

# Curet Ultrasonic Scaler EPMA

# SEM

I. 가

1,2), 1962 Selvig Zander<sup>18)</sup> 가 EDTA Ca Mg

가 Ca, Mg, P

3), 가 19-21)

4-6) 7,8) , 1979 Wirthlin<sup>22)</sup>

가 Ca P 23-4)

9-17)가 40μm

9-14) , Barton<sup>25)</sup> energy dispersive X-ray analysis(EDX) , 60μm  
15-17)

Ca P

2.

EPMA(Electron Probe

가 7 - 9 mm

Micro - Analysis)가

EPMA

0.9%

가 가 X - ray가

, X - ray

/

가

26 -

7),

(1)

EPMA

, Cohen

28)

12

, Hennequin

70%, 90%, 95%, 100%, 100%,

29)

Ca P

100%, 100%

12

, Atilla 30)

12

2

가

2:1

12

1:2

12

48

70

8 - 12

EPMA

2 - 3

가

II.

(2)

1.

가 40

가 7 - 9mm

1.2 - 1.5mm

가

aluminum

stub carbon tape

600,  
 1000 - 1200 sand paper 3  
 9 $\mu$ m film (blue color) 3, 3 $\mu$ m  
 film(pink color) 5, 1  $\mu$ m film(green  
 color) 5  
 0.05 $\mu$ m alumina powder silicone  
 5  
 가 1.0mm 1.4mm가  
 3 3  
 spray air  
 가

(3) EPMA

EPMA system(JXA - 8900R, JEOL, Japan)

2mm x 2  
 mm 3

WDS(wavelength dispersive x -  
 ray spectrometer)

Ca, P, Mg, Na

JXA - 8900R

Accelerating

Voltage : 20.0 kV Dwell Time : 30.0 msec,

Magnification : 120, Probe Diameter( $\mu$ m) : 2,

Probe Current (A) : 1.900 - 2.000

(4)

EPMA

Gold - Palladium

(JSM - 840A,

Table 1. Ca level

	GC	US
Cervical	184.0 $\pm$ 5.7	178.5 $\pm$ 23.3
Middle	171.5 $\pm$ 3.5	172.5 $\pm$ 21.9
Apical	155.5 $\pm$ 2.1	163.5 $\pm$ 9.2

(GC : Gracey curettes US : Ultrasonic scaler)

JEOL, Japan) 70

III.

1. EPMA

(1) Ca level

Ca level Table 1

Table 2. P level

	GC	US
Cervical	62.5 $\pm$ 5.0	66.0 $\pm$ 1.4
Middle	60.5 $\pm$ 2.1	65.0 $\pm$ 1.4
Apical	55.5 $\pm$ 0.7	61.5 $\pm$ 2.1

(GC : Gracey curettes US : Ultrasonic scaler)

4가 가 level  
 Ca level

Ca level

Ca level  
 (Figure 1 - 6).

Table 3. Mg level

	GC	US
Cervical	4.0 $\pm$ 0.0	4.5 $\pm$ 0.7
Middle	4.5 $\pm$ 0.7	4.5 $\pm$ 0.7
Apical	3.5 $\pm$ 0.7	4.5 $\pm$ 0.7

(GC : Gracey curettes US : Ultrasonic scaler)

(2) P level

Table 4. Na level

	GC	US
Cervical	1.0 ± 0.0	1.0 ± 0.0
Middle	1.0 ± 0.0	1.0 ± 0.0
Apical	1.0 ± 0.0	1.0 ± 0.0

(GC : Gracey curettes US : Ultrasonic scaler)

가

, Selvig 18)

, Furseth 24)

P level Table 2

4가

level

Ca level

가

. Barton 25)

EPMA

Ca level  
(Figure 7 - 12).

, Hennequin 29) EPMA

Ca level

Ca P

Mg

(3) Mg level

EPMA

Mg level Table 3

EDS(Energy Dispersive Spectro - metry)

Ca P

level

WDS(Wavelength Dispersive Spectrometry) 가 가 , EDS

(Figure 13 - 18).

WDS

X - ray spectrum

(4) Na level

WDS 26). Barton 25)

Na level Table 4

Cohen 28)

Hennequin 29) EDS

level

WDS

(Figure 19 - 24).

