

EDTA가

• • •

I. fibronectin, stannous fluoride
가
Urist(1965)¹²⁾

,
1),
,
Register (1973)¹³⁾ 가

,
pH 1.0 2 - 3
가 가 ¹⁴⁾,
2,3),

15 - 26),
가

,
2 - 4),
22,23,26) 가 가 15,16),

, ethylenediaminetetraacetic acid(EDTA),
5 - 11), (1986)²⁷⁾, Wikesj
가
fibronectin

가 , 47,49 - 54),
 laminin , EDTA
 가
 genase , colla - II.
 , 28 - 1.
 38). Frantz (1987)³⁹⁾ In vitro
 , 5mm , 6
 , Sterrett (1997)⁴⁰⁾
 ,
 20
 EDTA 5N
 Bloml f (1995)^{41,42)} pH ethylenediaminetetraacetic
 acid disodium salt (C₁₀H₁₄N₂O₈Na₂ · 2H₂O)
 가 . 3%, 17%, 24%가
 20
 가
 2.
 EDTA
 41,43 - 45). pH
 EDTA
 가
 1/2 round bur

Table 1. Experimental group design

Group 1	Root conditioning with saline for 3 min.
Group 2	Root conditioning with 3% EDTA for 20 sec.
Group 3	Root conditioning with 3% EDTA for 3 min.
Group 4	Root conditioning with 3% EDTA for 5 min.
Group 5	Root conditioning with 17% EDTA for 20 sec.
Group 6	Root conditioning with 17% EDTA for 3 min.

43,44,46 - 48). EDTA

43 - 46).

EDTA

EDTA

(Figure

2).

2
3

(2) 3% EDTA, 3
20

가 가

.40 10
3

(Figure 3).

(×10,000)

가

(Figure 4).

24% EDTA, 5
3%, 17%, 20, 3
(Table

1). 30

(3) 3% EDTA, 5

가 가

ion sputting coater (Eiko,

가

IB - 3,) 0.1 Torr

가

4

(Model S - 2300, Hitachi ,)

(Figure

20kV polaroid film (Polaroid , UK)

5).

(4) 17% EDTA, 20

III.

1.

3

(Figure 6).

(5) 17% EDTA, 3
20

가

(Figure 1).

2.

가

(1) 3% EDTA, 20

가

(Figure 7).

(6) 17% EDTA, 5

Table 2. Effects of saline and EDTA solution of various concentrations and etching time on root surfaces

	smear layer	exposure of dentinal tubule	the number of opening dentinal tubules	exposure of collagen fiber	surface texture
Group 1	+++++	-	-	-	DT
Group 2	++++	+	+	-	DT
Group 3	+++	++	++	+	LF
Group 4	++	+++	+++	+	S
Group 5	++++	+	++	-	DT
Group 6	+++	+++	+++	+	LF
Group 7	++	+++	+++	+	S
Group 8	+++	+	++	-	DT
Group 9	++	+++	+++	+	DT
Group 10	+	+++	+++	+	S

DT: Dentin has a dull texture
S: Smooth flat surface

가 3 (9) 24% EDTA, 5
(Figure 8). (Figure 12).
(7) 24% EDTA, 20
IV.
가 ,
(Figure 9). 가 18).
(8) 24% EDTA, 3 가 가 가 가 8-11),
가 가 가 가 14,15,33).
20 가 (Figure 10).
(× 10,000) 가 (Figure 가 3,6,14),
11). 가 22,23,26).

가

30

가

fibronectin

가

collage -

nase

27 - 30)

가

가

26)가

. Bergeholtz (1998)⁵¹⁾

39).

Bloml f

(1995)^{41,42)}

가

pH

,

(1998)⁵²⁾

2

가

20

, 3

가

EDTA

가

gel type

EDTA

41 - 45).

가

가

EDTA

43,44), EDTA

가

45).

EDTA

52).

EDTA

가

. Bloml f (1996)⁴⁴⁾

3

EDTA

3%, 17%, 24%

EDTA

20 , 3 , 5

EDTA

3

가

EDTA

Garberoglio (1994)⁵⁰⁾

3%

17%

3%

3

EDTA가

, Bloml f

(1997)⁴⁷⁾ 15 - 24% 가 42,43)

가

, 24% EDTA 42).

