

in vivo in vitro

I.

30

가

1970

in vitro

40%

1%

가

가

Nyman^{8, 9)}

rubber cup

smoothing

polishing

polish

tional epithelium

8).

long junc -^{9),}

1),

lipopolysaccharide가

, Jones O'Leary

2).

retoxification

10)

가 cementum

cementum

2) ultrasonic device

11).

3, 4),

ng

O'Leary¹²⁾

1980

Nakib⁵⁾

, cementum

cementum dentin

Hughes Smales⁶⁾

가 cementum

. Moore⁷⁾ tum

cemen -

13, 14). Caffesse¹⁵⁾ Buchanan¹⁶⁾ tip piezo ultrasonic
in vivo in vitro
가 , ,
가
17). paradox
Robertson¹⁸⁾ II.
Fujikowa¹⁹⁾ probing depth가 1. in vitro
가
, root polishing 20 ()
9). root planing root 19 , 10)
polishing 가
Sherman²⁰⁾ 2. in vivo
, 9
가 21). 40
curette ultrasonic device , 가 1 Gracey
, curette debride- curette #5, 6(LM - Dental), 2 #1 tip
ment , piezo ultrasonic device(Satlec,P
22, 23). Max) , 3 #H3, H4L, H4R
curette piezo ultrasonic device , 4 #H1, H2L,
H2R tip piezo ultrasonic device ,
5 Perio Clean(Busch) 18
, ,
가 24). , probing
ultrasonic device depth 1 .
debridement , (Table 1).
ultraoonic device cavitation 3
activity , 가 , ultrasonic device
acoustic microstreaming force Perio clean .
가 25). ultrasonic device power setting #1
tip Scaling mode 7, #H1, H2L,
26) H2R H3, H4L, H4R
ultrasonic device . Periodontia mode 7 .
27). round bur , #1

Table 1. Assignment of the 5 test instruments to various root surface segments

Tooth	site	PD(mm)	Instrumentation
#15	D	8	Gracey curette #5, 6
	M	5	#H3, H4L, H4R
#14	D	5	#H1, H2L, H2R
	M	7	#1
#13	D	10	Gracey curette #5, 6
	M	9	#1
#12	D	8	#1
	M	9	#H1, H2L, H2R
#21	D	8	#H1, H2L, H2R
	M	4	#H3, H4L, H4R
#22	D	4	Perio Clean
	M	6	#H3, H4L, H4R
#23	D	4	Gracey curette #5, 6
	M	3	Perio Clean
#24	D	12	H1, H2L, H2R
	M	10	H3, H4L, H4R
#25	D	10	Gracey curette #5, 6
	M	3	#1

M:mesial surface

D:distal surface

vivo in vitro
(Fig 1). in vivo

curette
(Fig 1a).

3. Hitachi S - 35004 가
100 500 (Fig 1b). in vitro

in vivo 가
, in vitro 가 (Fig 1C).
가 (Fig 1d).

2. 2 (#1)

III. 가

1. 1 (curette) 가
가 , in 가 cementurn

cementum (Fig 2a). 가
 (washboard) 가
 cementum (Fig 2 b).
 in vitro (Fig 2c). 가
 2가 (Fig 2d).
 tum (Fig 2e).
 , cementum (Fig 2f).

3. 3 (#H3 H4L H4R)
 가 2 (Fig 3a).
 . crack (Fig 3b). in vitro
 (Fig 3c).
 가 (Fig 3d).

4. 4 (#H1 H2L H2R)
 (Fig 2). in vivo
 가

cementum (Fig 4a).
 diamond tip (Fig 4b). in
 vitro in vivo (Fig 4c). tip
 (Fig 4d).

5. 5 (Perio Clean)
 in vivo 가
 cementum 가
 가 (Fig 5a).
 cementum (Fig 5b) in vitro
 가 (Fig 5c). 가
 (Fig 5d).

IV.
 Sherman²¹⁾
 가
 in vitro 가

Ultrasonic device magnetostriuctive
 piezoelectric type crack
 tostrictive type tip , magne -
 , piezoelectric type curette
 , tip , piezo - ultrasonic device # 1 tip
 , tip Perio Clean
 crack
 tostrictive type 28). magne - cementum
 tric type ultrasonic device piezoelec - cemen -
 , Flemming 28) tum
 piezo electric type cementum
 magnetostriuctive ultrasonic scaler 32, 33),
 sonic scaler , tip , Gracey curette 가
 tip , cementum
 in vitro diamond 가가
 , in vivo , in vitro 가
 Caffesse 150), Buchanan 16), Sherman 20), 가 가 , 가
 21) dentin hardness 가
 가 20) . 3
 가 31). Clean 가 . Perio
 Fukazawa Nishimma 32) , crack cementum
 cementum
 50µm cementum . 40 in vitro 가 . 3
 Lie Meyer 22) 가 가
 crack

H3, H4L, H4R curette
 root debridement curette
 . power setting 가
 tip #1
 1/3
 tactile sensation , curette
 ultrasonic device
 curette
 ultrasonic cavitation
 microstream effect chlorohexidine
 34, 35, Kocher²⁴⁾ curette
 가
 program 가

VI.

