

# 소양인, 태음인의 표준 3차원 얼굴 모델링 개발 및 그 특성에 관한 연구

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## Abstract

### Studies on the Modeling of the Three-dimensional Standard Face and Deriving of Facial Characteristics Depending on the Taeumin and Soyangin

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#### Objectives

This study was aimed to find the significant features of face form according to the Taeumin and Soyangin by analyzing the three-dimensional face information data. Also, making standard face of the Taeumin and Soyangin was an object of this study.

#### Methods

We collected three-dimensional face data of patients aged between 20~45 years old diagnosed by a specialist of Sasang constitutional medicine. The data were collected using a 3D scanner, Morpheus 3D(Morpheus Corporation, KOREA). Extracting a face feature point total of 64, was set to 332 pieces(height, angle, ratio, etc.) of each variable between feature points. ANOVA test were used to compare the characteristics of subjects according to the Taeumin and Soyangin.

#### Results

When not to consider gender, the Taeumin and Soyangin were different from the 18 items(3 items in the ear, 9 items in the eye, 1 item in the nose, 1 item in the mouth, 4 items in the jaw). When to consider gender, the Taeumin and Soyangin men were different from the 6 items(1 item in the ear, 2 items in the nose, 3 items in the face). And the Taeumin and Soyangin women were different from 17 items(1 item in the ear, 10 items in the eye, 2 items in the nose, 1 item in the mouth, 3 items in the face).

#### Conclusions

These results show Taeumin's face(both men and women) width of the right and left is larger than the length of the top and bottom. Compared to men of Soyangin, men of Taeumin has greater wings of the nose. Compared to women of Soyangin, women of Taeumin has longer length of the eye. Soyangin's face(both men and women) length of the top and bottom is larger than the width of the right and left. Compared to men of Taeumin, men of Soyangin has smaller wings of the nose. Compared to women of Taeumin, women of Soyangin has more stereoscopic facial features at the top and bottom of the lateral face. Also, by accumulating three-dimensional face data, this study modeled the standard facial features by Taeumin and Soyangin. These results may be helpful in the development of Sasang constitutional diagnostics utilizing the characteristics of the facial form at later.

**Key Words** : Standard Facial Feature, Three-dimensional, Sasang Constitution Diagnosis, Sasang Constitutional Medicine (SCM)

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## I. 緒論

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## II. 研究對象 및 方法

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. QSCC +

(QSCC: Questionnaire for the

Sasang Constitution Classification)

QSCC

. (IRB : 2014-06-003)

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3D

Morpheus 3D

(Mesh Form)

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(Table 1).

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QSCC +,

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Table 1. Detail Informations of the Device

	3	
	-	: H390 * W140 * D240 / 3kg
	-	: 480 *640
	-	: 24bit True Color
Morpheus 3D NEO	-	: IEEE 1394
( : 3 )	-	: Power White LED
	-	: 225mm * 300mm
	-	: 700mm
	-	: 1
	-	:
Face-Maker		Morpheus 3D NEO
	3	
RENAI-MEF	- 3	
	- 3	
	3	
RENAI-FSD	-	
	- / , , ,	

		3D Animation	3D
Morpheus 3D	60~70cm		
		4)	
		(1)	
-	: 90		: 24
		(	6 ,
			18 )
-	: 45 45		: 132
		(	20 ,
			112 )
			: 62
3)		(	20 ,
			42 )
	, auto detecting self detecting		: 38
	3	(	7 ,
			31 )
	3		: 38
3D Maya		(	2 ,
			36 )
	Rendering		: 10

( 7 , (Facial Definition Parameter) 38 ,  
 3 ) 13 64  
 : 12 Table 2, Table 3, Figure 1, Figure  
 ( 7 , 2 (Table 2, Table 3, Figure 1, Figure 2).  
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 : 16 16 , 316 332  
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 , 8 (3)  
 B  
 3 , breadth, H height, T tration-projected length,  
 3 , 3 , A angle, R ratio, E eye, M mouth, Er  
 3 , ear, F face, Ar area  
 4 16 . F fron-  
 (2) tal, S side, A angle, E exposure  
 . frontal side  
 6 A angle  
 97 60 157 ,  
 7 8  
 51 , 60 (FDP)  
 11 , 11  
 , 'Z'  
 , '◇'  
 MPEG-4  
 FDP FAP . FDP 84  
 3 X, Y, Z  
 FAP  
 68  
 9 MPEG-4(Moving Picture Experts A, B  
 Group)  
 38 , 13  
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 4.  
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Table 2. The FDP of Frontal Face