EPMA

2.

evaporation

1 μm

가

0.05 μm

(Figure 25, 26).

alumina powder

Barton 25) EDX

IV.

, Ca, P, Na

Atila <sup>30)</sup>

EPMA SEM

Cohen <sup>28)</sup>

Ca P

가

Ca P level

1.

Ca, P,

Mg, Na level

Ca, P,

2. Ca, P, Mg, Na

가

Mg, Na level

O, Leary <sup>31)</sup> Coldiron <sup>32)</sup>

3. Ca P

EPMA

4.

Ca P Mg 가

5. Ca, P, Mg

가

Selvig (1962)<sup>18)</sup>, Neider

(1972)<sup>19)</sup>, Hals (1977)<sup>20)</sup>, Totdal

(1985)<sup>21)</sup>, Cohen (1991)<sup>28)</sup>

가

가

Ca P

가

VI.

가

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alized dentin from periodontitis -  
affected root surfaces. J Periodontol

가  
WDS

EPMA  
가

V.

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Figure 1. Ca Level at Cervical portion (US)

Figure 2. Ca Level at Cervical portion (GC)

Figure 3. Ca Level at Middle portion(US)

Figure 4. Ca Level at Middle portion (GC)

Figure 5. Ca Level at apical portion (US)

Figure 6. Ca Level at apical portion (GC)

Figure 7. P Level at Cervical portion (US)

Figure 8. P Level at Cervical portion (GC)

(1)

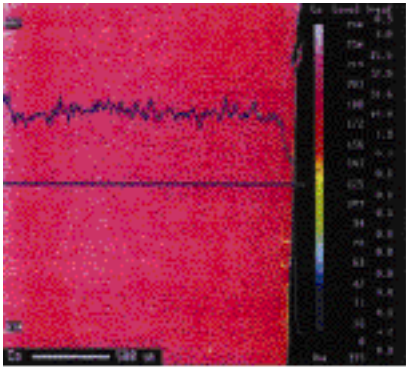


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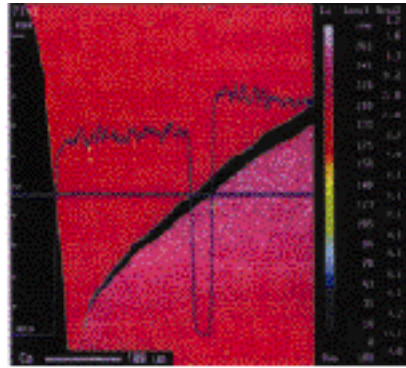


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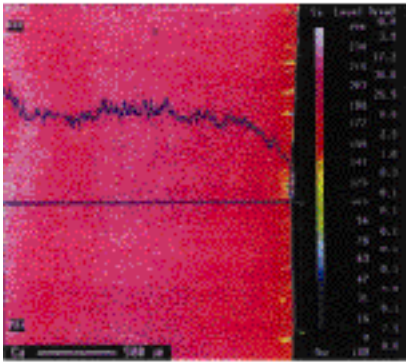


Figure 3

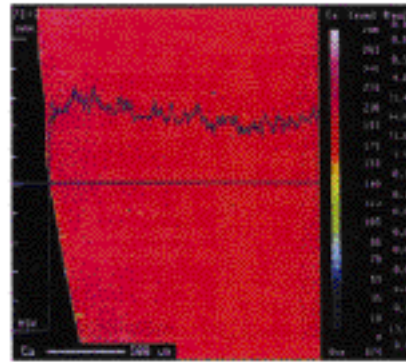


Figure 4

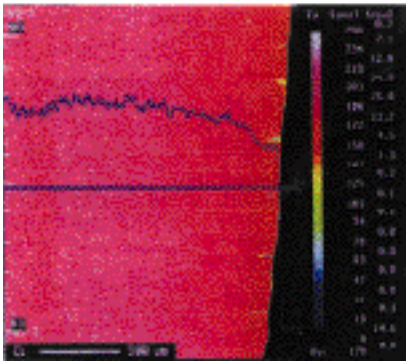


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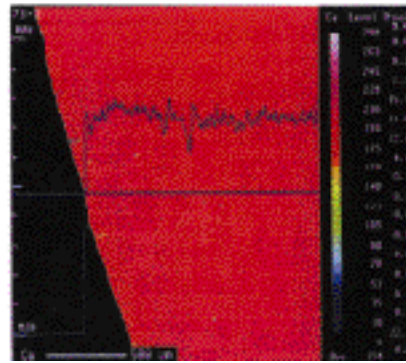


