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I. , 가가 가

가 7).

1). Fleszar (1980)²⁾ 가
가 가 가

, Ericsson (1984)³⁾, Nyman
(1976)⁴⁾ 가

가 8).
100 pound 가

Perrier (1982)⁵⁾
가

, 500 pound

가 . ,
가 가 가 9).

가 10)

. , 11 - 13)
가 , 2,14,15)

가 가 , 6). 9), 16 - 18),
19 - 22),
23,24)

가 가
가 . ,

가 ,

Yankell(1988)²⁵⁾

^{31),}

가

, Schulte(1992)²⁶⁾

^{32).}

가

가

가

가

가

가

가

가

가

가

가

가

Periotest

tapping head가

가

Periotest (Periotest
value: PTV) Schulte (1988, 1992)^{6,27)}

가 . Persson(1980)<sup>33),
Kerry (1982)<sup>34), Ferris (1966)<sup>14), Kegel
(1979)³⁵⁾</sup></sup></sup>

tapping head

, Persson(1981)<sup>12,36),
Kerry (1982)^{34), Galler (1979)³⁷⁾}</sup>

Steenberghe (1995)²⁸⁾

가

^{38 - 40).}

가

가

PTV

가,

가

Periotest

²⁹⁾

가

^{30).}

II.

1.

Y 3mm 1 1
 , 11) 287 21 (10 , 4 - 6mm 2 2
 , 34 - 62 (47.38 ± 7.22 , 7mm 3 3
) . (Table 1).
 , 12 ,
 ,
 (parafunction) . , ,
 (3) , , ,
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 , 가 .
 , , , 4 , 1 , 2
 , 3 , 4 , 8 , 12
 , 4 , 8 , 12
 , , ,
 가 20 (11 , 9 , , ,
 25.50 ± 2.21) 320 (Figure 1).
 1). 가 (Table 2).
 2.
 (1)
 (2)

가 1 - Periotest (Siemens AG, Bensheim,

Table 1. Examined teeth according to initial probing depth and location

		Mx		Mn		Total
		PM	M	PM	M	
Control	group 1	7	4	16	2	29
	group 2	30	16	20	27	93
	group 3	4	7	2	4	17
Experimental	group 1	5	2	8	1	16
	group 2	25	14	30	22	91
	group 3	10	17	2	12	41
		141		146		287

Mx: Maxilla, Mn: Mandible, PM: Premolar, M: Molar

Table 2. Pretreatment clinical parameters

Cinical parameters		group 1	group 2	group 3
		Mean ± SD	Mean ± SD	Mean ± SD
Mobility(PTV)	cont.	6.76 ± 4.19	13.29 ± 9.38	20.88 ± 10.31
	expt.	9.31 ± 5.24	12.27 ± 7.10	18.85 ± 8.82
Probing depth(mm)	cont.	2.97 ± 0.19	5.00 ± 0.81	7.71 ± 1.26
	expt.	2.94 ± 0.25	5.15 ± 0.76	7.80 ± 1.27
Attachment loss(mm)	cont.	3.90 ± 1.26	5.83 ± 1.52	9.35 ± 1.87
	expt.	4.13 ± 1.02	5.93 ± 1.37	8.80 ± 1.55
Radiographic bone loss(%)	cont.	54.19 ± 14.19	28.36 ± 8.57	37.01 ± 13.06
	expt.	31.72 ± 10.88	38.07 ± 11.19	56.76 ± 17.20
Bleeding on probing	cont.	0.27 ± 0.23	0.59 ± 0.27	0.64 ± 0.29
	expt.	0.35 ± 0.32	0.62 ± 0.28	0.73 ± 0.25

	baseline	4days	1wk	2wks	3wks	4wks	8wks	12wks
Mobility(PTV)	*	*	*	*	*	*	*	*
Probing depth	*					*	*	*
Attachment loss	*					*	*	*
Radiographic bone loss	*							
Bleeding on probing	*					*	*	*

Figure 1. Study design

Germany)

tapping head가

1 - 2mm

2

가

hi(intra - alveolar root length)

2

ht(total root length)

Marquis

color - coded

1mm

6

0/1

30

6

(BL: bone loss) Schulte (1992)²⁶⁾

BL = (1 - hi / ht) 100%

3.

