

한국인 치아치은 집합체구조의 삼차원적인 분석

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- 1.
- 2.

Three dimensional analysis of Korean dentogingival complex

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ABSTRACT

Purpose: Variation in the morphology of gingival papilla may be determined by the shape and position of anatomic crown as well as contact area and embrasure form of individual teeth. However, periodontal biotype classification is regarded to be subjective because of the lack of definite criteria. In this study, we defined the objective parameters which constitute the periodontal biotype and measured their relationship.

Materials and Methods: 109 of dental casts were prepared using three dimensional scanner and specialized reconstruction software, then acquired virtual models were sent to the 20 professional dentists to define the specific periodontal biotypes. Several parameters around periodontal structures were measured from the virtual models; facial surface area of the anterior tooth (AT), anterior papillary area (AP), proportion of the dento-papillary complex, clinical papillary length (PL), and clinical papillary angle (PA). Statistical analysis was performed to confirm the relationship among parameters.

Results: Coincidence rate of periodontal biotype within observers was 63.77±16.05%. Coincidence rate between observers was 76.15±16.43%. Among the parameters measured, PL showed the most positive correlations and PA presented the most negative correlations. The parameter of the AP and PL of six maxillary anterior teeth showed significant correlation coefficient.

Conclusion: Anterior papillary area and clinical papillary length would be objective parameters for determining the consistent periodontal biotypes. (*J Korean Acad Periodontol 2008;38:199-206*)

KEY WORDS: dentogingival complex; periodontal biotype; three dimensional scanner.

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: 2008 6 12 ; : 2008 6 14

2.04 mm가

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Hirschfeld

가 . , 가

6). Wheeler, Glickman

가

7,8)

embrasure form

가

9,10)

thin-scalloped, thick-flat

가

가

가

Moire contourgraphy

(periodontal biotype)

11,12)

가

16)

. Olsson Lindhe

three dimensional scanner가

가

가

17-19)

가

가

13)

가

thick-flat

, three dimensional scanner

가

, thin-scalloped

가

가

Olsson

1) 가

10%

가

14). Becker

(S-D20060006). 20

119

200

flat, scal -

. , 3

loped, pronounced-scalloped

가

5 mm

15)

109

가

75

, 34

23

26

±0.001 mm

X

Y

0.040 mm,

Z

0.002 mm

가

three di -

mensional scanner(Breckmann GMBH, Meersburg, Germany)

10

, three dimensional image

(Rapidform XO, INUS Technology, Seoul, South Korea)

가 가

three dimensional image analysis

(Rapidform 2004, INUS Technology, Seoul, South Korea)

3 3

2)

가 3 가 109

2

20

, Becker flat, scalloped,

pronounced-scalloped

3)

(1) Facial surface area of anterior teeth (AT)

2

, 3

(ATSum2),

4 (ATSum4), 6

(ATSum6) (Fig. 1).

(2) Anterior papillary area (AP)

가

가 가 가

(APSum1), 4 3

(APSum3), 6 5

(APSum5) (Fig. 2).

(3) The proportion of the dento-papillary complex

AT AP

Rate1_2 = APSum1/ATSum2

Rate3_4 = APSum3/ATSum4

Rate5_6 = APSum5/ATSum6

(4) Clinical papillary length(PL)

PL 가 가 가

가 가 가

(PL1), 4 3

(PL3), 6 5

(PL5) (Fig. 3).

(5) Clinical papillary angle(PA)

PA

가

,

(PA1),

4 3 (PA3), 6

5 (PA5)

(Fig. 4).

(AL), (AW), (ICW),

1 (FMW) 가

4)

가

. 가

Student's *t*-test

SPSS(SPSS Inc. Chicago, Illinois)

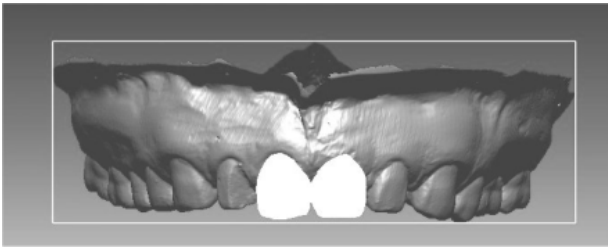


Figure 1. Facial surface area of anterior teeth (ATSum2).