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Fig 1. Surface following instrumentation with gracey curette.

Fig 1 - a. Low power (× 100) in vivo.

Remnants of dental calculus scattered lower right side and instrument surface is smooth.

Fig 1 - b. High power (× 500) in vivo.

Cementum was removed in instrumented smooth surface.

Fig 1 - c. Low power (× 100) in vivo.

Remaining calculus are found except upper left area.

Fig 1 - d. High power (× 500) in vitro.

Remaining calculus area

Fig 2. Surface following instrumentation with #1 Tip.

Fig 2 - a. Low power (× 100) in vivo.

Relatively smooth surface in right is seen.

Fig 2 - b. High power (× 500) in vivo.

Washboard effect on instrumented surface which is perpendicular to working stroke from left to right is seen.

Fig 2 - c. Low power (× 100) in vitro.

Borderline between instrumented(upper 2/3) and un instrumented(lower 1/3) area.

Fig 2 - d. High power (× 500) in vitro.

Instrumented area have two directional washboard effects.

Fig 2 - e, f. Very smooth surface with instrumented mark.

Fig 3. Surface following instrumentation with #H3, H4L,H4R Tip.

Fig 3 - a. Low power (× 100) in vivo.

Relatively smooth surface and washboard effect are seen in entire surface.

Fig 3 - b. High power (× 500) in vivo.

Instrumental marks which are perpendicular to working stroke are seen, however cementum is still remaining.

Fig 3 - c,d. Lower power (× 100) and high power (× 500) in vitro.

Working stroke is seen in center area but dental calculus is still remaining.

Fig 4. Surface following instrumentation with #H1, H2L,H2R Tip.

Fig 4 - a, b. There are marked corrugated area between instrumental marks

(low power (× 100) and high power (× 500) in vitro).

Fig 4 - c, d. Almost same effect on root surface but there are smooth surface between marked area(low power (× 100) and high power (× 500) in vitro).

(1)



Fig 1a

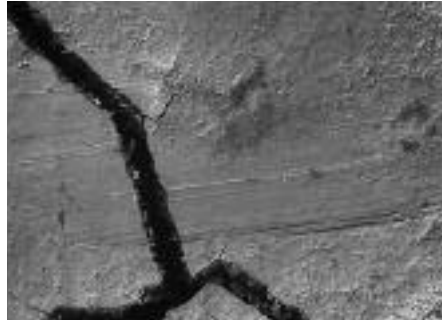


Fig 1b



Fig 1c

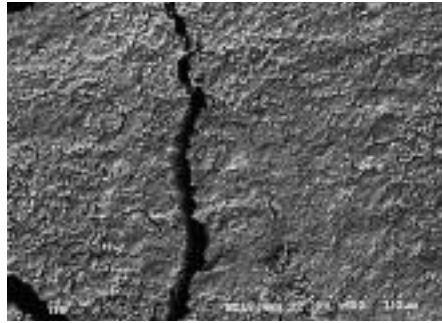


Fig 1d



Fig 2a



Fig 2b



Fig 2c



Fig 2d

(II)