Table 3. PTVs in healthy group

	Tooth	N	Right	Left
			Mean ± SD	Mean ± SD
Maxilla	1st premolar	20	3.21 ± 2.84	3.05 ± 2.66
	2st premolar	20	3.30 ± 3.18	5.50 ± 3.41
	1st molar	20	2.60 ± 3.22	1.55 ± 3.41
	2nd molar	20	4.30 ± 4.61	4.05 ± 3.79
Mandible	1st premolar	20	0.16 ± 2.77	- 0.79 ± 2.44
	2nd premolar	20	0.95 ± 2.78	0.35 ± 2.46
	1st molar	20	0.55 ± 2.95	0.15 ± 2.56
	2nd molar	20	2.10 ± 3.61	2.80 ± 3.67

N : number of teeth

4, 8, 12
 가
 4, 1, 2, 2 가 (Table
 3, 4, 8, 12 3).
 SAS program Paired t - test
 t - test , 1 , 2
 , 3
 Analysis of variance(ANOVA) 가
 , 4, 8, 12
 III. 가
 가
 1. (Table 4).
 가 20 3.

Table 4. Results of correlation analysis at each visit

Clinical parameters	baseline (op.day)	postop. 4wks	postop. 8wks	postop. 12wks
	r	r	r	r
Probing depth(mm)	0.4117	0.3416	0.3556	0.3852
Attachment loss(mm)	0.4718	0.5078	0.4784	0.4761
Radiographic bone loss(%)	0.5325			
Bleeding on probing	0.3326	0.0003	0.1096	0.2835

r: correlation coefficient

Table 5. Mean PTVs at each visit

		baseline	4days	7day	7days	7days	14days	28days	12weeks
	N	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
cont. 1	29	6.78 ± 4.29	6.31 ± 3.92 [†]	6.28 ± 3.74 [†]	6.31 ± 3.42 [†]	6.53 ± 3.51 [†]	6.53 ± 3.44 [†]	6.61 ± 3.66	6.66 ± 3.65
cont. 1	16	6.70 ± 3.29	11.50 ± 7.37	12.20 ± 7.73	11.66 ± 6.19	12.00 ± 6.80	12.00 ± 6.08	12.29 ± 6.40	12.19 ± 5.70
cont. 2	53	13.25 ± 9.59	12.76 ± 8.33 [†]	12.44 ± 7.92 [†]	12.90 ± 7.58 [†]	13.10 ± 7.93 [†]	13.26 ± 7.69 [†]	13.30 ± 8.05 [†]	13.24 ± 7.86 [†]
cont. 2	31	12.25 ± 7.18	16.23 ± 8.69 [†]	16.08 ± 9.03 [†]	15.59 ± 8.29 [†]	15.24 ± 7.39	12.27 ± 6.97	11.52 ± 6.72 [†]	11.97 ± 6.26 [†]
cont. 3	17	16.38 ± 11.21	19.31 ± 10.71 [†]	17.82 ± 10.22 [†]	17.66 ± 9.99 [†]	17.87 ± 10.2 [†]	17.66 ± 11.53 [†]	17.26 ± 10.43 [†]	17.34 ± 11.42 [†]
cont. 3	11	18.00 ± 8.62	25.01 ± 10.29 [†]	20.67 ± 11.13 [†]	23.88 ± 9.76 [†]	20.26 ± 11.43 [†]	19.91 ± 9.78	17.15 ± 8.29 [†]	16.07 ± 7.55 [†]

N: number of teeth

[†]: significantly different from baseline ($p < 0.01$)

[‡]: significantly different between control and experimental group ($p < 0.01$)

Table 6. Mean changes of PTVs in each interval

		9days	1week	7days	7days	14days	28days	12weeks
	N	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
cont. 1	29	-0.45 ± 1.84	-0.49 ± 1.82	-0.50 ± 1.81	-0.21 ± 1.17	0.00 ± 1.00	0.41 ± 2.00	-0.16 ± 1.84
cont. 2	91	-0.17 ± 1.29	-0.62 ± 1.27	-0.61 ± 1.26	0.20 ± 1.05	0.18 ± 1.01	-0.42 ± 1.21	-0.19 ± 1.21
cont. 3	17	-0.47 ± 1.30	-1.59 ± 1.58	-0.74 ± 1.21	0.24 ± 1.04	0.78 ± 2.77	0.71 ± 2.69	-0.10 ± 1.25
cont. 1	16	2.19 ± 1.90 [†]	0.83 ± 1.94	-1.35 ± 2.21 [†]	1.06 ± 2.02 [†]	0.81 ± 1.97	-0.88 ± 1.89	-0.10 ± 1.29
cont. 2	31	3.99 ± 3.01 [†]	1.83 ± 1.83	0.19 ± 1.88	1.93 ± 1.23	-0.32 ± 1.02	-0.62 ± 1.28	-0.50 ± 1.48
cont. 3	11	6.35 ± 2.61	2.81 ± 3.51	-3.13 ± 3.55	-0.28 ± 2.50	-1.60 ± 2.38	-1.73 ± 2.81	-1.47 ± 2.55

