

# GTR e - PTFE

## I.

Mellonig <sup>20)</sup>

e - PTFE

가

가

e - PTFE

가

가

가

가 4,5,7,8,10,20,25,29,32)

6,11,36)

1976 Melcher<sup>19)</sup>

e - PTFE

가

가

16,21,37,39,43)

가

가

5가 31)

7,8,35)

가

가

2

e - PTFE

가

6

8,17,28,38,43)

## II.

, 2

e -

PTFE

Gottlow <sup>13)</sup>,

1.

Pontoriero <sup>27)</sup>, Schallhorn <sup>33)</sup>, Becker <sup>3)</sup>,

\* 1999

Y  
 21 21  
 2 (17 )  
 29 59 ( 39.4± (4 )  
 8.0 ) , 가 10 , 가 11 Marquis color - coded  
 12

0.5mm

가 5mm ,

가0

2.

.15)

(1)

L e and Silness

31 59 ( 39.2±8.2 ) 7  
 7 2

Miller index

57 ( 38.1±9.1 ) 7 , 29  
 2 e - PTFE (3)

5 e - PTFE  
 , 32

59 ( 40.1±8.1 ) 7  
 7 2 e - PTFE  
 5 e -

PTFE (1mm  
 )

e - PTFE

(2)

2mm

e - PTFE

3 , 5 3

Gore - tex

1

6

(Penicillin 250mg,t.i.d.)

4

chlorhexidine

3

(Figure - a, - b, - c, -

1, d)

3

3

3mm

e - PTFE

5

e - PTFE

2

, 5

1

3, 4, 5

(Figure - a, - b, - c, - d) 5

e - PTFE

1mm

(4)

2.

6

Wilcoxon

sign rank sum test

0.6±0.5 0.4±0.5

Mann - Whitney U test

0.6±0.5 0.6±0.5

0.7±0.5

Kruskal - Wallis test

6

1.9±0.4 1.1±

III.

1.0

2.0±0 1.1±1.0

6

1.

, (P < 0.05)

2.0±0 1.6

Table 1. Control(Open flap debridement only)

pt	site	P.D		A.L		B.L		G.R		P.I		G.I		B.O.P	
		BS	PS	BS	PS	BS	PS	BS	PS	BS	PS	BS	PS	BS	PS
1	36B	8	7	9	10	10	11	1	3	1	1	2	0	1	0
2	36L	5	4	5	5	7	8	0	1	1	1	2	2	1	1
3	46L	8	3	8	6	8	7	0	3	1	1	2	2	1	1
4	46B	6	3	6	5	7	6	0	2	0	0	2	0	1	0
5	46B	9	5	12	10	12	11	3	5	0	0	2	2	1	0
6	36B	6	6	6	6	7	7	0	0	0	0	1	0	1	0
7	47B	6	4	7	6	8	6	2	2	1	0	2	2	1	1
mean ± s.d (mm)		6.9 ± 1.5	4.6 ± 1.5	7.6 ± 2.4	6.9 ± 2.2	8.4 ± 1.9	8.0 ± 2.2	0.7 ± 1.1	2.3 ± 1.6	0.6 ± 0.5	0.4 ± 0.5	1.9 ± 0.4	1.1 ± 1.0	1.0 ± 0.0	0.4 ± 0.5

P.D. : Probing Depth

A.L : Attachment leve

B.L : Probing Bone Level

G.R. : Gingival recession

P.I. : Plaque Index

G.I. : Gingival Index

B.O.P : Bleeding on Probing

BS : Before Surgery

PS : Post.Surgery (6months)

Table 2. Experiment I(e - PTFE membrane exposure)

pt	site	P.D		A.L		B.L		G.R		P.I		G.I		B.O.P	
		BF	PS	BF	PS	BF	PS	BF	PS	BF	PS	BF	PS	BF	PS
1	46L	7	6	8	9	8	9	1	3	1	1	2	2	1	1
2	36L	6	4	6	7	9	9	0	3	1	1	2	2	1	1
3	46B	6	5	7	7	8	8	1	2	0	0	2	2	1	1
4	36B	5	4	5	5	6	6	0	1	0	0	2	1	1	0
5	47B	6	3	6	3	7	6	0	0	0	1	2	0	1	0
6	46B	7	4	7	8	10	11	0	3	1	1	2	2	1	1
7	36B	7	3	7	3	10	8	0	0	0	0	2	2	1	1
mean ± s.d (mm)		8.3 ± 0.8	4.1 ± 1.1	6.6 ± 1.0	6.0 ± 2.4	8.3 ± 1.5	8.1 ± 1.8	0.3 ± 0.5	1.7 ± 1.4	0.6 ± 0.5	0.6 ± 0.5	2.0 ± 0	1.6 ± 0.8	1.0 ± 0	0.7 ± 0.5

