

. . .

I.

, ,  
가

가

가

<sup>1-3</sup>). Ramfjord (1973)<sup>4)</sup>

가

<sup>13)</sup>.

가

O'Leary

(1983)<sup>5)</sup>

가

가

<sup>11,12,14,15)</sup>.

Lasho (1983)<sup>6)</sup>

Bergenholtz (1998)<sup>16)</sup>

가

10

가

가

40

가

가

Polson (1984)<sup>7)</sup>, Hanes

. Bloml f

(1991)<sup>8)</sup>

Terranova

(1996,1997)<sup>11,12)</sup> 20

(1986)<sup>9)</sup>, Wikesj (1986)<sup>10)</sup>

, Bloml f (1996,1997)<sup>11,12)</sup>

3

ethylenediaminetetraacetic

가

acid(EDTA)

I

Trombelli (1994)<sup>17)</sup>

가

가 II.

. Wikesj (1988)<sup>18)</sup> 1.

fibronectin 가 가

, Wiekjesj 20

Terranova(1986)<sup>19)</sup> 3

laminin .

. Al - Ali (1989)<sup>20)</sup>, Bjorvatin 2

(1985)<sup>21)</sup> .

ph calcium ( , )

chelator 20mg/ml, 50mg/ml, 100mg/ml

22).

2.

가

가

11,12,14,15). 1 - 2 Gracey curette

5

30

20 , 3 , 5

9

36

4

30

3

Table 1. Experimental group design

Group 1	Root conditioning with saline for 3 min
Group 2	Root conditioning with 20mg/ml TC - HCL for 20 sec
Group 3	Root conditioning with 20mg/ml TC - HCL for 3 min
Group 4	Root conditioning with 20mg/ml TC - HCL for 5 min
Group 5	Root conditioning with 50mg/ml TC - HCL for 20 sec
Group 6	Root conditioning with 50mg/ml TC - HCL for 3 min
Group 7	Root conditioning with 50mg/ml TC - HCL for 5 min
Group 8	Root conditioning with 100mg/ml TC - HCL for 20 sec
Group 9	Root conditioning with 100mg/ml TC - HCL for 3 min
Group 10	Root conditioning with 100mg/ml TC - HCL for 5 min

Table 2. Effects of saline and TC - HCL solution of various concentrations and etching time on root surfaces

Group 1	+++++	-	-	DT
Group 2	++++	-	-	DT
Group 3	+++	++	+	S
Group 4	++	+++	+	S
Group 5	++++	+	-	DT
Group 6	+++	+++	+	LF
Group 7	++	+++	+	S
Group 8	+++	+	-	DT
Group 9	++	+++	+	LF
Group 10	+	+++	+	S

DT: Dentin has a dull texture.  
S: smooth flat surface

(Table 1).  
 1) 20mg/ml  
 20mg/ml  
 30 20  
 air syringe  
 mounting stub ion  
 sputting coater (Eiko, IB - 3, )  
 0.1 Torr 4 gold palla - 20mg/ml  
 dium coating (Model 3  
 S - 2399, Hitachi , ) 20KV (mat - like)  
 3000  
 5  
 III. (Fig. 2 - 4).

1. 2) 50mg/ml  
 50mg/ml  
 20  
 가  
 3  
 (Fig.  
 1). 가 (Fig.  
 11). 12 50mg/ml  
 2. 3 3000

가

(Fig. 12). 5

7),

가

가

(Fig. 5 - 7).

.

3) 100mg/ml

100mg/ml

20

가

가

. 3

5

11,20,21).

(Fig. 8 -

10).

가

48

IV.

가

9,10,19). Minabe (1994)<sup>25)</sup> 10 µg/ml

. Fardal

minocycline 5 µg/ml minocycline 50

Lowenberg(1990)<sup>23)</sup>

µg/ml minocycline

, ,

,

, ,

. Bjorvatin

(1992)<sup>21)</sup> 0.5 - 250 µg/ml

.

