

가

.

I.

가 7),

1,2),

10 - 12),

3),

9),

가

4). 5mm

13 - 15),

가

(local drug delivery system)

가 1970

16 - 19),

5 - 8),

tetracycline, minocycline, metron -

가 idazole, chlorhexidine ,

9),

gel^{9,10,23-27)}

ointments²⁸⁾

가

fibers^{6,20-22)}

films²⁹⁻³⁰⁾

(insoluble, non-degradable polymers) (bioabsorbable polymers)가 Goodson (1985)¹⁸⁾ 25% tetracycline monolithic fibers가 643µg/ml 가 10

minocycline chlorhexidine 가 minocycline chlorhexidine 가

가

II.

poly-caprolactone films²⁹⁻³⁰⁾, poly-glycolide-colactide powder³¹⁻³²⁾, ointments^{9-11,19,23-28,33)}

1.

polycaprolactone film 30% minocycline

8mm 가 5mm

7 7

가 2 32 (15 , 17 : 43.4 , 29 57)

syringeable gel³⁴⁻³⁶⁾, van Steenberghe (1993)²⁴⁾ Graca (1997)²⁵⁾ 2% minocycline gel

6 3

minocycline gel

가 chlorhexidine 1970

tetracycline phenytoin, nifedipine, cyclosporin

가 1

Wennström (1987)^{33,37)} 0.2% chlorhexidine

가 2

2. glass slide 0.85% 400

(1) split - mouth design ; 2 - ; 3 - ; 4 -

0, 1, 2, 3 1 41). slide 3

2% minocycline gel (Minocline dental ointment,) 1

(n=70), 0.1% chlorhexidine digluconate (n=37) (n=41) (3) 2 - way ANOVA Test

III.

0

4 가 2 가 5 8mm 1/4

4, 8, 12 32 , minocycline gel , chlorhexidine

(2) William's probe(12 0.5 mm)

(Silness and L e (1964))³⁸⁾, (L e and Silness (1963))³⁹⁾, (M hlemann and Son (1970))⁴⁰⁾ 1. (1)

Table 1. Mean plaque index(mean±SD)

group	week	initial exam.	0	1	2	3	4	8	12
	saline 0.15		2.40±0.28	1.22±0.35	0.83±0.25	0.73±0.22	0.72±0.21	0.72±0.24	0.72±0.20

Statistically significant difference at each group from the initial examination(p<0.05 by two - way analysis of

Table 2. Mean gingival index(mean±SD)

group \ week	initial exam.	0	1	2	3	4	8	12
saline	2.43 ± 0.25	1.13 ± 0.30	0.84 ± 0.18	0.78 ± 0.19	0.76 ± 0.23	0.71 ± 0.21	0.65 ± 0.20	0.65 ± 0.20

Statistically significant difference at each group from the initial examination(p<0.05 by two - way analysis of variance)

Table 3. Mean sulcular bleeding index(mean±SD)

group \ week	initial exam.	0	1	2	3	4	8	12
saline	2.93 ± 0.24	1.34 ± 0.28	0.95 ± 0.18	0.87 ± 0.19	0.86 ± 0.16	0.86 ± 0.16	0.90 ± 0.16	0.94 ± 0.16
chlorhexidine	2.90 ± 0.33	1.27 ± 0.33	0.88 ± 0.22	0.79 ± 0.19	0.79 ± 0.17	0.77 ± 0.21	0.73 ± 0.21	0.78 ± 0.22
minocycline	2.99 ± 0.31	1.31 ± 0.31	0.63 ± 0.21*	0.43 ± 0.19**		0.30 ± 0.18**	0.27 ± 0.16**	0.26

Statistically significant difference at each group from the initial examination(p<0.05 by two - way analysis of variance)

*: Statistically significant difference at the saline group(p<0.05 by two - way analysis of variance)

(p<0.05), chlorhexidine

8 12

12 (p<0.05) (Table 2).

(p<0.05).

12 8 (3)

가 가

12

(p<0.05),

(Table 1).

2.99 ± 0.31

가 2 0.43 ± 0.19

(2)

1 (p<0.05), 12

가 가 . 1 12

(p<0.05), minocycline gel

가 . 1 2 12

12 (p<0.05).

Table 4. Mean probing pocket depth(mean ± S.D., mm)

group \ week	initial exam	0	4	8	12
saline	5.24 ± 0.45	4.13 ± 0.41	4.07 ± 0.37	4.08 ± 0.36	4.23 ± 0.34
chlorhexidine	5.62 ± 0.70	4.44 ± 0.64	4.36 ± 0.58	4.34 ± 0.56	4.46 ± 0.58
minocycline	5.60 ± 0.70	4.46 ± 0.58	4.25 ± 0.53*	4.13 ± 0.52*	4.15 ± 0.50*

Statistically significant difference at each group from the initial examination (p<0.05 by two - way analysis of variance).