P.D. : Probing Depth  
 G.R. : Gingival recession  
 B.O.P : Bleeding on Probing  
 A.L : Attachment leve  
 P.I. : Plaque Index  
 BS : Before Surgery  
 B.L : Probing Bone Level  
 G.I. : Gingival Index  
 PS : Post.Surgery (6months)

Table 4. Experiment II(e - PTFE membrane minimum exposure)

pt	site	P.D		A.L		B.L		G.R		P.I		G.I		B.O.P	
		BF	PS	BF	PS	BF	PS	BF	PS	BF	PS	BF	PS	BF	PS
1	46L	10	4	10	5	12	7	0	1	1	1	2	0	1	0
2	47L	9	4	9	5	10	6	0	1	1	1	2	2	1	1
3	36B	6	3	7	5	9	5	1	2	0	1	2	0	1	0
4	46B	8	5	9	7	11	8	1	2	0	0	2	0	1	0
5	36B	7	5	9	7	9	8	2	1	1	1	2	2	1	1
6	37B	11	6	12	8	12	9	1	2	1	1	2	2	1	1
7	47B	7	5	7	5	9	6	0	1	1	0	2	0	1	0
mean ± s.d (mm)		8.3 ± 0.8	4.6 ± 1.1	9.0 ± 1.7	6.0 ± 0.3	10.3 ± 1.4	7.0 ± 1.4	0.7 ± 0.8	1.6 ± 0.5	0.7 ± 0.5	0.4 ± 0.5	2.0 ± 0	1.1 ± 1.0	1.0 ± 0	0.4 ± 0.5

P.D. : Probing Depth  
 G.R. : Gingival recession  
 B.O.P : Bleeding on Probing  
 A.L : Attachment leve  
 P.I. : Plaque Index  
 BS : Before Surgery  
 B.L : Probing Bone Level  
 G.I. : Gingival Index  
 PS : Post.Surgery (6months)

± 0.8  
 0.8mm  
 4.1 ± 1.1mm ,  
 8.3 ± 1.8mm  
 4.6 ± 1.0mm  
 (P < 0.05).  
 1.0 ± 0  
 0.4 ± 0.5  
 6  
 ,(P < 0.05)  
 1.0 ± 0  
 0.7 ± 0.5  
 ,  
 7.6  
 ± 2.4mm  
 6  
 6.9 ± 2.2mm ,  
 6.6 ± 1.0mm  
 6.0 ±  
 6.9 ± 1.5mm  
 6  
 2.4mm ,  
 9.0 ± 1.7mm  
 4.6 ± 1.5mm  
 6.3 ±  
 6.0 ± 1.3mm

Table 4. Mean clinical recordings( $\pm$ s.d)(change from baseline and differences between treatment groups)

Treatment	P.D		change	change in A. L.	change in B. L.	change in G. R
	BS	PS				
Control	6.9 $\pm$ 1.5	4.6 $\pm$ 1.5*	2.3 $\pm$ 1.8	0.7 $\pm$ 1.1	0.4 $\pm$ 1.1	-1.6 $\pm$ 1.0
Exp.	6.3 $\pm$ 0.8	4.1 $\pm$ 1.1*	2.1 $\pm$ 1.2	0.6 $\pm$ 2.1	0.1 $\pm$ 1.1	-1.4 $\pm$ 1.3*
Exp.	8.3 $\pm$ 1.8	4.6 $\pm$ 1.0*	3.7 $\pm$ 1.6	3.0 $\pm$ 1.3*	3.3 $\pm$ 1.3*	-0.9 $\pm$ 0.4