[†]: significantly different between group 1 and group 2 ($p < 0.01$)

[‡]: significantly different between group 2 and group 3 ($p < 0.01$)

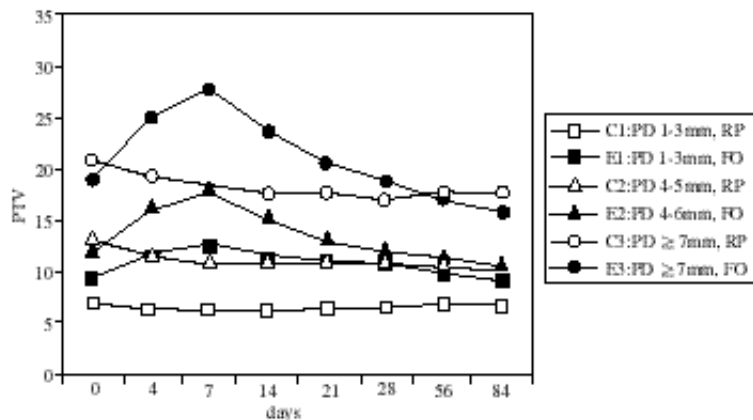


Figure 2. Changes of PTVs

(C: Control group, E: Experimental group RP: Root planing, FO: Flap operation, PD: Probing depth)

가 (Table 5, Figure 2). 2 4 , , 12 1 1 가 (p<0.01). 1 1 1 가 가 (p<0.01), 1, 2 1, 2 4 , 1 가 가 (Table (p<0.01), 1 가가 . 3 5, Figure 2). 2 3 가 (p<0.01) 1 가 (p<0.01). 1 4 4 1

Table 7. Mean PTVs at each visit in the upper teeth

	Baseline	4days	7days	2weeks	3weeks	4weeks	5weeks	6weeks
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
cont. 1	11 2.26 ± 4.28	7.91 ± 3.65	6.27 ± 3.55 [†]	5.30 ± 3.70	6.55 ± 4.51 [†]	6.50 ± 3.96	5.55 ± 4.14	8.27 ± 3.93
expl. 1	7 13.28 ± 4.24	14.57 ± 6.48	16.11 ± 5.62	15.25 ± 6.78	15.50 ± 5.71	15.28 ± 5.88	14.23 ± 5.05	13.29 ± 3.96
cont. 2	46 17.31 ± 10.32	14.20 ± 8.99 [†]	14.12 ± 8.53 [†]	14.33 ± 8.60 [†]	11.44 ± 8.72 [†]	14.31 ± 10.54 [†]	14.65 ± 8.72 [†]	12.58 ± 9.60 [†]
expl. 2	29 16.21 ± 6.40	20.95 ± 7.98 [†]	22.54 ± 8.18 [†]	19.51 ± 7.87 [†]	16.71 ± 7.14	15.75 ± 6.47	14.95 ± 5.77 [†]	14.26 ± 5.70 [†]
cont. 3	11 21.70 ± 10.50	23.21 ± 9.88 [†]	23.04 ± 10.25 [†]	20.55 ± 10.47 [†]	22.10 ± 9.76 [†]	20.82 ± 11.07	21.01 ± 10.16	21.81 ± 10.42 [†]
expl. 3	27 21.44 ± 9.41	27.15 ± 11.22 [†]	26.85 ± 11.70 [†]	23.71 ± 11.02 [†]	22.40 ± 9.93	23.01 ± 9.15	17.54 ± 9.47	17.54 ± 8.34

[†] significantly different from baseline (p<0.05)

[‡] significantly different between control and experimental group (p<0.05)