Table 5. Mean reduction of probing pocket depth from the initial examination(mean ± S.D., mm)

group \ week	initial exam	0	4	8	12
saline	5.24 ± 0.45	1.12 ± 0.27	1.18 ± 0.25	1.16 ± 0.26	1.02 ± 0.28
chlorhexidine	5.62 ± 0.70	1.18 ± 0.27	1.26 ± 0.27	1.28 ± 0.29	1.16 ± 0.32
minocycline	5.60 ± 0.70	1.14 ± 0.22	1.36 ± 0.26*	1.48 ± 0.28*	1.45 ± 0.31*

Statistically significant difference at each group from the initial examination (p<0.05 by two - way analysis of variance).

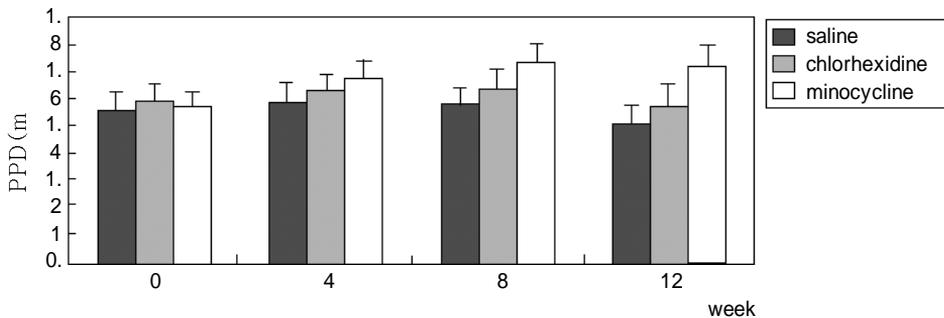


Figure 1. Schematic illustration of mean probing pocket depth reduction between each group

Table 6. Mean gingival recession(mean ± SD., mm)

group \ week	initial exam.	0	1	2	3	4	8	12
saline	0.74 ± 0.60	1.37 ± 0.69	1.36 ± 0.68	1.36 ± 0.68	1.39 ± 0.66	1.43 ± 0.63	1.42 ± 0.65	1.42 ± 0.65
chlorhexidine	0.55 ± 0.59	1.22 ± 0.62	1.22 ± 0.61	1.22 ± 0.61	1.27 ± 0.60	1.30 ± 0.57	1.34 ± 0.54	1.32 ± 0.54
minocycline	0.57 ± 0.59	1.23 ± 0.65	1.26 ± 0.66	1.25 ± 0.66	1.28 ± 0.65	1.32 ± 0.64	1.32 ± 0.64	1.32 ± 0.64

Statistically significant difference at each group from the initial examination (p<0.05 by two - way analysis of variance).

가 2 12 가 (Table 3).

(4) 1.23mm, 가 1.22mm, 1.37mm 가 12
5.60mm 8 4.13mm 1.48mm (p<0.05), 가 12
, 5.24mm 8
4.08mm 1.16mm (Table
5.62mm 8 6).
4.34mm 1.28mm .
12 2.
12
가 0
(p<0.05), 가
4, 8, 12 가
(p<0.05) (Table 4, Table 5, Figure 4 가
1). (p< 0.05).
(5) 8 12
0.57mm, 0.55mm, (p<0.05)
0.74mm ,

Table 7. Percent of mean distribution of subgingival bacteria(mean%±S.D.)

organisms	week group	initial exam.	0	4	8	12
cocci+ rods	saline	54.50 ± 5.40	66.20 ± 4.50	67.37 ± 5.40	63.12 ± 4.25	62.55 ± 3.51
	chlorhexidine	53.68 ± 4.52	66.56 ± 5.04	70.43 ± 4.93	68.12 ± 3.77	69.04 ± 2.81
	minocycline	52.22 ± 4.55	68.55 ± 5.03	77.76 ± 4.31	75.47 ± 4.22	76.93 ± 3.77
fusiforms + filaments	saline	10.79 ± 3.74	11.13 ± 3.72	13.31 ± 3.55	14.33 ± 2.06	14.55 ± 1.97
	chlorhexidine	11.46 ± 3.29	10.22 ± 3.50	12.61 ± 2.81	13.93 ± 1.81	13.54 ± 1.88
	minocycline	11.52 ± 3.26	10.62 ± 4.11	11.75 ± 3.68	13.96 ± 2.27	13.98 ± 3.01
spirochetes	saline	20.98 ± 2.42	16.47 ± 3.72	12.89 ± 3.52	13.26 ± 1.89	12.54 ± 1.41
	chlorhexidine	20.93 ± 3.02	14.67 ± 3.72	11.31 ± 4.03	9.95 ± 2.52*	6.96 ± 1.45*
	minocycline	21.58 ± 3.11	14.55 ± 4.34	7.27 ± 2.77**	6.68 ± 2.88**	4.96 ± 1.34**
motile rods	saline	13.73 ± 3.15	6.19 ± 2.45	6.43 ± 2.49	9.29 ± 2.62	10.37 ± 2.03
	chlorhexidine	13.94 ± 2.83	6.54 ± 2.55	5.63 ± 2.22	8.01 ± 2.17	10.46 ± 2.03
	minocycline	14.69 ± 2.61	6.28 ± 2.72	3.22 ± 1.10**	3.89 ± 1.55**	4.13 ± 1.02**