Treatment	Plaque index		Gingival index		Bleeding on probing	
	BS	PS	BS	PS	BS	PS
Control	0.6 $\pm$ 0.5	0.4 $\pm$ 0.5	1.9 $\pm$ 0.4	1.1 $\pm$ 1.0*	1.0 $\pm$ 0	0.4 $\pm$ 0.5*
Exp.	0.6 $\pm$ 0.5	0.6 $\pm$ 0.5	2.0 $\pm$ 0	1.6 $\pm$ 0.8	1.0 $\pm$ 0	0.7 $\pm$ 0.5
Exp.	0.7 $\pm$ 0.5	0.4 $\pm$ 0.5	2.0 $\pm$ 0	1.1 $\pm$ 1.0*	1.0 $\pm$ 0	0.4 $\pm$ 0.5*

P.D. : Probing Depth

A.L. : Attachment level

B.L. : Probing Bone Level

G.R. : Gingival recession

BS : Before Surgery

PS : Post.Surgery(6months)

‡ : P < 0.05 differences between before surgery and post surgery

(P < 0.05), 9.0 $\pm$ 1.7mm VI. 가  
 < 0.05) 6 4,5,7,8,10,20,25,29,32).  
 .(P < 0.05) e - PTFE , ,  
 8.4 $\pm$ 1.9mm 6 8.0 $\pm$  가  
 2.2mm , 8.3 $\pm$ 1.5mm 가  
 8.1 $\pm$ 1.8mm , 10.3 $\pm$  2,13,14,17,18,19,22,23).  
 1.4mm 7.0 $\pm$ 1.4mm , ,  
 .(P < 0.05) 가 e - PTFE 가  
 6 (P 26,34). 가  
 < 0.05). 0.7 $\pm$  e - PTFE  
 1.1mm 6 2.3 $\pm$ 1.6mm ,  
 0.3 $\pm$ 0.5mm 1.7 $\pm$  , 2 3  
 1.4mm 가 (P 가 가 ,19)  
 < 0.05) 0.7 $\pm$ 0.8mm 1.6 , e - PTFE  
 $\pm$ 0.5mm 가 가 ,  
 . Gottlow <sup>13)</sup>, Bragger <sup>6)</sup>, Cortellini <sup>10)</sup>,  
 Becker & Becker <sup>3)</sup> ,

가 가

e - PTFE , 5 가

Demolon <sup>11)</sup>, Sharaf <sup>38)</sup>, Selvig <sup>37)</sup> Sigurdsson <sup>39)</sup> e -  
 Porphyromonas gingivalis, Bacteroides  
 forsythus, Fusobacterium nucleatum,  
 Wollinella recta PTFE

, Guillemin <sup>14)</sup>,  
 Nalbandian <sup>21)</sup> Streptococcus species,  
 Actinomyces species

Tempro <sup>41)</sup> ,  
 e - PTFE ,  
 ,  
 가 ,  
 가

, Selvig <sup>36)</sup> e - PTFE  
 가

e - PTFE 가  
 가

가  
 Tonetti <sup>42)</sup> , 6 , 2 , 4 ,  
 , 20 e - PTFE  
 14

가  
 , Schallhorn <sup>32)</sup> ,  
 ,  
 가  
 가 , 가 Selvig <sup>37)</sup> e - PTFE  
 , 12

Tonetti Schallhorn 2가  
 Haney <sup>16)</sup> e - PTFE 가 가  
 , 1 , 2 , 3  
 가 ,  
 , Stahl <sup>40)</sup> 가