가

Aleo (1976)<sup>24)</sup>

.

가

가

Boyko

(1980)<sup>26)</sup>, Froum (1983)<sup>27)</sup>, Crigger (1978)<sup>28)</sup>

Bjorvatin (1985)<sup>21)</sup>, Oles (1985)<sup>29)</sup>, Polson (1984)<sup>7)</sup>, Willey Steinberg(1984)<sup>30)</sup> hair brush

Register Burdick(1973)<sup>31</sup>, Sterrette  
Brain (1987)<sup>32</sup>

. Magnusson (1985)<sup>33</sup> syringe

. Isik (1997)<sup>34</sup>

가

. ph 2.0

ph

가

가

가

11,12,39)

. Labahn (1992)<sup>35</sup>

Dyer Caffesse(1993)<sup>40</sup>

가

가

Aukhil (1983)<sup>41</sup>

. Trombelli (1995)<sup>36</sup>

가

Trombelli (1994)<sup>17</sup>

가

가

4

가

가

Phillipe (1997)<sup>37</sup> 50mg/ml

fibronectin

5

Caffesse(1993)<sup>40</sup>,  
Smith(1987)<sup>42</sup>

. Dyer  
Caffesse  
fibronectin

가

3

가

fibronectin

Nyman (1981)<sup>38</sup>

Franz Polson(1980)<sup>39</sup>

Gamel (1998)<sup>43</sup>

- BB

- I

가

가

가  
V.

Wikesj (1988 )<sup>18)</sup>

fibronectin

가

20

(20mg/ml, 50mg/ml, 100mg/ml)  
(20 , 3 , 5 )

3000

1.

가

air syringe

가

2. 20mg/ml

20  
가

50mg/ml

가

3

가

3. 50mg/ml

20

3

33,44)