Figure 6



( II )

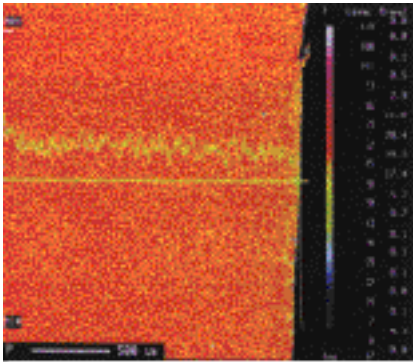


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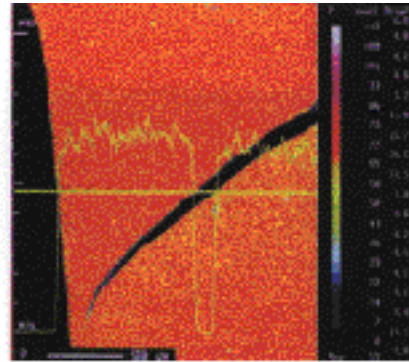


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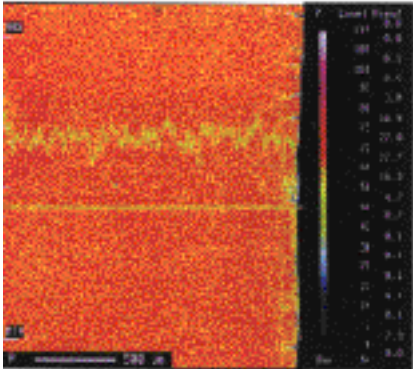


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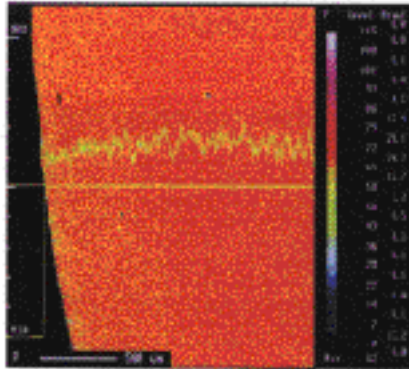


Figure 10

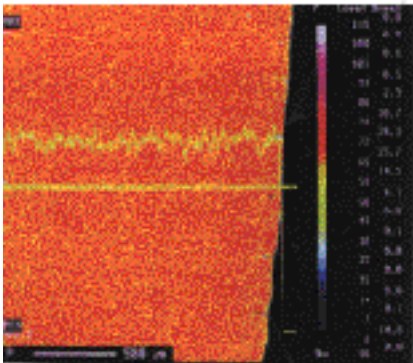


Figure 11

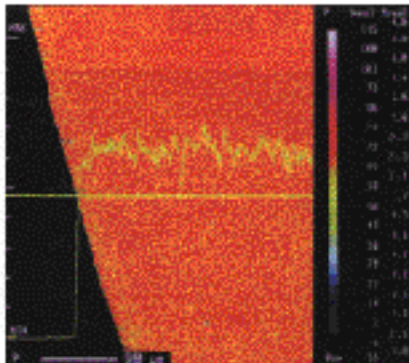


Figure 12

( III )

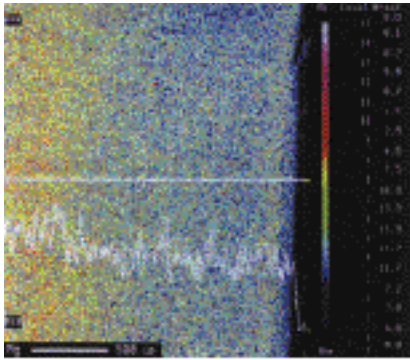


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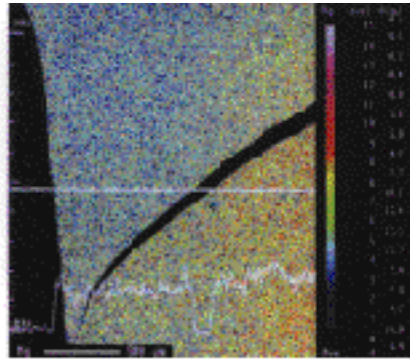