*: Statistically significant difference at the saline group(p<0.05 by two - way analysis of variance)

+: Statistically significant difference at the chlorhexidine group(p<0.05 by two - way analysis of variance)

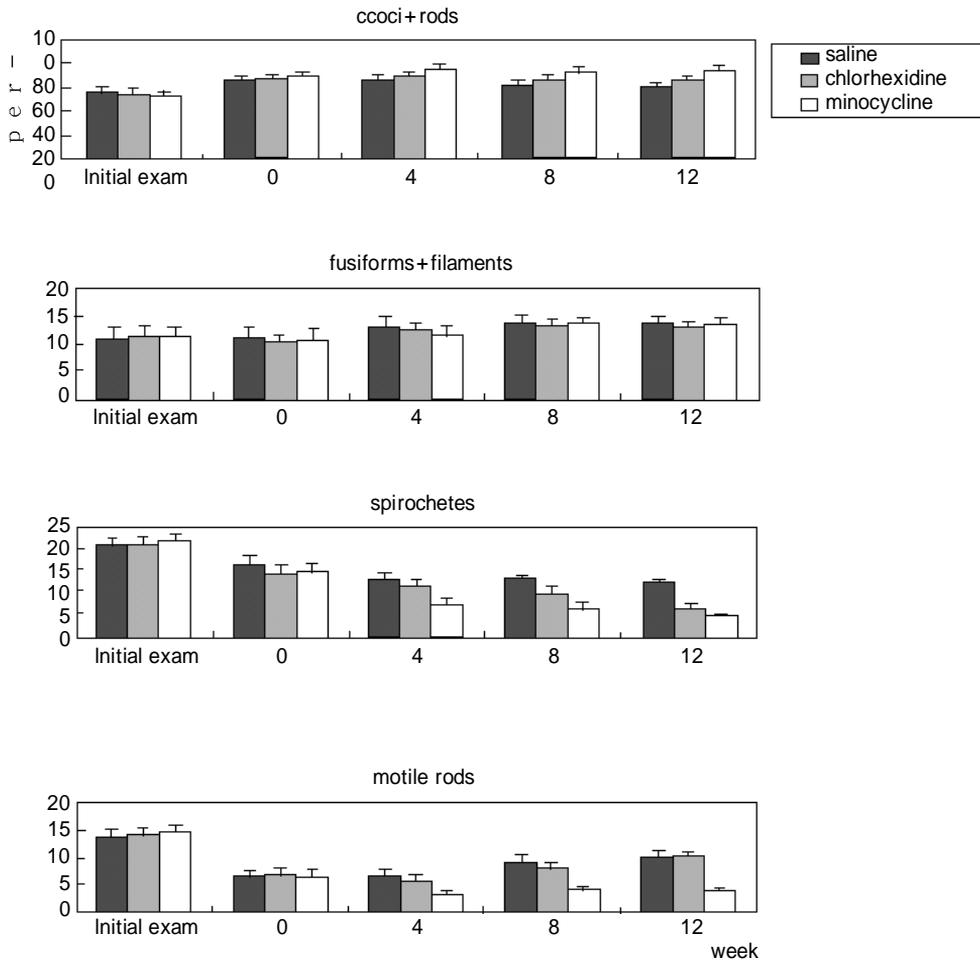


Figure 2. Schematic illustration of % variation of cocci+rods, fusiforms+filaments, spirochetes and motile rods between each group at the various time intervals

(Table 7, Figure 2).

IV.

가

nucleatum, Actinobacillus actinomycetem -
comitans Capnocytophaga species

가 . 가
3 6
가 가
가 1,28). Magnusson
(1984)⁴²⁾

, Lavancy (1987)⁴³⁾

가
29,44 - 46).