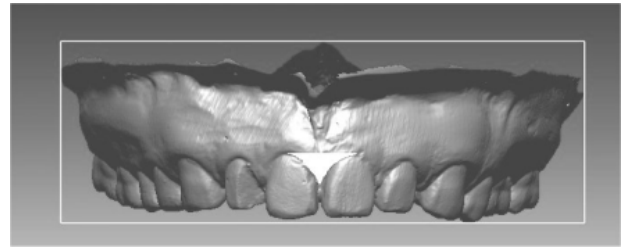


Figure 2. Anterior papillary area (APSum1).

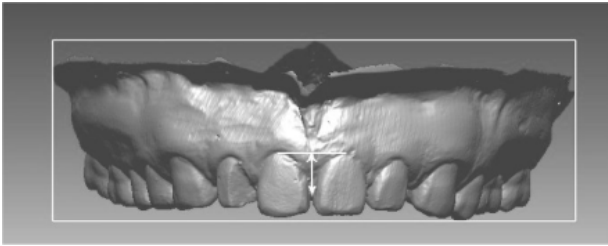


Figure 3. Clinical papillary length (PL1).

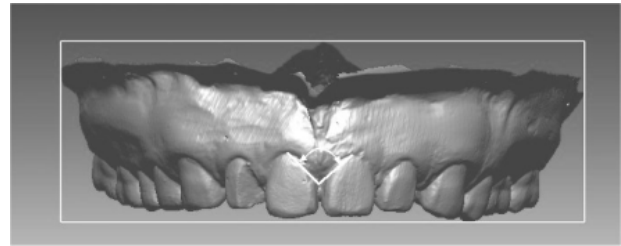


Figure 4. Clinical papillary angle (PA1).

Table 1. Three Dimensional Analysis Data of Anterior Maxilla

	Male		Female		Total	
	Mean	SD	Mean	SD	Mean	SD
APSum1	18.01	4.20	16.57	3.81	17.56	4.12
APSum3	46.50	10.11	42.78	7.38	45.34	9.47
APSum5	77.82	17.28	70.40	10.95	75.50	15.91
ATSum2	168.78	19.75	162.82	21.09	166.92	20.30
ATSum4	284.26	33.12	271.11	31.34	280.16	33.00
ATSUM6	429.57	51.75	412.52	43.61	424.25	49.79
Rate1_2	0.13	0.03	0.12	0.03	0.13	0.03
Rate3_4	0.16	0.03	0.16	0.03	0.16	0.03
Rate5_6	0.18	0.03	0.17	0.03	0.18	0.03
PASum1	98.41	12.41	98.43	9.77	98.42	11.60
PASum3	293.75	31.55	291.68	22.21	293.11	28.88
PASum5	488.48	50.69	483.60	33.86	486.96	46.00
PLSum1	4.12	0.89	3.97	0.67	4.078	0.83
PLSUM3	11.49	2.22	10.94	1.46	11.32	2.03
PLSUM5	19.13	3.66	18.30	2.19	18.87	3.29
AL	49.24	2.64	47.19	2.29	48.60	2.70
AW	60.53	2.55	58.61	1.98	59.93	2.54
ICW	36.98	2.05	35.94	2.00	36.66	2.08
FMW	10.59	0.56	10.34	0.49	10.51	0.55