Table 8. Mean changes of PTVs in each interval in the upper teeth

	4days	7days	2weeks	3weeks	4weeks	5weeks	6weeks
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
cont. 1	11 -1.65 ± 2.31	-1.16 ± 2.16	-0.79 ± 2.20	0.58 ± 1.80	-1.28 ± 1.72	0.10 ± 1.83	-2.27 ± 2.37
cont. 2	46 -2.57 ± 3.62	-3.07 ± 1.67	-0.67 ± 1.70	0.35 ± 2.20	-2.13 ± 3.65	0.48 ± 2.25	-1.63 ± 3.30
cont. 3	11 -1.82 ± 3.39	-1.27 ± 1.13	-0.29 ± 1.14	0.15 ± 0.93	-1.18 ± 3.25	3.09 ± 7.39	-1.60 ± 3.46
expl. 1	7 1.29 ± 6.33	1.37 ± 2.91	-0.34 ± 1.37 [†]	0.74 ± 3.25 [†]	-1.13 ± 1.39	-1.57 ± 1.71	-1.30 ± 1.83
expl. 2	29 1.72 ± 3.25	3.59 ± 3.62	4.25 ± 3.86	-2.56 ± 4.57	-1.00 ± 3.04	2.90 ± 2.21	-0.99 ± 2.71
expl. 3	27 6.57 ± 5.45	2.74 ± 4.98	2.17 ± 3.59	-1.39 ± 3.93	-1.59 ± 1.41	2.17 ± 3.21	0.17 ± 3.33

[†] significantly different between group 1 and group 2 (p<0.05)

[‡] significantly different between group 1 and group 3 (p<0.05)

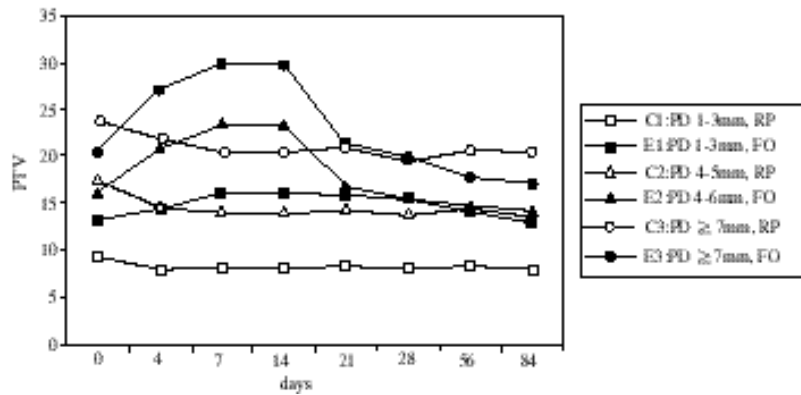


Figure 3. Changes of PTVs in the upper teeth

Table 9. Mean PTVs at each visit in the lower teeth

		baseline	4days	1wk	2wks	3wks	4wks	6wks	8wks
	N	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
cont. 1	18	5.17 ± 3.40	5.35 ± 3.14	5.59 ± 3.15	5.66 ± 2.71	5.28 ± 3.33	5.33 ± 3.39	5.91 ± 2.93	5.67 ± 3.71
expt. 1	9	6.52 ± 3.16	9.11 ± 7.94	8.33 ± 7.53	7.73 ± 6.16	7.12 ± 4.21	7.22 ± 4.41	5.86 ± 3.46	6.07 ± 3.36
cont. 2	47	8.17 ± 6.39	8.34 ± 6.37 ¹	7.77 ± 6.76 ¹	7.78 ± 6.49 ¹	7.83 ± 6.41 ¹	8.34 ± 5.74	7.91 ± 6.67	7.57 ± 6.64 ¹
expt. 2	52	9.51 ± 6.05	12.69 ± 6.05 ¹	13.08 ± 7.21 ¹	12.10 ± 7.28 ¹	10.62 ± 6.46 ¹	9.65 ± 5.31	9.02 ± 5.30	8.52 ± 3.38 ¹
cont. 3	9	13.67 ± 6.39	14.53 ± 11.00	13.67 ± 8.96	12.47 ± 8.04	12.60 ± 8.05	12.10 ± 8.05 ¹	12.03 ± 6.72 ¹	12.39 ± 8.73 ¹
expt. 3	14	15.70 ± 7.06	20.46 ± 9.07 ¹	20.06 ± 10.12 ¹	21.20 ± 9.15 ¹	18.67 ± 8.79 ¹	15.49 ± 7.25	15.29 ± 7.72	13.71 ± 6.47 ¹

¹: significantly different from baseline ($p < 0.05$)

²: significantly different between central and experimental group ($p < 0.05$)