EDTA Register (1975)¹⁴⁾

3% EDTA 가 Bouchard (1997)³⁷⁾

가

.20 가

24% EDTA EDTA

. Bloml f (1997)⁴⁷⁾ EDTA 가 EDTA

가 가 3

, 가

, 20 가

3 Sterrett (1997)⁴⁰⁾

Bergenholtz (1998)⁵¹⁾ 10

EDTA

(1998)⁵²⁾

10 - 20mg/ml 가

가 17% EDTA 3 24%

5 EDTA EDTA

가

20 EDTA 가

EDTA

5 EDTA 가

. 3% EDTA 3 가

가 30 - 2

. EDTA 33,37),

가

가

Bloml f (1995)⁴¹⁾ 24%
EDTA 8

1.

Mayfield (1998)⁵³⁾ 24%
EDTA gel 3

2. EDTA

EDTA 3 3%

가 가
3. 20 EDTA

가 ,

가 가 .

4. 3 3% EDTA

EDTA

가

가

가

EDTA가
가

V.

가

VI.

pH

가
EDTA

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5mm , 6
20 ,
3%, 17%, 24% EDTA
20 , 3 , 5

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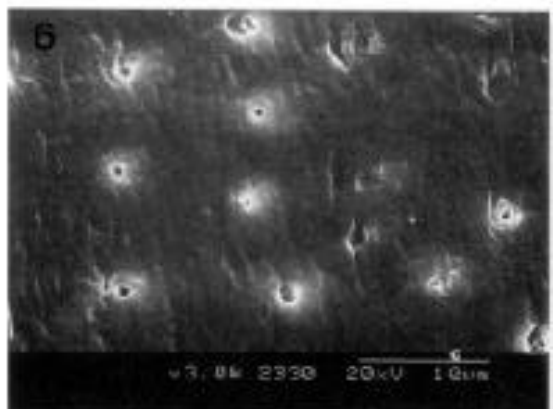
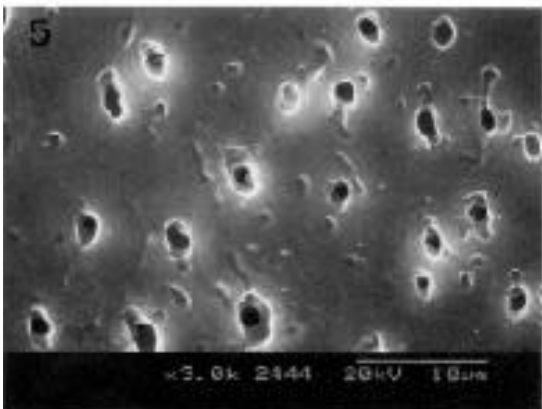
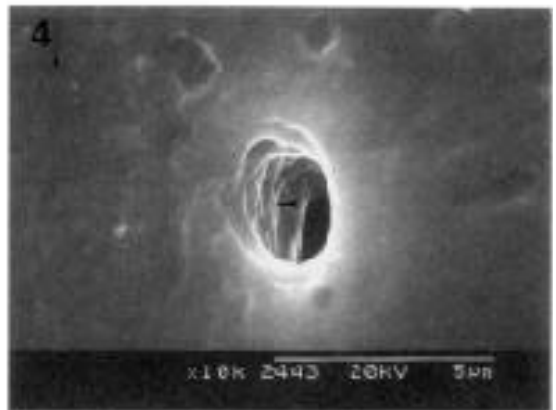
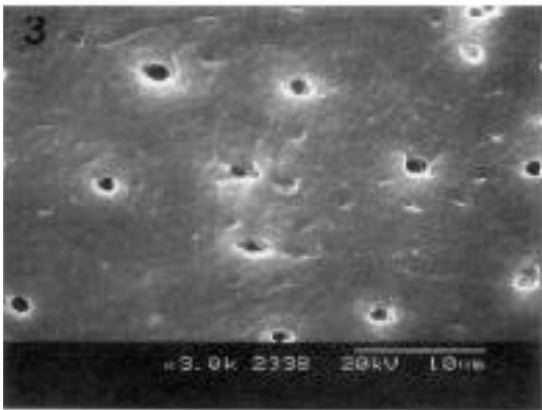
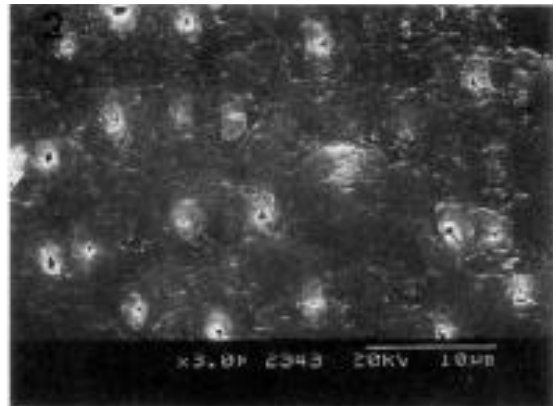
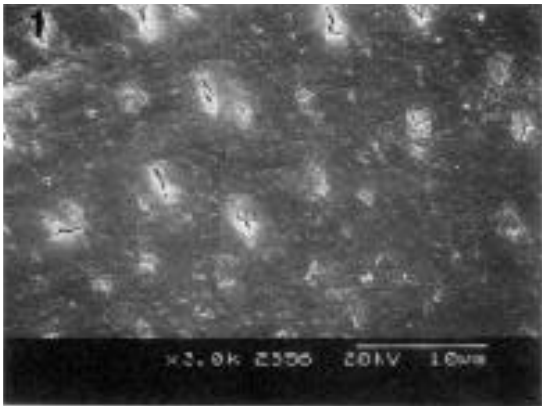
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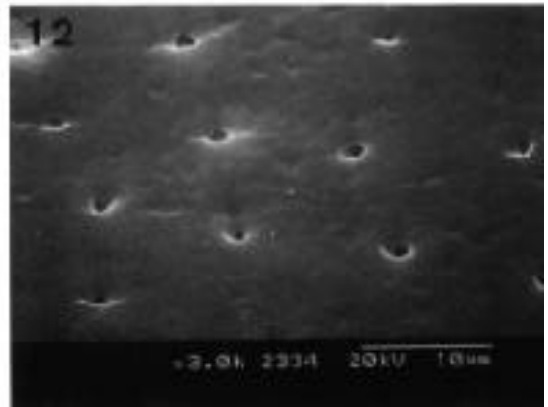
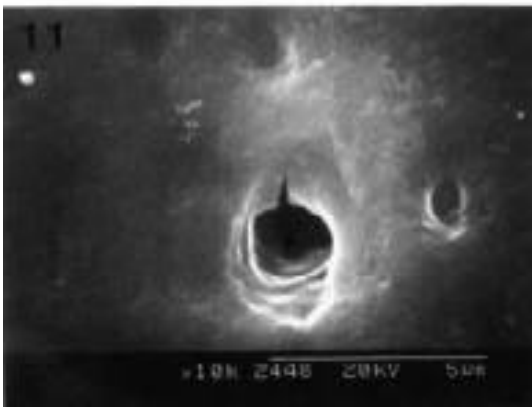
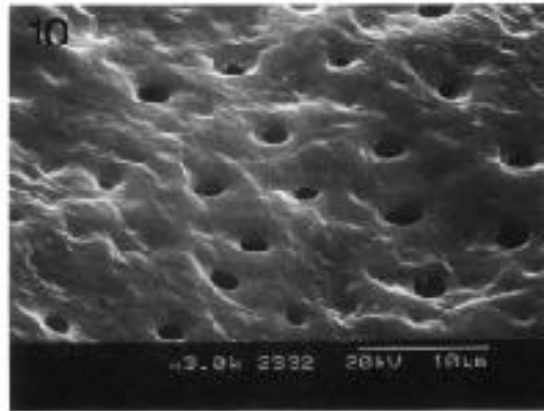
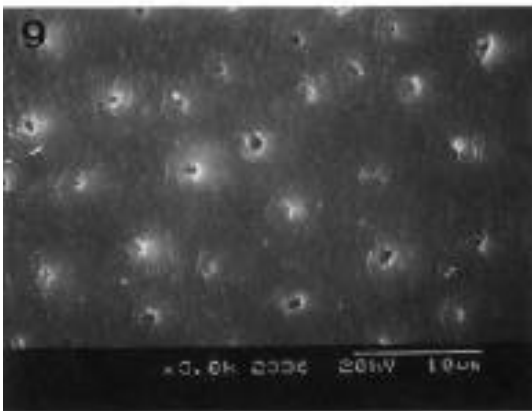
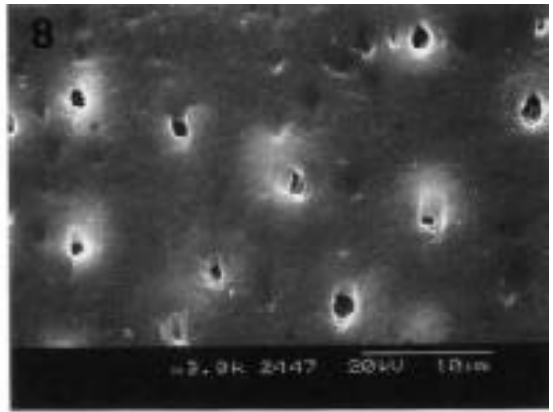
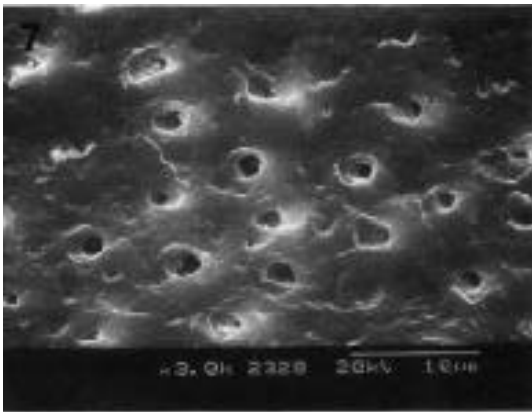
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 52. , , : EDTA

