

. . *

*

I.

⁵⁾,

6-8),

(furcation entrance)

(root fusion)^{9, 10)}

(location of furcation)¹¹⁾

가

, , ,
, , 35
가

. Wasserman

1

¹²⁾.

, 1, 2 ,

, 1, 2

Mandelaris ¹³⁾ 134

, (root trunk)

2.23 - 2.93mm ,

가

가

. Roussa¹⁴⁾ 60

가 가

1

, 가

가

2

89

93

(cervical
enamel projection)¹⁾, (enamel
pearl)²⁾, (molar root
concavity)³⁾, (bifurcation ridge)⁴⁾

, 3.42mm, 3.55mm, 3.69mm

, 2

3.01 mm, 4.04 mm,

3.00mm , 1 가
 1.90mm, 2.90mm 2 가
 2.82mm, 3.46mm 15).
 Hou 16) , .
 가
 . 2 가 1 .
 가 ,
 가 가 II.
 . Michele 17) 203 1.
 207
 , 1
 3.8mm, 2 4.4mm, 1
 3.3mm, 2 4.5mm
 .
 가
 가 . 252 ,
 , X 120 . 132
 47 , 34
 ,
 가 . 2.

Table 1. Total tooth number and percent of teeth with root fusion

	Maxillary first molars	Maxillary second molars	Mandibular first molars	Mandibular second molars
Total Number	58	74	46	74
Number of teeth with root fusion	4	43	0	34
Percent of teeth with root fusion(%)	7	59	0	46

3%

3

III.

1) : divider 252
 Digimatic 47
 Micrometer (Mitutoyo, Japan) 34

(Table 1).

가
 가
 2) : 가 1 가 5.06mm,
 4.52mm, 4.01mm
 2 4.04mm,

Table 2. Vertical location of maxillary molar

	Maxillary first molars	Maxillary second molars
B	4.01 ± 0.41	3.87 ± 0.60
M	4.52 ± 0.45	4.02 ± 0.38

B : Length between CEJ and buccal furcation (mm)
 M : Length between CEJ and mesial furcation (mm)
 D : Length between CEJ and distal furcation (mm)

Table 3 : Vertical location of mandibular molar

	Mandibular first molars	Mandibular second molars
B	2.81 ± 0.51	3.61 ± 0.64

B : Length between CEJ and buccal furcation (mm)
 L : Length between CEJ and lingual furcation (mm)

Table 4. Horizontal location of maxillary molar furcations

		Maxillary first molars	Maxillary second molars
Buccal furcation	m	4.18 ± 0.25	3.94 ± 0.38
	d	3.97 ± 0.30	3.82 ± 0.40
Mesial furcation	b	7.98 ± 0.46	6.94 ± 0.48
	p	4.10 ± 0.29	3.89 ± 0.32
Distal furcation	b	5.11 ± 0.43	4.72 ± 0.45
	p	4.86 ± 0.31	4.45 ± 0.46

m: Thickness of root of mesial side (mm)
 d: Thickness of root of distal side (mm)
 b: Thickness of root of buccal side (mm)
 p: Thickness of root of palatal side (mm)

Table 5. Horizontal location of mandibular molar furcations

		Mandibular first molars	Mandibular second molars
Buccal furcation	m	4.13 ± 0.52	3.79 ± 0.4
	d	4.30 ± 0.53	4.04 ± 0.37
Lingual furcation	m	3.65 ± 0.44	3.89 ± 0.33
	d	3.78 ± 0.40	4.04 ± 0.24

m : Thickness of mesial root(mm)

d : Thickness of distal root(mm)

4.02mm, 3.87mm 6-8), (root fusion)^{9, 10)}
 (Table 2). 1 (location of furcation)¹¹⁾
 가 2.81mm, 2
 3.69mm 가 3.87mm 가 - 가
 3.61mm, (Table 3). , 170
 3. 1,340 , Ross¹⁰⁾ 170
 35% 24% 2
 2/3 (Table 4), 가 52.9%, 1 가 7.7% 2
 3.2%, 1 3.3% 2
 (Table 5). 가 가
 IV. . Hou Tsai⁹⁾
 158 151
 가 (39.7%)
 , (28.1%) , 2
 가 1
 가 252
 가 1 7%,
 2 59% , 1
 (cervical enamel projection)¹⁾,
 (enamel pearl)²⁾, (molar root
 concavity)³⁾, (bifurcation ridge)⁴⁾
⁵⁾, (furcation entrance) 2 (Table 1). 46%

(osseous crater)

. Ross

Ochsenbein²⁰⁾

가

10),

가 3mm, 4mm,

5mm

2mm, 3mm, 4mm

short, average, long

, Larato²¹⁾ 188

75%가 short

가

, Rosenberg

가

1

가 가

가 가

¹⁸⁾. Dunlap²²⁾

1

4mm

5mm

2

6mm

가

, Gher²³⁾

1

(Table 2),

1

5.0mm

2

5.5mm

6mm

(Table 3).