Table 10. Mean changes of PTVs in each interval in the lower teeth

		4days	1wk	2wks	3wks	4wks	6wks	8wks
	N	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
cont. 1	38	0.17 ± 3.25	-0.28 ± 3.75 ¹	0.01 ± 1.14	0.22 ± 1.36	0.31 ± 1.68	0.58 ± 2.18	-0.25 ± 3.18
cont. 2	47	-0.03 ± 3.55	-0.57 ± 1.75	-0.02 ± 1.93	0.06 ± 1.28	0.05 ± 1.97	-0.07 ± 3.05	0.51 ± 2.02
cont. 3	6	-0.83 ± 1.61	-2.17 ± 2.14	0.20 ± 2.25	-0.17 ± 1.17	0.66 ± 1.41	0.06 ± 1.26	0.36 ± 1.06
expt. 1	9	2.89 ± 1.88	0.72 ± 1.33 ¹	-1.76 ± 2.79	0.63 ± 3.13	0.31 ± 1.57	-2.73 ± 3.06	-0.69 ± 2.29
expt. 2	52	3.56 ± 1.88	0.23 ± 1.29	-1.20 ± 2.20	-0.48 ± 2.67	-0.94 ± 1.78	-0.65 ± 2.09	-0.61 ± 1.25
expt. 3	14	0.31 ± 1.09	4.89 ± 2.53 ¹	-2.67 ± 2.38	-1.71 ± 1.11	0.39 ± 2.07	-1.21 ± 2.26	-1.88 ± 1.79

¹: significantly different between group 1 and group 3 ($p < 0.05$)

²: significantly different between group 2 and group 3 ($p < 0.05$)

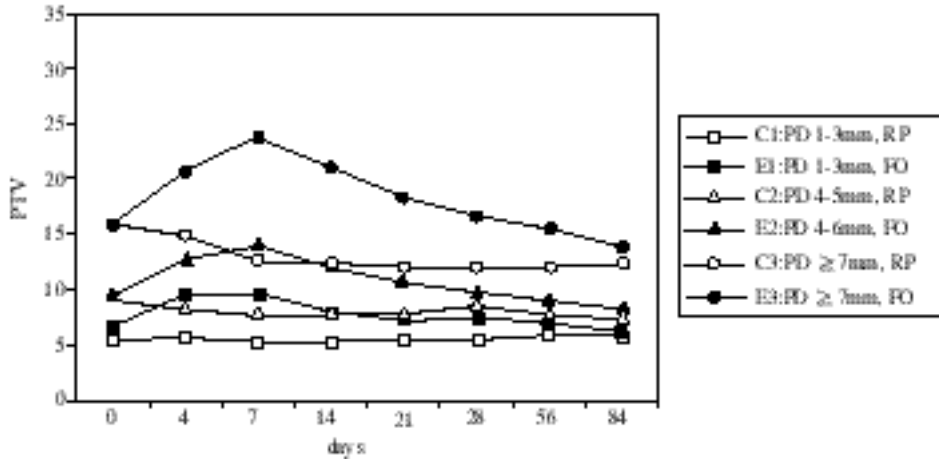


Figure 4. Changes of PTVs in the lower teeth

가 (p<0.01). (p<0.01)(Table 6).

12

가 (Table 5, Figure 2). 4.

가

가

가

1 ,

4 2 , 3

Figure 3, 4).

가 ,
(Table 7, 9,

Table 11. Mean PTVs at each visit in premolars

		baseline	4days	7day	14day	21day	28day	56day	84day
	N	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
cont. 1	45	6.91 ± 0.42	9.85 ± 3.55	8.52 ± 3.27	8.43 ± 3.20	9.32 ± 3.15	8.27 ± 3.38	8.25 ± 3.42	8.33 ± 3.52
expt. 1	51	9.18 ± 3.84	18.36 ± 7.09	11.08 ± 8.07	10.25 ± 8.06	9.86 ± 8.87	13.09 ± 6.23	9.19 ± 6.47	9.89 ± 6.40
cont. 2	58	14.18 ± 9.74	13.75 ± 8.02*	21.82 ± 8.47*	15.90 ± 8.30*	13.22 ± 6.97*	12.14 ± 8.27*	22.86 ± 8.30*	11.94 ± 6.97*
expt. 2	55	12.56 ± 6.95	15.91 ± 7.21*	22.46 ± 8.79*	11.69 ± 7.64*	12.73 ± 5.06	18.96 ± 6.57	21.75 ± 6.35	14.18 ± 6.21*
cont. 3	6	27.43 ± 3.07	24.67 ± 7.52	23.67 ± 7.61	23.53 ± 6.06*	25.67 ± 4.28*	25.32 ± 3.71	27.80 ± 2.31	23.80 ± 6.86
expt. 3	12	21.52 ± 8.45	28.51 ± 11.55*	31.73 ± 10.89*	26.58 ± 8.76	23.83 ± 8.57	32.17 ± 3.64	35.43 ± 7.59*	15.78 ± 7.54*