100mg/ml

4. 100mg/ml

가

3

가

## VI.

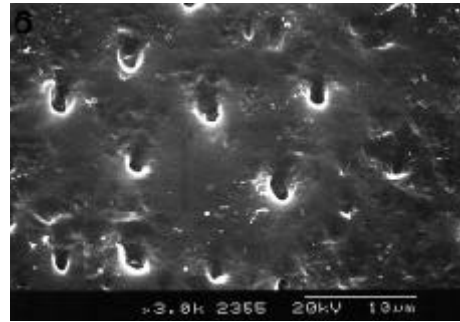
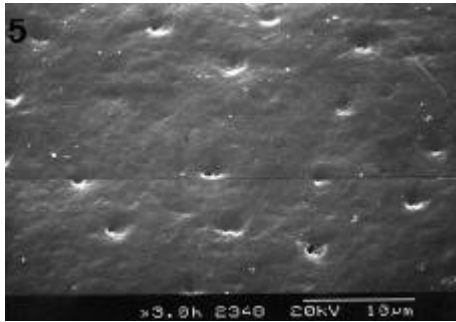
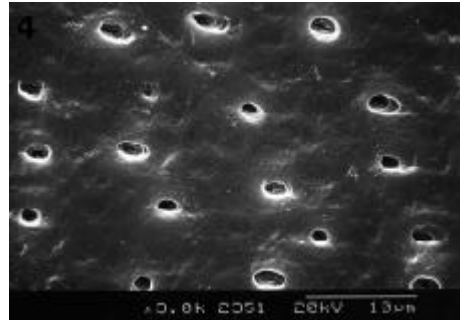
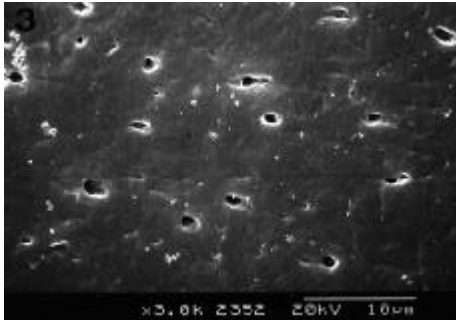
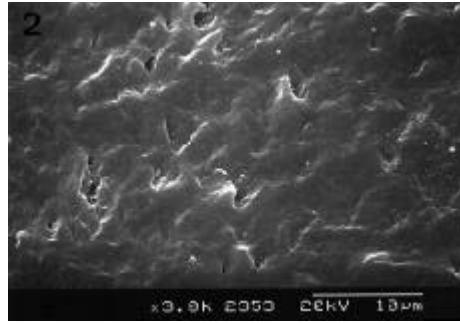
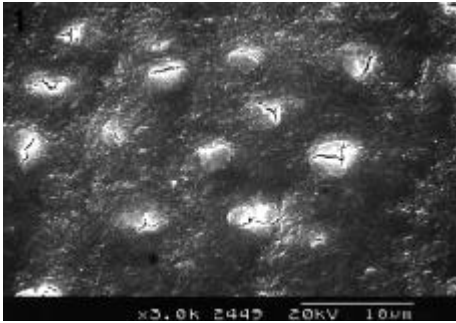
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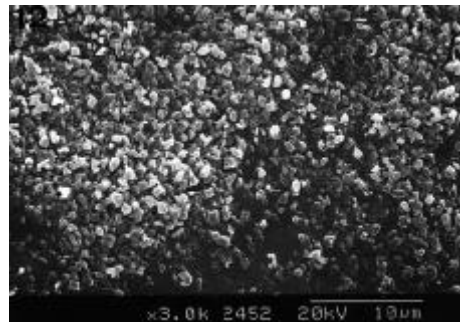
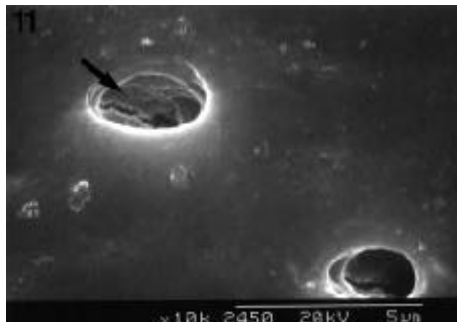
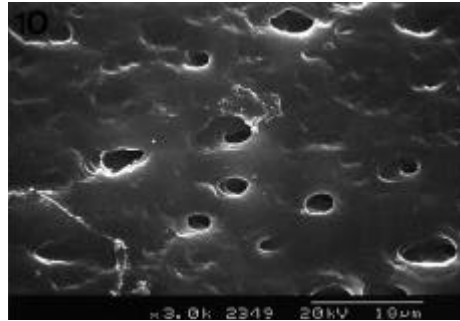
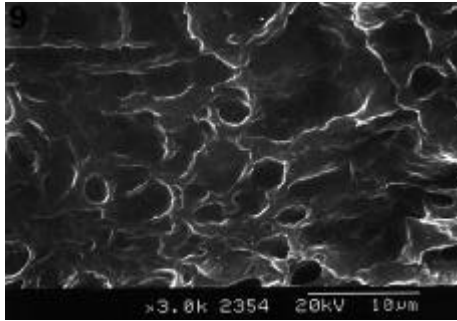
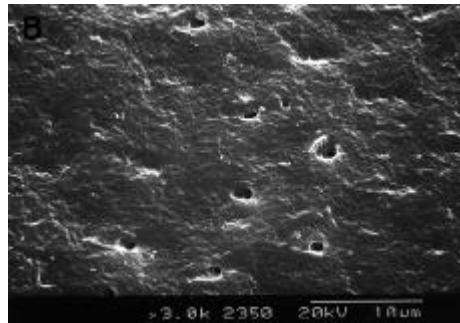
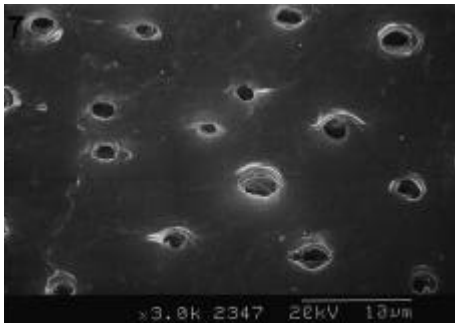


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Figure 1. Saline treated dentin surface for 30 sec(x 3000)

Amorphous smear layer obscured the underlying dentinal tubules.