(I)



(II)



- . , 28: 4: 731 - 743, 1998.
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Figure 1. Surface following root planing with curettes and root conditioning with cotton pellets soaked with saline for 3min(× 3,000).

The surface shows an amorphous irregular coating with no evidence of sharpey's fibers and dentinal tubule orifices. The tubule orifices seem to be compressed in the direction of the curette strokes.

Figure 2. Surface following root planing with curettes and root conditioning with 3% EDTA solution for 20sec(× 3,000). A few dentinal tubule orifices are shown. The smear layer has been partly removed.

Figure 3. Surface following root planing with curettes and root conditioning with 3% EDTA solution for 3min(× 3,000). Widened dentinal tubule orifices are shown. The smear layer has been removed.

Figure 4. Higher magnification of Figure 3. which reveals a smear free dentinal tubule and collagen-like fibers covering the circum tubular dentin surface(× 10,000).

Figure 5. Surface following root planing with curettes and root conditioning with 3% EDTA solution for 5min(× 3,000). Dentinal tubules are wide open and the

root surface is regular and smooth.

Figure 6. Surface following root planing with curettes and root conditioning with 17% EDTA solution for 20sec(× 3,000). A few dentinal tubule orifices are partly open. The smear layer has been partly removed.

Figure 7. Surface following root planing with curettes and root conditioning with 17% EDTA solution for 3min(× 3,000). Widened dentinal tubule orifices are shown. The smear layer has been removed.

Figure 8. Surface following root planing with curettes and root conditioning with 17% EDTA solution for 5min(× 3,000). Dentinal tubules are wide open. The smear layer has been removed and root surface is smooth.

Figure 9. Surface following root planing with curettes and root conditioning with 24% EDTA solution for 20sec(× 3,000). Dentinal tubule orifices are partly open. The smear layer has been partly removed.

Figure 10. Surface following root planing with curettes and root conditioning with 24% EDTA solution for 3min(× 3,000). Widened dentinal tubule orifices are shown. The smear layer has been removed.

Figure 11. Higher magnification of Fig 10. which reveals a smear free

dentinal tubule and collagen-like fibers covering the circumtubular dentin surface($\times 10,000$).

Figure 12. Surface following root planing with curettes and root conditioning with 24% EDTA solution for 5min($\times 3,000$). Widened dentinal tubule orifices are shown. The smear layer has been removed and root surface is regular and smooth.

- Abstract -

Scanning Electron Microscopic Study of the Effect of EDTA on Demineralizing Diseased Root Surface

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University

The present study was performed to evaluate the effect of EDTA on diseased root surfaces with regard to the removal of the smear layer, exposure of dentinal tubule openings, and demineralization of the peritubular dentin. 20 periodontally involved single rooted teeth were used. After scaling and root planing, root conditioning was carried out with 3%, 17%, and 24% EDTA solution for 20 sec., 3 min., and 5 min. respectively. Then, the specimens were rinsed with tap water for 5 min. and processed for scanning electron microscopic observation.

The following results were obtained.

1. In control group which was conditioned with cotton pellets soaked with saline for 3 min., the surface showed an amorphous irregular coating. The tubule orifices seemed to be com -

pressed in the direction of the curette strokes.

2. In test group which was conditioned with EDTA solution, the number of opening dentinal tubules and the extent of the dentinal tubule opening increased with time irrespective of the concentration of EDTA solution.
3. In the group which was conditioned with EDTA solution for 20 sec., the smear layer was not completely removed.
4. If the time of root conditioning is above 3 min., collagen-like fibers covering the circum tubular dentin surface were shown even in the group which was conditioned with 3% EDTA solution.

In conclusion, EDTA solution was a very effective root conditioning agent like low pH root conditioning agents which had various disadvantages. Therefore, using EDTA solution, more successful periodontal regeneration could be obtained.