ORIGINAL ARTICLE

Facial Indices in Chinese Ethnic Students Aged 20-22

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ABSTRACT

Facial aesthetics is one of the factors affecting personal confidence in a social community. Facial indices are very important to obtain a facial aesthetic in orthodontic treatment. Facial indices can be influenced by gender and ethnicity. **Objectives:** To measure facial indices of Chinese ethnic students at the Faculty of Medicine, Maranatha Christian University aged 20-22 years old in 2011 using anthropometric measurements. **Methods:** This was an observational descriptive study. Facial indices of 48 students were measured using dial caliper. **Results:** Male have larger facial index (89.5±5.66), than female (86.67±4.45). Mouth-face width index and upper facial index of female was greater when compared with male, which mouth-face width index of female was 35.22±2.46 while index of male was 34.69±3.04. Upper facial index of female was 56.03±2.99 and male was 55.35±3.72. The lower facial height-facial height index was greater in male (61.22±1.77) than in female (60.20±3.81). Chin-lower facial height index was also greater in male (50.63±3.61) than female (49.64±4.04). Conclusion: Chinese male aged 20-22 have leptoprosop facial type and higher lower facial height and chin, whereas Chinese female aged 20-22 have mesoprosop facial type, higher facial height and wider mouth.

ABSTRAK

Indeks wajah pada mahasiswa etnis Cina rentang usia 20-22. Estetika wajah merupakan salah satu faktor yang dapat mempengaruhi kepercayaan diri dalam suatu komunitas sosial. Indeks-indeks wajah sangat penting untuk mendapatkan estetika wajah dalam perawatan ortodontik. Indeks wajah ini dapat dipengaruhi oleh jenis kelamin dan etnis. **Tujuan:** Tujuan dari penelitian ini adalah mengukur indeks wajah mahasiswa/i etnis Tionghoa pada Fakultas Kedokteran, Universitas Kristen Maranatha dengan menggunakan pengukuran antropometri. **Metode:** Penelitian ini merupakan penelitian deskriptif observasional. Indeks wajah dari 48 subjek diukur menggunakan jangka sorong dial. **Hasil:** Hasil mengindikasikan bahwa laki-laki memiliki indeks wajah (89,5±5,66) lebih besar daripada perempuan (86,67±4,45). Indeks mulut-lebar wajah dan indeks wajah atas pada perempuan lebih besar dibandingkan dengan laki-laki, indeks mulut-lebar wajah pada perempuan 35,22±2,46 dan pada laki-laki 34,69±3,04. Indeks wajah atas pada perempuan 56,03±2,99 dan pada laki-laki 55,35±3,72. Indeks tinggi wajah bawah-tinggi wajah lebih besar pada laki-laki (61,22±1,77) daripada perempuan (60,20±3,81). Indeks dagu-tinggi wajah bawah juga lebih besar pada laki-laki (50,63±3,61) dibandingkan perempuan (49,64±4,04). **Simpulan:** Laki-laki etnis Tionghoa memiliki tipe wajah *leptoprosop* serta tinggi wajah bawah dan dagu yang lebih tinggi, sedangkan pada perempuan etnis Tionghoa memiliki tipe wajah *mesoprosop*, tinggi wajah yang lebih tinggi dan mulut yang lebih lebar.

Keywords: anthropometric measurements, Chinese ethnic, facial indices, leptoprosop, mesoprosop

INTRODUCTION

Facial aesthetic is closely related to distortion and asymmetry of the face that can lead to psychosocial problems. Anthropometric examination is mainly used to detect any disproportion.[1] Variations in the facial morphology can be achieved by modifying the teeth position. Such treatment is mainly performed on children and teenagers, though it is not uncommon in adults and may impart a greater change in appearance of these older individuals, especially to achieve aesthetic results.[2] Orthodontic treatment is one of the treatment in dentistry that can be used to correct facial morphology. By using anthropometric calculations, the proportion of the face before and after orthodontic treatment can be determined.[1]