가 $\frac{2}{3}$

(Table 4, 5).

Rosenberg¹⁸⁾

Ross¹⁹⁾

가

가

V.

가

252

81

- 86
1. 59% 가 , 2
(46%), 1 (7%)
1
 2. 1
(5.06mm), (4.52mm),
(4.01mm) , 2
(4.04mm), (4.02mm),
(3.87mm) , 1
(3.69mm), (2.81mm)
, 2
(3.87mm), (3.61mm)
 3. , ,
2/3 .

VI.

1. Hou GL & Tsai CC :“ Relationship between periodontal furcation involvement and molar cervical enamel projections ” J Periodontol 58:715 - 721 1987
2. Risnes S. :“ The prevalence, location, and size of enamel pearls on human molars ” J Dent Res 82:403 - 412 1974
3. Bower RC :“ Furcation morphology relative to periodontal treatment: furcation root surface anatomy ” J Periodontol 50:366 - 374 1979
4. Everett FG, Jump EB et al :“ The

intermediate bifurcational ridge: a study of the morphology of the bifurcation of the lower first molars” J Dent Res 37:162 - 169 1958

5. Svardstrom G & Wennstrom JL : “ Furcation topography of the maxillary and mandibular first molars ” J Clin Periodontol 15:271 - 275 1988
6. Bower RC :“ Furcation morphology relative to periodontal treatment: furcation entrance architecture ” J Periodontol 50:23 - 27 1979
7. Chiu BM, Zee KY et al :“ Periodontal implications of furcation entrance dimensions in Chinese 1st permanent molars ” J Periodontol 62:308 - 311 1991
8. Hou GL & Tsai CC :“ Root separation and tunneling therapy in a molar with narrow furcation entrance diameter: periodontal & prosthetic therapy ” J. Formosan Dent. Assoc. 12:406 - 412 1989
9. Hou GL, Tsai CC :“ The morphology of root fusion in Chinese adults ” J Clin Periodontol 21:260 - 264 1994
10. Ross IF & Evanchik PA :“ Root Fusion in Molars: Incidence and Sex Linkage ” J Periodontol 52 : 663 - 667 1981
11. Walid MB, Zeina M, & Simao K : “ Anatomic considerations in the etiology and management of maxillary and mandibular molars with furcation involvement ” Int J Periodont Rest Dent 5:399 - 409 1991
12. Wasserman BA & Hirschfeld L :“ A long - term survey of tooth loss in 600 treated periodontal patients ” J Periodontol 49:225 - 237 1978

13. Mandelaris GA, Wang HL & Macneil RL : " A morphometric analysis of the furcation region of mandibular molars. "Compend Contin Educ Dent Feb;19(2):113 - 116 1988
14. Roussa E. : " Anatomic characteristics of the furcation and root surfaces of molar teeth and their significance in the clinical management of marginal periodontitis. " Clin Anat 11(3):177 - 186 1998
15. Hou GL, Chen SF, Tsai CC & Huang JS : " Analysis of divergent angle and length of CEJ to the furcation entrance in extracted molars. "Kao Hsiung I Hsueh Ko Hsueh Tsa Chih Dec;13(12):710 - 720 1997
16. Hou GL & Tsai CC : " Types and dimensions of root trunk correlating with diagnosis of molar furcation involvements. "J Clin Periodontol 24(2):129 - 135 1997
17. Michele P, Giacinto P, Antonio S & Adriano P : " Molar root furcation: Morphometric and morphologic analysis. "Int J Periodont Rest Dent 18:489 - 501 1998
18. Rosenberg MM : " Periodontal and prosthetic management for advanced cases " Quintessence Pub. co.,Inc. 247 1988
19. Ross IF et al : " Furcation involvement in maxillary and mandibular molars "J Periodontol 51:450 1980
20. Ochsenbein C. : " A primer for osseous surgery "Int J Periodont Rest Dent 6(1):8 1986
21. Larato DC : " Some anatomical factors related to furcation involvements " J Periodontol 46:608 1975
22. Dunlap R, Gher M : " Root surface measurements of the mandibular first molars " J Periodontol 56:234 1985
23. Gher M, Dunlap R : " Linear variation of the root surface area of the maxillary first molar "J Periodontol 56:39 1985.