Figure 2. 20mg/ml tetracycline - HCL treated dentin surface for 20 sec(x 3000)

Surface morphology was irregular and undulating by smear layer.

Figure 3. 20mg/ml tetracycline - HCL treated dentin surface for 3 min(x 3000)

Mat - like surface was evident and parts of the dentinal tubules were open.

Figure 4. 20mg/ml tetracycline - HCL treated dentin surface for 5 min(x 3000)

Widened funnel shaped dentinal tubule orifices were visible.

Figure 5. 50mg/ml tetracycline - HCL treated dentin surface for 20 sec(x 3000)

Parts of dentinal tubules orifice were obscured by the smear layer.

Figure 6. 50mg/ml tetracycline - HCL treated dentin surface for 3 min(x 3000)

Mat - like surface and undulating surface were visible.

Dentinal tubules were opened.

Figure 7. 50mg/ml tetracycline - HCL treated dentin surface for 5 min(x 3000)

Wide funnel shaped dentinal tubules orifice were evident.

Figure 8. 100mg/ml tetracycline - HCL treated dentin surface for 20 sec(x 3000)

Surface morphology was irregular and undulating and parts of the dentinal tubules were opened.

Figure 9. 100mg/ml tetracycline - HCL treated dentin surface for 3 min( x 3000)

Irregular surface by demineral -

ization of the intertubular dentin was evident.

Figure 10. 100mg/ml tetracycline - HCL treated dentin surface for 5 min(x 3000)

Wide opened dentinal tubules were evident.

Figure 11. 50mg/ml tetracycline - HCL treated dentin surface for 3 min(x 10,000)

Collagen fibrils were visible within the dentinal tubule.

Figure 12. 50mg/ml tetracycline - HCL treated dentin surface for 3 min(x 3000)

tetracycline - HCL granules covered the dentin surface due to from incomplete washing.

- Abstract -

## Effect of Tetracycline - HCL in Root Conditioning : A SEM Study

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Department of Periodontology, College of Dentistry, Kyung Hee University

Root conditioning has introduced to dissolve the smear layer and to produce surface demineralization, resulting to exposure of dentin collagen fibril and opening of dentinal tubules. The purpose of the present study was to examine the effect of different concentration and application time of tetracycline - HCL on root conditioning. Total 40 root specimen were prepared from 20 periodontitis - prone human single rooted tooth. The specimen were treated with tetracycline - HCL solution (20mg/ml, 50mg/ml, 100mg/ml) for 20 sec, 3 min, 5 min., and saline for 30 sec. The application method was rubbing method with cotton pellet. Under the scanning electron microscopy (20KV), the extent of smear removal and opening of the dentinal tubules were examined at x 3000.

The following results were obtained.

1. Treatment of root specimen with saline did not remove the smear layer and open the dentinal tubules.
2. Treatment of root specimen with

different concentration of tetracycline - HCL for 20 sec also did not remove the smear layer completely.

3. Treatment of root specimen with different concentration of tetracycline - HCL for 3 min opened the dentinal tubules and removed smear layer.
4. Treatment of root specimen with 50mg/ml of tetracycline - HCL for 3 min showed collagen fibril within the opened dentinal tubules.

In conclusion, the effect of root conditioning with tetracycline - HCL is more dependent on the application time than the application concentration. Root conditioning with 50mg/ml tetracycline - HCL for 3 min is enough for obtaining the periodontal regeneration.