* : significantly different from baseline (p<0.01)

† : significantly different between control and experimental group (p<0.01)

Table 12. Mean changes of PTVs in each interval in premolar

	N	-4days	1week	2weeks	3weeks	4weeks	6weeks	7weeks
		Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
cont. 1	25	-0.22±1.51 ¹	-0.24±1.30	0.15±1.26	1.13±1.57	0.63±1.50	-0.17±1.27	-0.52±1.38
cont. 2	30	-0.70±2.05	-0.30±1.87	0.22±1.76	6.12±3.15	-0.08±1.85	0.29±2.15	-0.64±2.06
cont. 3	6	-0.67±1.97	-1.02±1.81	0.33±1.65	4.35±1.63	-0.23±1.80	0.17±1.80	-0.53±1.28
expt. 1	12	1.25±4.00 ²	0.69±3.51	-0.25±3.45 ¹	4.28±3.32	0.15±1.82	-0.21±1.49	-0.62±1.94
expt. 2	35	3.35±2.79	3.75±1.53	-0.10±1.53	-1.75±2.64	-0.64±1.31	-0.25±1.55	-0.60±1.38
cont. 4	12	6.58±5.42	3.10±4.36	4.30±4.26	-0.67±2.15	-2.67±2.27	-0.75±2.42	-0.80±1.10

¹ significantly different between group 1 and group 2 (p<0.05)

² significantly different between group 3 and group 2 (p<0.05)

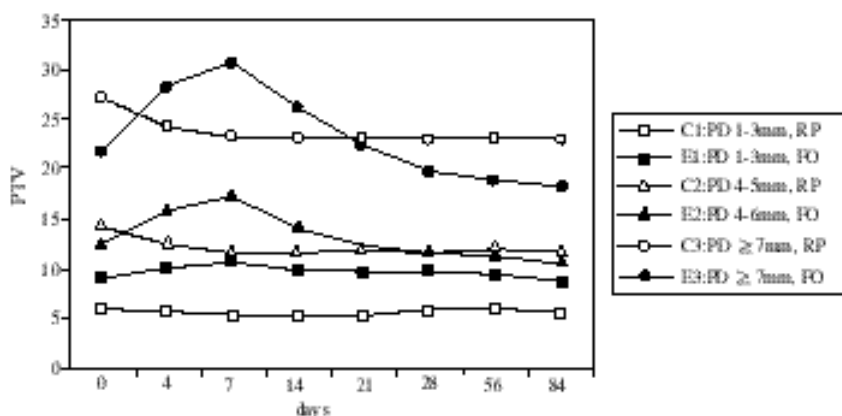


Figure 5. Changes of PTVs in premolars

Table 13. Mean PTVs at each visit in molars

baseline	N	-4days	1wk	2weeks	3wks	4wks	6wks	7weeks
		Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
cont. 1	6	8.57±3.53	8.37±2.93	9.93±4.47	9.67±3.88	10.27±4.07	7.67±3.64	9.17±4.17
expt. 1	1	10.02±0.00	16.73±2.18	17.67±2.85	14.67±5.13	16.00±3.44	15.33±0.58	12.00±2.00
cont. 2	40	11.91±8.71	10.14±7.49 [*]	9.75±7.57 [*]	9.72±7.44 [*]	9.79±7.27 [*]	10.12±8.87	9.93±7.48 [*]
expt. 2	36	11.63±7.73	15.72±8.22 [*]	18.02±9.42 [*]	16.25±9.22 [*]	14.00±1.00 [*]	11.93±7.48	11.37±6.81
cont. 3	51	12.36±10.01	16.02±10.74	14.81±10.65 ¹	14.46±10.28 [*]	14.04±10.24 [*]	13.61±10.53 [*]	14.16±10.77 [*]
expt. 3	49	10.99±5.80	15.33±10.57 [*]	18.21±11.22 [*]	17.29±10.72 [*]	16.46±9.65 [*]	15.43±8.01	16.21±8.22

^{*} significantly different from baseline (p<0.05)

¹ significantly different between control and experimental group (p<0.05)