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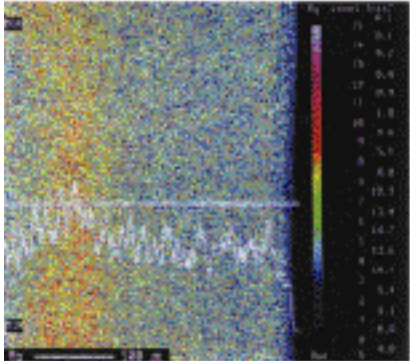


Figure 15

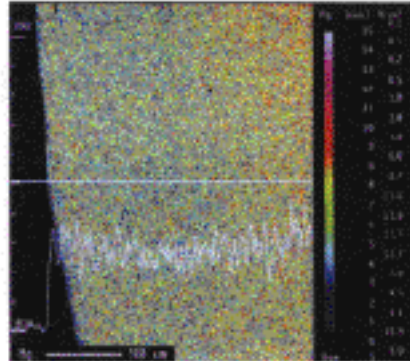


Figure 16

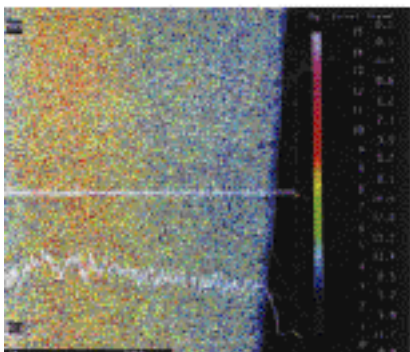


Figure 17

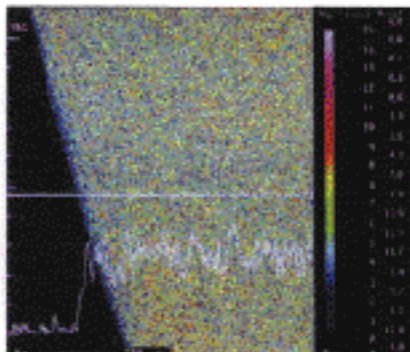


Figure 18

( IV )

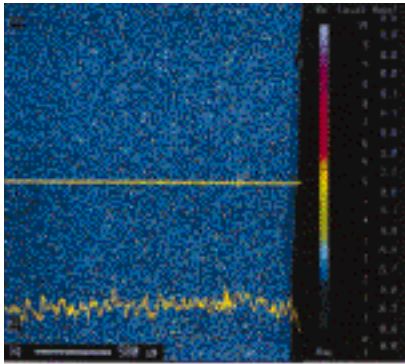


Figure 19

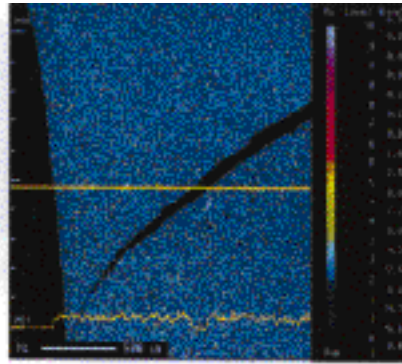


Figure 20

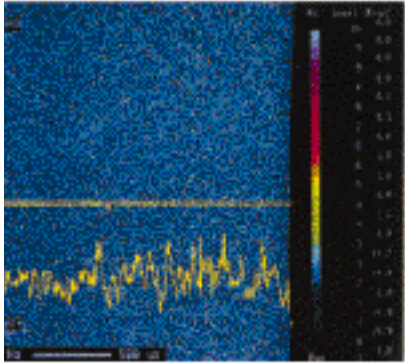


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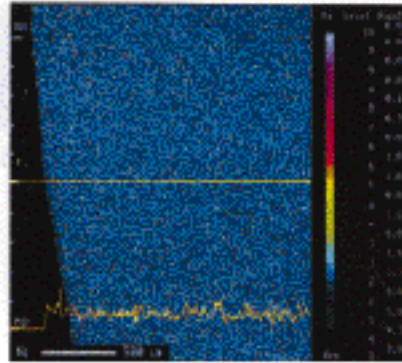