가 가 . 2 6<sup>15,30)</sup>

e - PTFE , 7

가 2

가 6

가 6

Westfelt<sup>43)</sup> 가 6 가 ,

44) 가 6 12 e - PTFE

가 6

가 6 Froum<sup>12)</sup>

가 6 3.3mm

1.5mm

Philstrom<sup>21)</sup> 6 2.9mm

1.4mm

2.3mm

6 0.7mm

가 ,

가 e - PTFE

, e - PTFE 2,3

6

Mellonig<sup>20)</sup>

2.6mm, Becker<sup>3)</sup> 3.3mm, Schallhorn

32) 4.0mm, Nyman<sup>24)</sup> 4.5mm

2.2mm

3.7mm Mellonig

Mellonig 1.6mm,

Becker 2.3mm, Schallhorn 3.1mm,

Nyman 4.1mm,

가 가 0.6mm 3.0mm

가

가 , 1. (2.3 ± 1.8mm) (2.1 ± 1.2mm),  
 Nyman (3.7 ± 1.6mm) 6  
 Kim <sup>15)</sup> . (P  
 < 0.05) ,  
 . (P  
 parameta가 < 0.05)  
 가 2. (0.7 ± 1.1mm)  
 . (0.6 ± 2.1mm)  
 0.1mm,  
 3.3mm (3.0 ± 1.3mm) 6  
 . Mellonig 0.9mm, Becker . (P < 0.05)  
 1.3mm, Schallhorn 0.8mm, Choi 1.9mm  
 1.4mm, 3. (0.4 ± 1.1mm)  
 0.9mm 1.1mm) (0.1 ± 1.1mm)  
 . e - PTFE (3.3 ± 1.3mm) 6  
 6 . (P < 0.05)  
 , 4. (0.9 ± 0.4mm) 가  
 , (1.6 ± 1.0mm)  
 . (1.4 ± 1.3mm) 6  
 가 . (P < 0.05)  
 V.  
 e - PTFE 2 e - PTFE  
 e - PTFE ,  
 6 ,  
 19 , e - PTFE  
 21 2 , ,  
 7 ,  
 e - PTFE 3mm  
 7 e - PTFE  
 , 5 e - PTFE  
 7  
 6

VI.

1. Anderegg, C.R., et al.: Clinical evaluation of the use of decalcified freeze dried bone allograft with guided tissue regeneration in the treatment of furcation invasions, J. Periodontol., 62:264 - 268,



- 1991
2. Aukhil, L., et al.: An experimental study of new attachment procedure in beagle dogs, *J. Periodont. Res.*, 18:643 - 654, 1983
  3. Becker, W., Becker, B.E., et al.: New attachment after treatment with root isolation procedures: Report for treated class and class furcations and vertical osseous defects, *Int.J.Periodont. Res.Dent.*, 8:9 - 23, 1988
  4. Bowers, G.M., et al.: Histologic evaluation of new attachment apparatus formation in humans. Part I, *J.Periodontol.*, 60:675 - 682, 1989
  5. Brown, I.S., et al.: The effect of orthodontic therapy on certain types of periodontal defects. I. Clinical findings, *J.Periodontol.*, 44:742 - 756, 1973
  6. Bragger, U., et al.: Remodeling of periodontal tissues adjacent to sites treated according to the principles of guided tissue regeneration, *J.Clin.Periodontol.*, 19:615 - 624, 1992
  7. C.K.Kim., E.J.Choi., K.S.Cho., J.K.Chai., Wikesj UME : Periodontal repair in intrabony defects treated with a calcium carbonate implant and guided tissue regeneration. *Journal of Periodontology*. 67(12):1301 - 1306, 1996.
  8. C.K.Kim., J.K.Chai., K.S.Cho., I.S.Moon., S.H.Choi., John. S. Sottosanti., U.M.Wikesj : Periodontal repair in intrabony defects treated with a calcium sulfate implant and calcium sulfate barrier. *Journal of Periodontology*. 69(12):1317 - 1324, 1998
  9. C.K.Kim., J.K.Chai., K.S.Cho., S.H.Choi: Effect of calcium sulphate on the healing of periodontal intrabony defects. *International Dental Journal*. 49(1):330 - 337, 1998
  10. Cortellini, P. et al.: Guided tissue regeneration with different materials, *Int.J.Periodont. Res.Dent.*, 10:137 - 151, 1990
  11. Demololon, I.A., et al.: Bacterial colonization associated with the guided tissue regeneration procedure, *J.Dent.Res.*, 70:537(sp.issue, abs. #2164), 1991.
  12. Froum, S.J., et al.: Periodontal healing following open debridement flap procedures. I. Clinical assessment of soft tissue and osseous repair, *J. Periodontol.*, 53:8 - 14, 1981
  13. Gottlow, J., et al.: New attachment formation in the human periodontium by guided tissue regeneration. Case reports, *J.Clin.Periodontol.*, 13:604 - 616, 1986
  14. Guillemin, G., et al.: Healing in periodontal defects treated by decalcified freeze - dried bone allografts in combination with e - PTFE membranes ( ). Clinical and scanning electron microscope analysis, *J. Clin.Periodontol.*, 20:528 - 536, 1993
  15. H.Y.Kim., S.W.Yi., S.H.Choi., C.K.Kim : Bone Probing Measurement as a Reliable Evaluation of the Bone Level in Periodontal Defects. *Journal of Periodontology*. 71:729 - 735, 2000
  16. Haney, J.M., et al.: Periodontal repair in dogs: Expanded polytetrafluoroethylene barrier membranes support wound stabilization and enhance bone regeneration, *J. Periodontol.*, 64:883 -