Table 14. Mean changes of PTVs in each interval in molars

	N	E1		E2		E3		E4		E5	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
cont. 1	6	-5.31	2.68	0.82	2.11*	3.67	2.16	0.70	2.57	-3.53	3.20
cont. 2	45	-5.77	2.73	-1.15	1.69 [†]	0.17	2.38	0.17	2.34	0.49	2.27
cont. 3	13	0.82	2.49	-3.92	1.54	0.18	2.34	0.18	2.58	-1.60	2.22
expt. 1	5	6.43	2.70	1.32	1.26	3.89	1.28	0.79	2.52	0.67	2.80
expt. 2	35	4.60	3.19	2.00	2.67	-2.67	1.24	-0.32	2.30	-1.17	1.96
expt. 3	20	5.97	4.82	2.07	1.31	-3.73	2.90	-0.14	2.65	-1.24	1.94

* : significantly different between group 1 and group 3 (p<0.05)

† : significantly different between group 2 and group 5 (p<0.05)

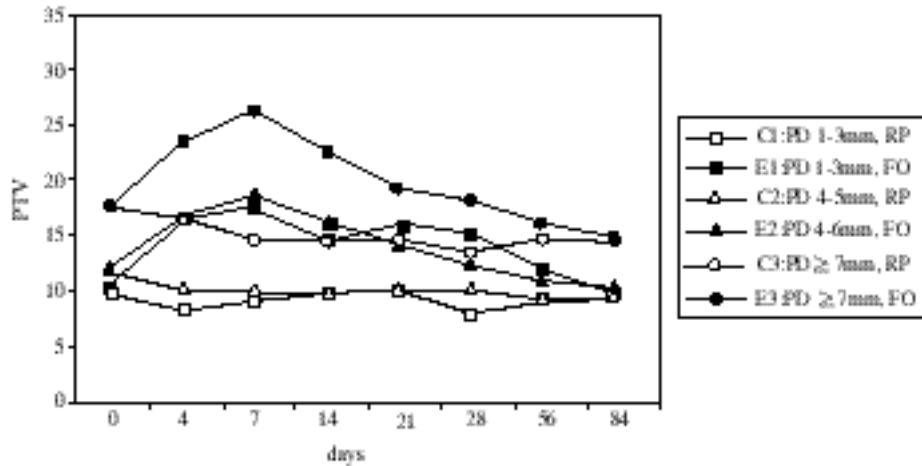


Figure 6. Changes of PTVs in molars

(Table 8, 10).

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가

5.

(Table 12, 14).

IV.

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가

(Table 11, 13, Figure 5, 6),

가

Holographic interferometry, Burstone (1978)⁴⁷⁾ Laser holography, Ryden (1974)⁴⁸⁾ Laser reflection method, Erick (1987)⁴⁹⁾ Stereophotography

가

6,42) .

Periotest

가

6) .

Periotest handpiece tapping head가 4/sec

tapping head 0.2 - 0.3 millisecond

가

Periotest microcomputer가 - 8 ?50 가

6) .

10 - 15

6) ,

Macro - periodontometer Manly ± 1, (1951)⁴³⁾ Vibrometer가 , ± 2 26) . rod 가

Parfitt(1960)⁴⁴⁾ 가 가 가 29) 가 가 ,

, transducer

Zulqar - Nain (1967)⁴⁵⁾ 가

Photogrammetry, Wedendal & Bjelkhagen(1974)⁴⁶⁾ ruby laser system 가 , PTV가

가

, 4, 8, 12

PTV가

PTV

가

가가

가

²⁹⁾, rod

Schulte (1992)⁵⁵⁾

가

^{51,52)},

hemorrhage index

handpiece

⁵²⁾, handpiece

가

⁵²⁾

PTV

, Demirel (1997)⁸⁾

PTV

가

⁵³⁾.

, 가

(1993)⁷⁶⁾

가

Elias

(1993)⁵⁴⁾ modal analysis hammer

Kaneko(1987)⁵⁵⁾ high frequency mechanical vibration

가

, Meredith (1996, 1997)^{56,57)} resonance frequency analysis

Ferris(1966)¹⁴⁾,

(1978)⁵⁹⁾, Kegel

(1979)³⁵⁾,

Persson(1980)³³⁾, Kerry (1982)³⁴⁾,

(1993)³⁹⁾

가

Periotest

4

20

1 가
(p<0.01) 12

PTV

^{26,58)}

PTV가

가

5 - 7

Stahl

. PTV

(1971)⁶⁰⁾

4

, 2

가

Caton (1979,

1

1982)^{61,62)}

²⁶⁾

¹⁰⁾

Ferris(1966)¹⁴⁾

2

가

12

, Kegel (1979)³⁵⁾

5

(r=0.5325)