Figure 22

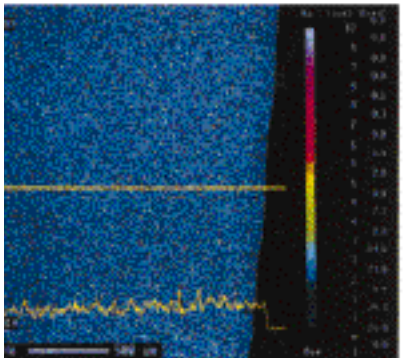


Figure 23

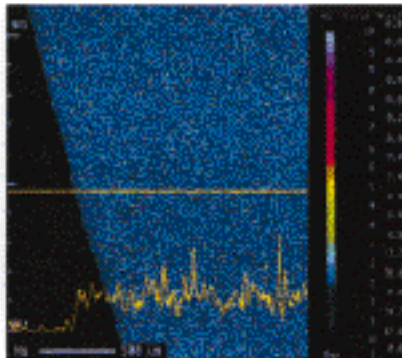


Figure 24

(V)



Figure 25

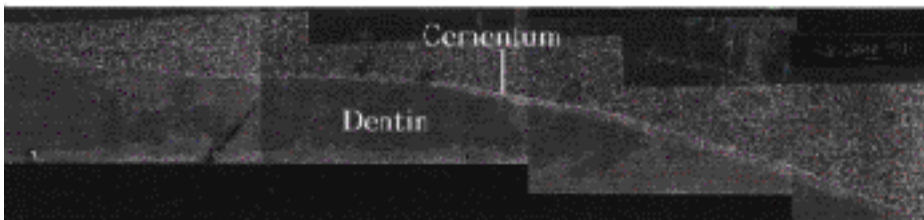


Figure 26

Figure 9. P Level at Middle portion (US)  
Figure 10. P Level at Middle portion (GC)  
Figure 11. P Level at apical portion (US)  
Figure 12. P Level at apical portion (GC)  
Figure 13. Mg Level at Cervical portion (US)  
Figure 14. Mg Level at Cervical portion (GC)  
Figure 15. Mg Level at Middle portion (US)  
Figure 16. Mg Level at Middle portion (GC)  
Figure 17. Mg Level at apical portion (US)  
Figure 18. Mg Level at apical portion (GC)  
Figure 19. Na Level at Cervical portion (US)  
Figure 20. Na Level at Cervical portion (GC)  
Figure 21. Na Level at Middle portion (US)  
Figure 22. Na Level at Middle portion (GC)  
Figure 23. Na Level at apical portion (US)  
Figure 24. Na Level at apical portion (GC)  
Figure 25. SEM (US)  
Figure 26. SEM (GC)

- Abstract -

## The Study on the Root Sur - faces with SEM and EPMA Following Periodontal Treatment with Curet and Ultrasonic Scaler

Jae - Hyuk Kim, Chong - Yeo Kim, Sung -  
Bin Lim, Chin - Hyung Chung  
Department of Periodontology College of  
Dentistry Dan - Kook University

One of the fundamental causes of peri -  
odontal disease is accumulation of bacterial  
plaque and calculus and most effective  
method of removing these plaque and cal -  
culus are scaling and root planning using  
hand curet and ultrasonic scaler. Many  
studies concerning residual degenerated  
mineral content after periodontal therapies  
have been carried out, but some problems  
about these studies were also known. This  
research studies mineral concents and dis -  
tribution of residual root surfaces after  
performing hand curet and ultrasonic scaler  
on root surfaces of single rooted teeth  
which were extracted for periodontal rea -  
sons. EPMA were used to avoid errors  
from chemical quantative analysis and in  
addition SEM observation was also per -  
formed.

The results were as follows.

1. No differences were found between  
curet group and ultrasonic scaler group

- in Ca, P, Mg and Na level.
2. Concentration level was decreased in  
the sequence of Ca, P, Mg and Na.
  3. Ca and P level were decreased as  
going to apical portion at curet group  
and ultrasonic scaler group.
  4. More cementum was removed at cer -  
vical portion compared to other portion  
at curet group and ultrasonic scaler  
group.
  5. Ca, P, Mg level was higher in dentin  
compared to cementum.

There was no difference in mineral level  
for Ca, P, Mg and Na between root surfaces  
treated with hand curet and ultrasonic  
scaler.