- 890, 1980
17. I.K.Moon., J.K.Chai., K.S.Cho., Wikesj UME., C.K.Kim : Effect of polyglactin mesh combined with resorbable calcium carbonate or replamineform hydroxyapatite on peri - odontal repair in dogs. *Journal of Clinical Periodontology*. 23(2):945 - 951, 1996.
  18. Karring, T., et al.: Healing follow - ing implantation of periodontitis affected roots into bone tissue, *J.Clin.Periodontol.*, 7:96 - 105, 1980
  19. Melcher, A.H., et al.: On the repair potential periodontal tissues, *J.Periodontol.*, 47:125 - 131, 1976
  20. Mellonig, J.T., et al.: Clinical evaluation of guided tissue regeneration in the treatment of grade furcation invasions, *Int.J.Periodont.Res. Dent.*, 14:255 - 271, 1994
  21. Nalbandian, J. & Temprow, P.J.: Microbial plaque on retrieved polytetra - fluorethylene membranes, *J.Dent.Res.*, 70:536(sp. issue, abs. #2163), 1991
  22. Nyman, S.: Bone regeneration using the principle of guided tissue regeneration, *J.Clin. Periodontol.*, 9:290 - 296, 1982
  23. Nyman, S., et al.: New attachment following surgical treatment of human periodontal disease, *J.Clin.Periodontol.*, 9:290 - 296, 1982
  24. Nyman, S., et al.: The regenerative potential of the periodontal ligament. An experimental study in the mokey, *J. Clin.Periodontol.*, 9:257 - 265, 1982
  25. Pature, B., et al.: Clinical and roentgenographic evaluation of the post treatment healing of intrabony pockets, *J.Periodontol.*, 33:164 - 171, 1962
  26. Philstrom. B.L., et al.: Randomized four year study of periodontal therapy, *J. Periodontol.*, 52:227 - 242, 1981
  27. Pontoriero, R., et al.: Guided tissue

- regeneration in degree furcation involved mandibular molars. A clinical study, *J.Clin.Periodontol.*, 15:247 - 254, 1988
28. Pontoriero, R. et al.: Guided tissue regeneration in surgically produced furcation defects: An experimental study in the beagle dog, *J.Clin.Periodontol.*, 19:159 - 163, 1992
  29. Prichard, J., et al.: Present state of the interdental denudation procedure, *J.Periodontol.*, 48:566 - 569, 1977
  30. Renvert, S., et al.: Healing after treatment of periodontal intraosseous defects. V. Effect of root planing versus flap surgery, *J.Clin. Periodontol.*, 12:619 - 629, 1985
  31. Scantlebury, T.V.: 1982 - 1992: A decade of technology development for guided tissue regeneration, *J.Periodontol.*, 64:1129 - 1137, 1993
  32. Schallhorn, R.G. & McClain, P.K.: Combined osseous composite grafting, root conditioning and guided tissue regeneration, *Int.J.Periodont. Res.Dent.*, 8:9 - 31, 1988
  33. Schallhorn, R.G. & McClain, P.K.: Clinical and radiographic healing pattern observations with combined regenerative techniques, *Int.J. Periodont.Res.Dent.*, 14:391 - 403, 1994
  34. Schluger, S., et al.: Osseous resection - A basic principle in periodontal surgery, *Oral Surg. Oral Med. Oral Pathol.*, 2:316 - 325, 1949
  35. Selvig, K.A., et al.: Regenerative surgery of intrabony periodontal defects using e-PTFE barrier reevaluation of retrieved membranes versus clinical healing, *J.Periodontol.*, 63:974 - 978, 1992
  36. Selvig, K.A., et al.: Scanning electron microscopic observations of cell population and bacterial contamination of membranes used for guided periodontal tissue regeneration in humans, *J.Periodontol.*, 61:515 - 520, 1990
  37. Selvig, K.A., et al.: Surgical treatment of intrabony periodontal defects using e-PTFE barrier membranes: Influence of defect configuration on healing response, *J.Periodontol.*, 64:730 - 733, 1993
  38. Sharaf, M.N., et al.: Morphological and microbiological examination of removed Gore - Tex membranes, *J.Dent.Res.*, 70:507(sp. issue, abs. #1931), 1991
  39. Sigurdsson, T.J., et al.: Periodontal repair in dogs: Space provision by reinforced e-PTFE membranes enhances bone and cementum regeneration in large supraalveolar defects. *J.Periodontol.*, 65:350 - 356, 1994
  40. Stahl, S.S., et al.: Human histologic responses to guided tissue regeneration techniques in intrabony lesions, *J.clin.Periodontol.*, 17:191 - 198, 1990
  41. Tempro, P.J., and Nalbandian, J.: Colonization of retrieved polytetrafluoroethylene membranes: Morphological and microbiological observation, *J.Periodontol.*, 64:162 - 168, 1993
  42. Tonetti, M.S., et al.: Periodontal regeneration of human intrabony defects. Determinants of healing response, *J.Periodontol.*, 64:934 - 940, 1993
  43. Westfelt, E., et al.: Improved periodontal conditions following therapy,