가 17

(r=0.4718)

(r=0.4117),

(r=0.3326)

가

가 , 10,19,35,37,69,70,72,73),

가 , 가

(1993)³⁹⁾ 1 가 , 가

가 가 가

12,15,34,37,38,57,63,64), 가 가 ,

4 가

(p<0.01) 1 , 가

, 2, 3

4 - 6 , 1

Galler (1979)³⁷⁾ 가

가 가 가

34,37,65), , 12

가 가

66), 가 가

67,68), 가 Rateitschak(1963)¹⁵⁾

(1991)³⁸⁾ 가

가 4mm

14,64,67), , 1 - 3mm

가 2 1 , 74),

가 가 2 41),

12), 가

가 ,

12,70), 가 4

, 12 가

3 - 4 , 71), 6 가

가 , Schulte

(1992)²⁶⁾

가 3
 가
 가 1 1
 (1 - 3mm), 2 2 (4 - 6mm),
 가 3 3 (7mm)
 가 4 , 1 , 2 , 3 , 4 , 8
 , 12 Periotest
 26).

Rateitschak(1963)¹⁵⁾ 36 , , 4 ,
 (1978)⁵⁹⁾ 24 8 , 12 ,
 가
 12
 가 (p<0.01).
 12 1. 가 1 - 3mm

. Kerry (1982)³⁴⁾
 1 2
 , Rateitschak(1963)¹⁵⁾
 2 3 2. 가 4 - 6mm,
 7mm 12
 12 가
 (p<0.01),
 가 가 4
 , 12

가 (p<0.01).
 3.
 가 1
 (p<0.01), 12 가
 V. 4. 가

가 , .

5. 가
가 .
6. 가
($r=0.5325$), 12
($r=0.4761$).

가 가 4mm
가 4 가 .
12
가

VI.

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Clinical Evaluation of Tooth Mobility Following Root Planing and Flap Operation

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Tooth mobility may be the decisive factor that determines whether dental treatment of any kind is undertaken. Although tooth mobility in isolation says little in itself, the finding of increased tooth mobility is of both diagnostic and prognostic importance. Only the detection of an increase or decrease in mobility makes an evaluation possible. Thus prior to treatment, we must understand the pathologic process causing the observed the tooth mobility and decide whether the pattern and degree of observed tooth mobility is reversible or irreversible. And then it must be decided whether retention and treatment or extraction and replacement.

The purpose of this study was to compare tooth mobility at different time period during root planing and flap operation and to relate changes in mobility to each treatment method. Twenty - one patients (287 teeth) with chronic adult periodontitis were treated with root planing(control group) and flap operation(experimental group), and each

group was divided 3 subgroups based upon initial probing pocket depth (1 - 3mm, 4 - 6mm, 7mm and more). Tooth mobility was measured with Periotest at the day of operation, 4 days, 1 week, 2 weeks, 3 weeks, 4 weeks, 8 weeks, 12 weeks after each treatment. Tooth mobility, attachment loss, radiographic bone loss, and bleeding on probing were measured at the day of operation, 4 weeks, 8 weeks and 12 weeks after treatment.

1. In group initial probing depth was 1 - 3mm, tooth mobility had no significant difference after root planing and flap operation.
2. In group initial probing depth was 4 - 6mm, 7mm and more, tooth mobility had decreased in 12 weeks after root planing($p<0.01$). And the mobility had increased after flap operation($p<0.01$) and was at peak in 1 week, and decreased at initial level in 4 weeks, below the initial level in 12 weeks($p<0.01$).
3. In 1 week, significant difference in tooth mobility between control and experimental group was found($p<0.01$) but, in 12 weeks no difference between two groups was found.
4. Change of immediate tooth mobility after treatment was more larger in deep pocket than in shallow one. In group with the same probing pocket depth, the change of tooth mobility in molar group was greater than that of premolar group.
5. Tooth mobility before treatment was more strongly correlated with

radiographic bone loss($r=0.5325$) than probing depth, attachment loss and bleeding on probing, in 12 weeks after treatment, was more strongly correlated with attachment loss($r^2=0.4761$) than probing depth and bleeding on probing.

Evaluation of the treatment effect and the prognosis after root planing and flap operation were meaningful on tooth initial probing depth 4mm and more. After flap operation, evaluation of the prognosis should be performed at least in 4 weeks and in 12 weeks after treatment, no difference in tooth mobility between two groups was observed. Radiographic bone loss and attachment loss were good clinical indicators to evaluate tooth mobility.