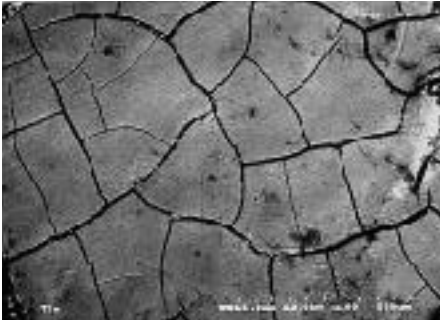


Fig 2e

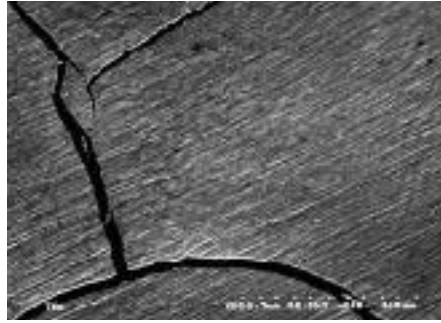


Fig 2f

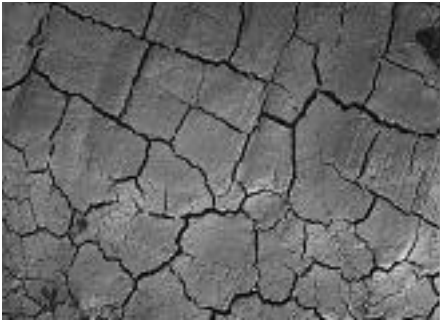


Fig 3a

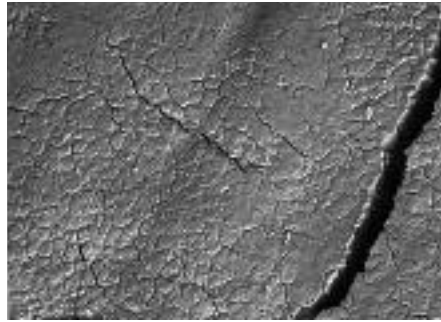


Fig 3b

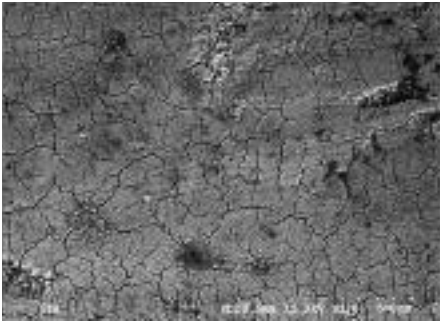


Fig 3c

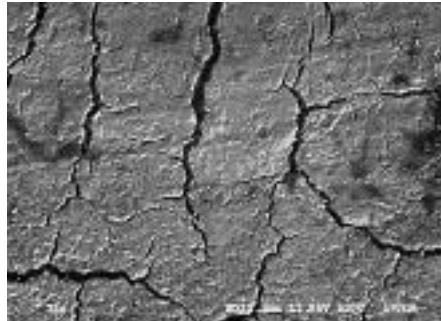


Fig 3d

(III)



Fig 4a



Fig 4b

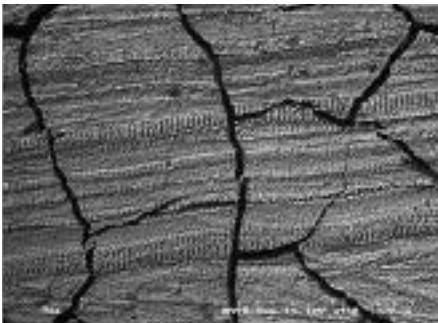


Fig 4c



Fig 4d



Fig 5a

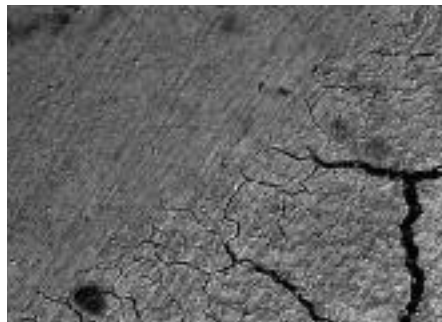


Fig 5b

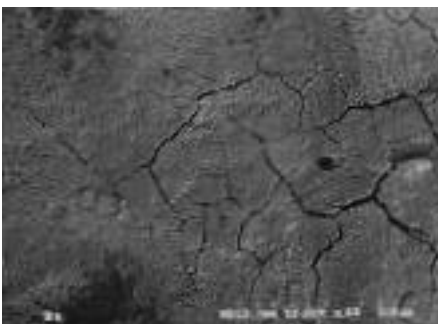


Fig 5c



Fig 5d

- Abstract -

Root surface roughness following mechanical instrumentation in vivo and in vitro SEM study

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Adequate root preparation in the treatment of periodontal disease often involves mechanical instrumentation to remove plaque, calculus perhaps contaminated cementum. Although meticulous scaling and root planing may remove some cementum, the use of aggressive root planing to remove cementum does not appear warranted. So ultrasonic device and rotary instrument appear to be replacing hand instrument. But it is not clear those instruments make smooth root surface as hand instrument. The roughness of the root surface were evaluate with SEM following instrumentation with Gracey curette, Perio Clean and piezo ultrasonic device(Setlec) with various tip. 20 extracted teeth were used in vitro experiment, and 9 teeth of a patient destined for extraction for periodontal reasons were utilized in vivo experiment. It was demonstrated that hand curette created the smoothest surface, while diamond tip tended to roughen the root surface. But the hand curette, Perio Clean, and piezo ultrasonic device with scaler tip tend to remove cementum completely. Piezo ultrasonic device with curette - like tip made the desirable smooth surface with partial removal of cementum.

Keywords : root roughness, SEM, piezo ultrasonic device, mechanical instrumentation