(1)



Figure I - a



Figure I - b

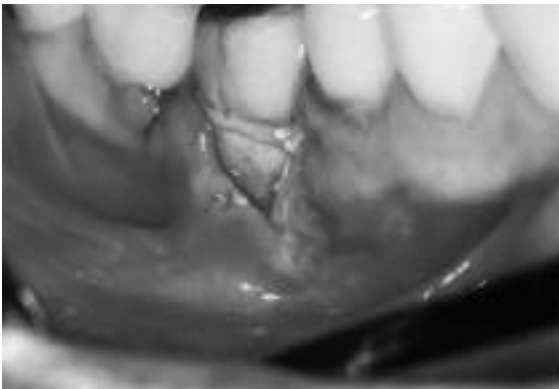


Figure I - c



Figure I - d

( II )



Figure II - a



Figure II - b



Figure II - c



Figure II - d

J.Clin.Periodontol., 12:283 - 293, 1985

44.

, :

, 23:367 - 380, 1993

( .e - PTFE

),

- Abstract -

## Evaluation of the Effects of e - PTFE Membrane Exposure on the GTR in the Mandubular Furcation Involvement

Chong - Kwan Kim, Joon - Il Kim

Department of Periodontology, Research  
Institute for Periodontal Regeneration,  
College of Dentistry, Yonsei University

In order to evaluate the effects of the early exposure of e - PTFE membrane on the periodontal regeneration, 21 cases of 21 patients diagnosed as the chronic adult periodontitis were evaluated. All were class furcation involvement cases.

The control group was composed of 7 cases treated only by the flap operation. 14 cases were treated by the e - PTFE membrane as the experimental group, the membranes of 7 cases were exposed more than 1mm during healing period, which were named as the experimental group , and the others, experimental group .

Clinical parameters such as probing pocket depth, clinical attachment level, bone probing depth, and gingival recession were recorded before the treatment and 6 months after the treatment. The results were as follows.

1. Significant probing depth reduc -

Fig - a : Cl furcation involvement on the mandibular molar

Fig - b : e - PTFE membrane was applied on the furcation area

Fig - c : Exposed membrane was seen at 5weeks after operation

Fig - d : After removal of the e - PTFE membrane

Fig - a : Cl furcation involvement on the mandibular molar

Fig - b : e - PTFE membrane was applied on the furcation area

Fig - c : Minimum exposure of the membrane was seen at 5weeks after operation

Fig - d : After reentry (6months), regenerated tissue was seen in the furcation area

tions were observed for all groups ( $p < 0.05$ ), but no group shows significantly greater reductions than another.

2. Significant clinical attachment gains were observed for the experimental group ( $p < 0.05$ ), no significant gains were observed in the other groups.
3. Significant bone probing depth reductions were observed for the experimental group ( $p < 0.05$ ), no significant reductions were observed in the other groups.
4. All but the experimental group exhibited a significant increase in gingival recession ( $p < 0.05$ ).

The result suggested that in case of the e-PTFE membrane is exposed, the result is similar to that of flap operation without membrane. Therefore selecting the proper treatment case, intricate surgical procedure and infection control are essential for minimizing the chance of membrane exposure and finally for the good treatment results.