가

가

tetracycline
29). O'Conner
(1990)¹³⁾ minocycline
(minimum inhibitory concentration) 0.03
32µg/Ml (minimum bac -
tericidal concentration) 0.5 32µg/Ml
, 32µg/Ml

minocycline
가 2% gel
minocycline
가 .

가

minocycline 가

Minocycline 27).
tetracycline

가
가 가
tetracycline

nase collage -
13).

(1994)⁵²⁾ minocycline

minocycline tetra - 가

cycline

9,27).

Bacteroides species, Fusobacterium.

가

Chlorhexidine

chlorhexidine digluconate cationic bis-guanide가 . chlorhexidine
 mucopolysaccharide hydroxyapatite
 G(-) 가 12 8 가 .
⁴⁷. Wennström (1987)^{33,37} Southard chlorhexidine 가
 (1989)⁴⁸ 0.2% chlorhexidine 가
 Porphyromonas gingivalis black-pigmented bacteroides
 Newman(1983)⁴⁹ 0.2% chlorhexidine Khoo 가
 minocycline gel 가
 가 가 2 가
 20 21%, 52 54% 13 14% minocycline metronidazole, tetracycline
 가 , 25% metronidazole gel 8 128µg/
 66 68% 가 MØ black pigmented G(-
 14 16% 6%)rods ³⁴.
 . 2% minocycline gel 가 24
 4 7% 3% , 9).
 12 가 tetracycline
 8 가 Goodson (1985)⁵⁰ 25% tetracycline
 monolithic fiber
 가 4
 가 가

²⁰⁾,
 가 가 ²¹⁾. Eckles
 (1990)⁵¹⁾ 40% tetracycline ointment minocycline gel
 , 35% tetracycline gel minocycline gel
 4
 12
¹¹⁾,
 van chlorhexidine
 8 가 가
 Steenberghe (1993)²⁴⁾ 2% minocycline minocycline gel
 가
 가 7mm
 가 Braatz 가 가
 (1985)⁵³⁾ 0.2% chlorhexidine 25,32,56 - 57), 23 -
 가 3
 (1994)⁵⁴⁾ 0.1% chlorhexidine 2
 . Christersson minocycline gel
 (1993)⁵⁵⁾ 10% tetracycline 가
 . chlorhexidine
 12 가
 minocycline gel
 8
 가 12 가
 chlorhexidine 가

V.

5 8mm

가

(p<0.05), chlorhexidine

2

가

32

가

(

가

4.

minocycline gel

4

가

(p<0.05),

가

0.1% chlorhexidine

12

. 0, 4, 8, 12

1.

5mm

, minocycline gel

가

가

가

가

가

8

2. chlorhexidine

VI.

가

가

8

12

(p< 0.05),

가

3. minocycline gel

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- Abstract -

Effects of Controlled - Release Local Delivery Drugs on the Treatment of Adult Periodontitis

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The present study was performed to assess and compare the clinical and microbiological effects following local application of 2% minocycline gel or 0.1% chlorhexidine subgingival irrigation to augment scaling and root planing in patients with moderate to advanced chronic adult periodontitis. 32 healthy patients with moderate to advanced chronic adult periodontitis were enrolled in the study. In each patient, the quadrants that had 2 or more teeth with 5 - 8mm probing pocket depth and radiographic evidence of alveolar bone loss were selected and divided into test side and control side according to the split - mouth design.

All patients received standardized oral hygiene instructions at the beginning of the study and all remaining teeth received scaling and root planing until 0 week. The 2% minocycline gel was applied to periodontal pocket at 0, 1, 2, 3 week in the test side. The 0.1% chlorhexidine solution and the normal saline were irrigated subgingivally for about 30 seconds in the positive

control side and negative control side respectively. The clinical and microbiological analysis carried out at 0, 4, 8, and 12 weeks.

gingival irrigation.

The results of this study were as follows;

1. In saline irrigation group, there was no adjunctive effects in probing pocket depth reduction, sulcular bleeding index and no significant changes in relative proportions of subgingival bacteria.
2. The chlorhexidine irrigation as an adjunct to scaling and root planing results in reduction in the plaque index and sulcular bleeding index, but there was not statistically significant. The relative proportion of spirochetes was significantly reduced, but the proportion of motile rods was no significant reduction.
3. The minocycline gel delivered subgingivally as an adjunct to scaling and root planing provide significant benefit in reducing probing depths and sulcular bleeding index compared to saline and chlorhexidine irrigation groups.
4. The relative proportions of spirochetes and motile rods were significantly reduced and the proportions of cocci and non - motile bacteria were correspondingly increased in the minocycline gel group.

In conclusion, minocycline gel delivered subgingivally as an adjunct to scaling and root planing induces clinical and microbial responses more favorable for periodontal health than saline and chlorhexidine sub -