Frontal Face Mark	Name (Chinese character)	Name (Korean)	Name (English)	Description	Remark
1	S1		Right pupil	( )	
2	S2		Left pupil	( )	
3	L1		Trichion		
4	L2		Pronasale		
5	L3		Gnathion		
6	1.1		Upper margine on right eyebrow		
7	1.2		Lower margine on right eyebrow		
8	1.3		Proximal point of right eyebrow		
9	1.4		Proximal point of left eyebrow		
10	1.5		Distal point of right eyebrow		
11	1.6		Distal point of left eyebrow		
12	1.7		Glabella		
13	1.8		Lower margine on right eyebrow		
14	1.9		Lower margine on left eyebrow		
15	2.1		Right double eyelid point		
16	2.2		Left double eyelid point		60%( )
17	2.3		Right upper eyelid point		
18	2.4		Left upper eyelid point		
19	2.5		Right lower eyelid point		
20	2.6		Left lower eyelid point		

Frontal Face Mark	Name (Chinese character)	Name (Korean)	Name (English)	Description	Remark
21	2.7		First sulcus point of right lower eyelid		
22	2.8		First sulcus point of left lower eyelid		
23	2.9		Right endocanthion	( )	
24	2.10		Left endocanthion	( )	
25	2.11		Right ectocanthion	( )	
26	2.12		Left ectocanthion	( )	
27	3.1		Sellion		
28	3.2		Right lateral point of nasal ala		
29	3.3		Left lateral point of nasal ala		
30	4.1		Labiale superius		
31	4.2		Stomion		
32	4.3		Labiale inferius		
33	4.4		Right oral angle point		
34	4.5		Left oral angle point		
35	5.1		Oblique point of right oral angle point	45	
36	5.2		Oblique point of left oral angle point	45	
37	5.3		Inferior point of right oral angle point		
38	5.4		Inferior point of left oral angle point		

FDP ; Facial Definition Parameter

P < 0.05

PASW/SPSS statistic (Version 20, IBM Co., Armonk, NY, USA)

Table 3. The FDP of Lateral Face

Lateral Face Mark	Name (Chinese character)	Name (Korean)	Name (English)	Description	Remark
1	S3		Left tragion		
2	6.1		Metopion		
3	6.2		Ophryon		
4	3.4		Superior point of nasal ala		
5	3.5		Inferior point of nasal ala		
6	3.6		Subnasale		
7	4.6		Mento-labial sulcus point		
8	5.5		Prominent point of mentus	( )	
9	7.1		Top point of left auricle		
10	7.2		Lateral point of left auricle	( )	
11	7.3		Left earlobe		
12	7.4		Left otobasion superius		
13	7.5		Left otobasion inferius		

FDP ; Facial Definition Parameter

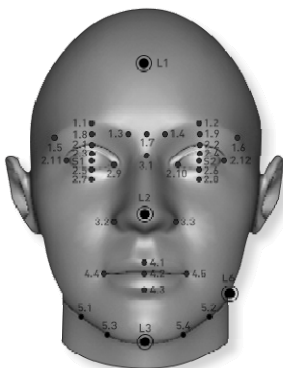


Figure 1. Image of frontal face mark

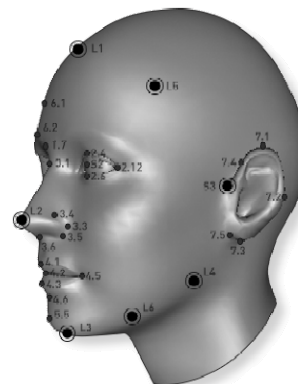


Figure 2. Image of lateral face mark



Table 4. Including and Excluding Criteria

Including Criteria	20~45
	4
Excluding Criteria	

Table 5. Characteristics of Subjects

Gender	Number	Constitution (Number)	Age
Male	64	Soyangin (36)	30.7
		Taeuemin (28)	
Female	91	Soyangin (59)	33.9
		Taeuemin (32)	
Total	155	Soyangin (95)	32.6
		Taeuemin (60)	

### III. 研究結果

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2, 22, 10, 2, 1, 3  
(Table 4).  
155, 64, 91 (1)  
95, 60, 332, 6  
36, 59  
28, 32 (Table 7).  
32.6, 30.7,  
33.9 (Table 5).

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9, 1, 1, (2)  
4, 18, 332, 17  
(Table 6).

