materials and Methods: 30 patients with chronic periodontitis were used in this study. 10 patients were treated with a combination of CS and CC as the experimental group and another 10 patients were treated with CC as the experimental group, and the remaining 10 patients, the control group were treated only with modified widman flap. Clinical parameters including probing depth, gingival recession, bone probing depth and loss of attachment were recorded 6 months later.

Results: The probing depth changes were 3.30±1.34 mm in the control group, 4.2±1.55 mm in the experimental group (CC) and 5.00±1.33 mm in the experimental group (CS+CC). They all showed a significant decrease 6 months after surgery($p < 0.01$). There was a significant difference($p < 0.05$) between the control and experimental group. However there were no significant difference($p < 0.05$) between the experimental group and . The gingival recession changes were -1.30±1.25 mm in the control group, This is a significant difference($p < 0.01$). However, there was a -0.50±0.53 mm change in the experimental group (CC) and -0.60±0.97 mm in the experimental group (CS+CC). In addition, in terms of gingival recession, there was a no significance difference($p < 0.05$) among the groups. The clinical attachment level changes were 2.00±1.33 mm in the control group, 3.60±1.58 mm in the experimental group (CC) and 4.40±1.17 mm in the experimental group (CS+CC). They all showed a significant decrease 6 months after surgery($p < 0.01$). There was a significant difference($p < 0.05$) between the control and experimental group. However there was a no significance difference($p < 0.05$) between the experimental group and . The bone probing depth changes were 0.60±0.52 mm in the control group, 3.20±1.48 mm in the experimental group (CC) and 4.60±1.43 mm in the experimental group (CS+CC). All of them showed a significant decrease 6 months after surgery($p < 0.01$), there was a significance difference($p < 0.05$) among the groups.

Conclusion: Treatment using a combination of CS and CC have a potential to improve periodontal parameters in intrabony defects and More efficient clinical results can be expected in intrabony defects less than 2 walls grafted with CS and CC. (*J Korean Acad Periodontol 2008;38:237-246*)

KEY WORDS: calcium sulfate; calcium carbonate; periodontal tissue regeneration; bone graft material.

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1).

(Guided Tissue Regeneration, GTR), (bone morphogenic protein, BMP), (Enamel Matrix Derivative, EMD)²⁻⁶⁾

(osteogenesis) (osteocoduction),

(osteoinduction)⁷⁾

(gold standard)

8)

(1) 가

(2) (3)

(4) (5)

가

가

10)

porous resorbable calcium

carbonate, calcium sulfate, tricalcium phosphate,

hydroxyapatite가 polymers,

hydroxyapatite¹⁰⁻¹²⁾

porous resorbable calcium carbonate(CC)

aragon -

ite(>98%[CaCO₃]) 가

13-16)

150 μm

(>45%)

Polylactic acid polymer, Polyglycolic acid polymer, Vicryl mesh, Oxidized cellulose, collagen, calcium sulfate²³⁻²⁶⁾ Calcium Sulfate(CS) 100

30~40

4~7

14,28-30)

Shaffer³¹⁾ CS

Yamazaki³²⁾가 Bone Morphogenetic Protein(BMP)

CS

, CS BMP 가

가

가

Schallhorn McClain^{33,34)}

Sottosanti³⁵⁾

CS Demineralized Freeze Dried Bone(DFDB)

CS가

(wound stabilization)

, BMP

DFDB

1,2,3

Medical Grade

CS

, Medical Grade

CS

19,20,36-48)

가

10,17-20)

CS CC

, GTR Gottlow²¹⁾

CS

CC

, CS

CC

CC

6

22)

e-PTFE

1. 30 30 (20 , 10)
 1 2 (2 20 , 1 8
 , 2) . 30
 67 (43.2±8.0) , 21 , 9
 12 .
 가 6mm ,
 3mm (6.5±2.0mm),
 2mm (4.6±1.9mm) 가
 3 .

2.
 1)
 10 10
 . 10 10
 Biocoral -450(calcium carbo-
 nate, Inotab, Saint Gonny, France) 1
 , 10 10 CALMATRIX(calcium
 sulfate, Lifecore Biomedical, Minesota, USA)
 Biocoral -450 2

2)
 , , ,
 , 3
 , 6
 Lidocaine(2% Lidocaine HCl -Epinephrine,
 1.8 mL, Yuhan Co., Seoul, Korea)

Lidocaine

Tetracycline tab. 250 mg(Chong Kun Dang
 Pharmaceutical Co., Seoul, Korea)
 Biocoral CALMATRIX
 Biocoral (Fig. 1). 1
 Biocoral , 2 CALMATRIX
 Biocoral . CALMATRIX Biocoral
 CALMATRIX 0.17g Biocoral 0.25 cc
 5 (penicillin 250 mg, t.i.d., Moxicle tab,
 Daewoong Pharm. Co., Seoul, Korea) ,
 Newtrine(Kun Wha Pharmaceutical Co., Seoul, Korea)
 3
 (Monosyn 4.0 Glyconate Monofilament,
 B|BRAUN, Tuttlingen, Germany) 1
 6

3)
 (Probing Pocket Depth)
 , ,
 6 marquis color - coded
 ,
 1.0 mm 가

(Gingival Recession)
 1.0 mm

(Clinical Attachment Level)

(Bone Probing Depth)

6 marquis color - coded

mm 6 1.00±0.99 mm 0.50±0.53 mm 가
 , 2(CS+CC) 0.90±1.2 mm 1.50±0.85 mm
 0.60±0.97 mm 가 . 6

4)

(Table 1).