Rate5_6, PASum5, PLSum5,

63.77 ± 16.05%

Table 2

76.15 ± 16.43%

AL, AW, ICW, FMW

Table 1

가

가 6

Table 1

Pearson 가

PLSum5가 가

PASum5가 가

ATSum6, Rate5_6

Student's t-test AL, AW, ICW, FMW, APSum5

가 ATSum6,

Table 2. Correlation Analysis Data of Anterior Maxilla

		Correlations															
		APSum1	APSum3	APSum5	ATSum2	ATSum4	ATSum6	Rate1_2	Rate3_4	Rate5_6	PASum1	PASum3	PASum5	PLSum1	PLSum3	PLSum5	ModeType
APSum1	Pearson Correlation	1	.835*	.760*	.322*	.307*	.314*	.835*	.691*	.637*	-.563*	-.618*	-.545*	.769*	.715*	.642*	.458*
	Sig. (2-tailed)	.000	.000	.000	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
APSum3	Pearson Correlation	.835*	1	.958*	.387*	.383*	.383*	.618*	.808*	.806*	-.622*	-.762*	-.757*	.747*	.884*	.856*	.560*
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
APSum5	Pearson Correlation	.760*	.958*	1	.430*	.448*	.449*	.491*	.715*	.809*	-.608*	-.759*	-.781*	.706*	.865*	.889*	.630*
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
ATSum2	Pearson Correlation	.322*	.387*	.430*	1	.960*	.918*	-.157	-.193*	-.122	-.269*	-.248*	-.235*	.323*	.353*	.362*	.340*
	Sig. (2-tailed)	.001	.000	.000	.000	.000	.000	.044	.044	.208	.005	.009	.014	.001	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
ATSum4	Pearson Correlation	.307*	.383*	.448*	.960*	1	.951*	-.233*	-.223*	-.122	-.241*	-.240*	-.235*	.307*	.348*	.373*	.353*
	Sig. (2-tailed)	.001	.000	.000	.000	.000	.000	.015	.019	.205	.012	.012	.014	.001	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
ATSum6	Pearson Correlation	.314*	.383*	.448*	.918*	.951*	1	-.194*	-.191*	-.152	-.305*	-.267*	-.258*	.342*	.353*	.375*	.391*
	Sig. (2-tailed)	.001	.000	.000	.000	.000	.000	.043	.046	.114	.001	.005	.007	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
Rate1_2	Pearson Correlation	.835*	.618*	.491*	-.157	-.233*	-.194*	1	.815*	.679*	-.441*	-.483*	-.411*	.613*	.525*	.428*	.253*
	Sig. (2-tailed)	.000	.000	.000	.104	.015	.043	.000	.000	.000	.000	.000	.000	.000	.000	.000	.008
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
Rate3_4	Pearson Correlation	.691*	.808*	.715*	-.193*	-.223*	-.191*	.815*	1	.923*	-.506*	-.652*	-.652*	.603*	.714*	.666*	.360*
	Sig. (2-tailed)	.000	.000	.000	.044	.019	.046	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
Rate5_6	Pearson Correlation	.637*	.806*	.809*	-.122	-.122	-.152	.679*	.923*	1	-.474*	-.666*	-.699*	.562*	.725*	.738*	.434*
	Sig. (2-tailed)	.000	.000	.000	.208	.205	.114	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
PASum1	Pearson Correlation	-.563*	-.622*	-.608*	-.269*	-.241*	-.305*	-.441*	-.506*	-.474*	1	.854*	.756*	-.889*	-.778*	-.712*	-.680*
	Sig. (2-tailed)	.000	.000	.000	.005	.012	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
PASum3	Pearson Correlation	-.618*	-.762*	-.759*	-.248*	-.240*	-.267*	-.483*	-.652*	-.666*	.854*	1	.939*	-.830*	-.911*	-.871*	-.729*
	Sig. (2-tailed)	.000	.000	.000	.009	.012	.005	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
PASum5	Pearson Correlation	-.545*	-.757*	-.781*	-.235*	-.235*	-.258*	-.411*	-.652*	-.699*	.756*	.939*	1	-.729*	-.886*	-.920*	-.699*
	Sig. (2-tailed)	.000	.000	.000	.014	.014	.007	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
PLSum1	Pearson Correlation	.769*	.747*	.706*	.323*	.307*	.342*	.613*	.603*	.562*	-.889*	-.830*	-.729*	1	.885*	.803*	.664*
	Sig. (2-tailed)	.000	.000	.000	.001	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
PLSum3	Pearson Correlation	.715*	.884*	.865*	.353*	.348*	.353*	.525*	.714*	.725*	-.778*	-.911*	-.886*	.885*	1	.961*	.710*
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
PLSum5	Pearson Correlation	.642*	.856*	.889*	.362*	.373*	.375*	.428*	.666*	.738*	-.712*	-.871*	-.920*	.803*	.961*	1	.704*
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
ModeType	Pearson Correlation	.458*	.560*	.630*	.340*	.353*	.391*	.253*	.360*	.434*	-.680*	-.729*	-.699*	.664*	.710*	.704*	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.008	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

64%

가

가

가 mension 11,12)

가 , APsum5 가

가 가 , Rate5_6 PAsum5 di - mension , 가 thin type 가 AL, AW, ICW, FMW 가 3 가 U shape V shape thin thick 가 APsum5 가 4 가 6 가 type thin type 3 , Olsson 13,14) 3 가 2 di -

가 Dry skull 15)가 가 가 thin type 가 3 가 가 가 가

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