Table 6. Significant Measured Values according to the Sasang Constitution

Part	Face Mark	Description	P value
Ear	S3_L3	Left tragion height	0.017
	7.3_L3	Left earlobe height	0.004
	7.3_L3/S2_3.6	Left earlobe height ratio	0.021
Eye	1.4_1.6	Left eyebrow breadth	0.042
	2.5_2.7	First sulcus point of right lower eyelid length	0.002
	2.6_2.8	First sulcus point of left lower eyelid length	0.01
	2.10_2.12	Left eye breadth	0.012
	S1_S2	Interpupillary distance	0.05
	1.5_1.6	Breadth of distal point of both eyebrow	0.027
	2.11_2.12	Biectocanthion breadth	0.006
	1.5_1.6/S2_3.6	Breadth height ratio of distal point of both eyebrow	0.039
Nose	S1_2.6_S2	Left lower eyelid point angle	0.045
	3.4_L3	Superior point of nasal ala height	0.032
Lip	S1_4.1_S2	Labiale superius angle	0.031
Jaw	4.6_L3	Mento-labial sulcus point height	0.022
	5.5_L3	Prominent point of mentus height	0.007
	5.5_L3/S2_3.6	Prominent point of mentus height ratio	0.008
	5.5_L3/S1_S2	Prominent point of mentus height breath ratio	0.013

Table 7. Significant Measured Values considering Gender (Male)

Part	Face Mark	Description	P value
Ear	7.1_7.3/S2_3.6	Left physiognomic ear length, physiognomic face height ratio	0.027
Nose	3.1_3.2_L2	Right nasal ala angle-1	0.022
	3.1_3.3_L2	Left nasal ala angle-1	0.028
Face	L1_1.7/S1_S2	Upper face length interpupillary face height ratio	0.031
	L1_L3/S1_S2	Physiognomic face height breadth ratio	0.028
	S1_L1_S2	Trichion angle	0.022

Table 8. Significant Measured Values considering Gender (Female)

Part	Face Mark	Description	P value
Ear	7.1_L3/S1_S2	Upper margine of left auricle height breadth ratio	0.041
Eye	S1_S2	Interpupillary distance	0.007
	2.11_2.12	Biectocanthic breadth	0.019
	1.1_L3/S1_S2	Upper margine on right eyebrow height breadth ratio	0.03
	1.2_L3/S1_S2	Upper margine on left eyebrow height breadth ratio	0.044
	1.5_L3/S1_S2	Distal point of right eyebrow height breadth ratio	0.01
	1.6_L3/S1_S2	Distal point of left eyebrow height breadth ratio	0.01
	1.8_L3/S1_S2	Lower margine on right eyebrow height breadth ratio	0.037
	S1_1.7_S2	Glabella angle	0.043
Nose	S1_2.2_S2	Left double eyelid point angle	0.026
	S1_2.4_S2	Left upper eyelid point angle	0.021
	3.1_3.2_3.3	Right nasal ala angle-2	0.004
	S1_3.3_S2	Left lateral point of nasal ala angle	0.004
Lip	S1_5.2_S2	Oblique point of left oral angle point angle	0.025
Face	L1_L3/S1_S2	Physiognomic face height breadth ratio	0.012
	6.1_L3/S1_S2	Metopion height breadth ratio	0.017
	6.2_L3/S1_S2	Ophryon height breadth ratio	0.025

(Table 8).

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#### IV. 考 察

Figure 1. Comparison of facial characteristics between Morpheus 3D and 3D modeling. The 3D modeling shows a more pronounced and wider nose bridge compared to Morpheus 3D, which has a more refined and narrower nose bridge.

Figure 2. Comparison of facial characteristics between Morpheus 3D and 3D modeling. The 3D modeling shows a more pronounced and wider nose bridge compared to Morpheus 3D, which has a more refined and narrower nose bridge.

Table 9. Characteristics of Facial Features by Sasang Constitution (Taeumin & Soyangin)

	Taeumin	Soyangin
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(Table 9).

Morpheus 3D



Figure 3. Three-dimensional standard face of Taeemin (Male)



Figure 4. Three-dimensional standard face of Taeemin (Female)



Figure 5. Three-dimensional standard face of Soyangin (Male)

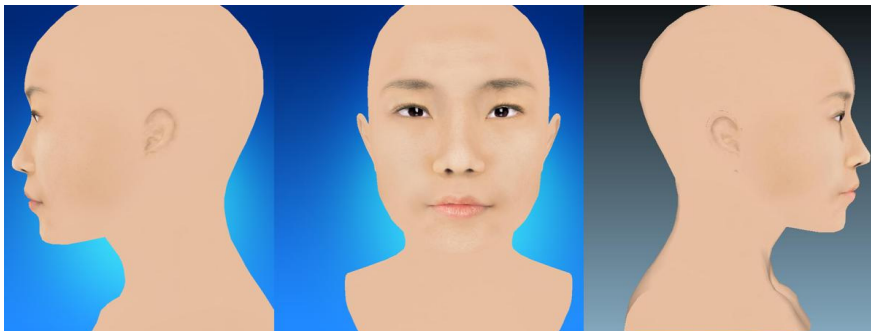


Figure 6. Three-dimensional standard face of Soyangin (Female)

(Figure 3, Figure 4, Figure 5, Figure 6).

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