가

3)

Wilcoxon signed

8.50±2.37

rank test

mm 6 6.70±2.36 mm 2.00±1.33 mm 가

Kruskal -Wallis test

, 1(CC) 8.40±1.78 mm 4.50±2.12 mm

SPSSWIN 12.0

3.60±1.58 mm 가 , 2(CS+CC) 9.60±2.27

mm 5.20±2.20 mm 4.4±1.17 mm 가

(P<0.01). 6

1.

($p < 0.05$).

1(CC)

2(CS+CC)

가

(Table 1).

1

4)

9.20±1.75 mm

2.

6

8.60±1.71 mm 0.60±0.52 mm ,

1(CC)

9.10±1.79 mm 5.90±1.85 mm

1)

3.20±1.48 mm ,

2(CS+CC) 10.90±1.73

mm 6.30±1.34 mm 4.60±1.43 mm

(P<0.01). 6

7.40±1.26 mm

6

4.30±1.16 mm 3.30±1.34 mm ,

1(CC) 7.90±1.79 mm 3.70±2.06 mm 4.20±1.55

2(CS+CC)

($p < 0.05$)(Table 1).

mm , 2(CS+CC) 8.70±1.70 mm

3.70±1.57 mm 5.00±1.33 mm

(P<0.01). 6

(p

<0.05).

1(CC)

2(CS+CC)

가

(Table 1).

2)

1.10±1.97 mm 6

2.40±2.37 mm 1.30±1.25 mm 가

(P<0.01). , 1(CC) 0.50±0.52

Table 1. Change of Clinical Parameters (unit :mm)

		Control (N=10)	CC (N=10)	CS+CC (N=10)
		Mean±SD	Mean±SD	Mean±SD
PPD	Baseline	7.40±1.26	7.90±1.79	8.70±1.70
	Postop.6 M	4.30±1.16	3.70±2.06	3.70±1.57
	Changes	3.30±1.34*	4.20±1.55*	5.0±1.33*
REC	Baseline	1.10±1.97	0.50±0.52	0.90±1.20
	Postop.6 M	2.40±2.37	1.00±0.99	1.50±0.85
	Changes	-1.30±1.25*	-0.50±0.53	-0.60±0.97
CAL	Baseline	8.50±2.37	8.40±1.78	9.60±2.27
	Postop.6 M	6.70±2.36	4.50±2.12	5.20±2.20
	Changes	2.00±1.33*	3.60±1.58*	4.40±1.17
BPD	Baseline	9.20±1.75	9.10±1.79	10.90±1.73
	Postop.6 M	8.60±1.71	5.90±1.85	6.30±1.34
	Changes	0.60±0.52*	3.20±1.48*	4.60±1.43*

PPD: Probing Pocket Depth, REC : Gingival Recession,
 CAL: Clinical Attachment Level, BPD : Bone Probing Depth,
 CC: Calcium Carbonate, CS : Calcium Sulfate, SD : Standard Deviation,
 * significant difference from change between baseline and Postop.6 months($p < 0.01$, p -value of using the Wilcoxon Signed Rank)
 # significant difference between groups ($p < 0.05$)

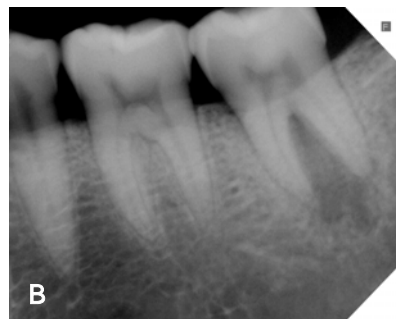




Figure 1. Clinical case of Biocoral graft plus CALMATRIX. A. clinical periodontal status before surgery. B. initial radiograph. Tooth #37. C. surgical view of circumferential defect after debridement and SRP. D. Biocoral plus CALMATRIX has been placed into the defect. E. 6 months postoperative clinical periodontal status. F. 6 months postoperative radiograph demonstrates filling of the defect.

CC 가
 CS
 putty
 2-6)
 19) CC , CS 가 22)
 , Gottlow, Guillemin, Yukna^{10,21,49)}
 CC
 14) CC Weinmann Sicher²⁸⁾ 가
 , 6 가 Bahn⁵¹⁾ Ca⁺⁺
 가 4.7 (Space Filler)
 CC Frame⁵²⁾ CS Hydroxyapatite
 1(CC) 4.20±1.55 mm (P
 <0.01), 3.60±1.58 mm 가(P<0.01)
 3.20±1.48 mm (P<0.01) BMP Yamazaki³²⁾ BMP
 . CS (enhancer)
 . Sottosanti³⁵⁾ DFDB
 가 , CS가
 (wound stabilization) DFDB
 10,13,50)
 . Schallhorn³³⁾ McClain³⁴⁾ CS

가
1, 2, 3

Medical Grade CS가

, Medical Grade CS

19,20,36-45,47,48) 36) 3
 CC CS
 가 ,
 2(CS+CC)
 5.00±1.33 mm (P<0.001) 4.40±
 1.17 mm 가(P<0.01) 4.60±1.43 mm
 (P<0.01)
 가
 1(CC)
 , 1(CC) 1
 9 2
 6.20±2.2 mm, 3.10±0.6 mm
 , 2(CS+CC) 5 1 4 2
 7.70±1.4 mm, 5.60±1.8 mm ,
 가 , Quintero⁵³⁾
 6 1 61%, 2
 62%, 3 73%
 , 가 가
 6 가 CS CC
 가
 (bone fill)
 가가
 CS CC
 , 2

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