Measurement of the body has been practiced since the ancient Egypt to measure the size of the body to be expressed in art. Anthropometric derived from the Greek, which 'anthropos' means man, and 'metry' means to measure, thus anthropometry is a science that correlated with the measurement of size, weight and proportions of the human body.[3] It was developed by a German anatomist, Johanne Sigismund Elsholtz for his doctoral thesis at the university of Padua in 1654.[4] The purpose of anthropometry is very broad and includes multi disciplinary sciences, which can be applied for reconstructive treatment in plastic surgery, oral surgery, orthodontics treatment and as well as for forensic analysis.[5] It measures the changes in facial indices after surgical-orthodontic treatment, to relate the magnitude of change by comparing the indices before and after treatment with clinical assessment. It can also be used to determine age, gender and race of an individual as applied in anthropology, archaeology, anatomy as well as in the forensic sciences. Furthermore, the result of anthropometry measurement can as well be applied in design industry for manufacture various products, such as hat, helmet and goggle.[6-8]

Facial aesthetics is a quality that include the shape of a face which can satisfy our vision.[9] It is one of the factors that affects personal confidence to maintain the appearance and perception in the social community.[10] There are no perfect faces, each face have disproportion and asymmetry which can be seen from its relationship to the teeth and lips when someone smiles. Assessment of the facial disproportion and asymmetry is therefore necessary. There are several aspects that need to be considered in determining the facial aesthetics, namely: head natural position, fronto-facial analysis, vertical facial proportion, transverse facial proportion, facial symmetry, dental midlines, lip aesthetics, dark buccal corridors and facial profile analysis.

Facial anthropometric indices are useful to describe facial proportion. In the past few decades modified versions of indices have been used in medical practice and research. They demonstrate the degree of disproportions in various parts of human body caused by hormonal and other disorders, congenital anomalies or trauma.[4] Anthropometric of facial indices have large variations and influenced by gender and races/ethnicity.[7] Chinese people belong to Mongoloid race, has differences with Caucasoid and Negroid. Their characteristics include a flat facial profile and a more prominent zygomatic arch. Generally, the middle third of Mongoloid race is taller than the forehead, while in Caucasoid race the opposite is true. The lower third of Caucasoid race is usually more prominent than the middle third, whereas in Mongoloid race, the faces are almost equally distributed, with one or the other being more prominent. In the Mongoloid race, the forehead is less prominent than the lower third, similar to the Caucasian race. Unfortunately, normative data regarding head and face on Mongoloid are still scarce and its facial analysis has not yet been studied thoroughly compared to Caucasian which have been studied since the renaissance age.[11-13] Therefore, this study aimed to analyse the facial indices in Chinese ethnic students at the Faculty of Medicine, Maranatha Christian University aged 20-22 years old in 2011.

METHODS

This study was conducted after receiving approval from research ethical committee of the Faculty of Medicine, Maranatha Christian University–Immanuel Hospital Bandung, started with performing the sampling from population. Subjects were the Chinese ethnic students at the Faculty of Medicine, Maranatha Christian University aged 20-22 years old who met the inclusion criteria. The consecutive sampling technique was performed, which consisted of 15 male students and 33 female students. Inclusion criteria were Chinese ethnic students whose their paternal and maternal grandparents and their parents are Chinese ethnic and aged between 20-22 years old.

Exclusion criteria were students that had a permanent impaired nasal obstruction, in the process of or have had received orthodontic treatment, had complex abnormalities in the craniofacial such as cleft lip, craniofacial fracture, has normal body mass index or overweight grade I (BMI 18.5-29.9kg/m^{2}), had undergone facial surgery and not willing to be the subject of research.[13] Then facial landmarks were used to determine facial indices measured by dial calipers (Mitutoyo Corp., Kawasaki, Japan). Anthropometric evaluation began with the identification of the landmarks location on the subjects, which could be either visible or palpable (skin or bone) on the subjects. Measurements were carried out using the sterilized caliper or measuring cord 2 times to reduce any errors. The facial landmarks used in measurement of facial indices were described in Figure 1 and Tabel 1.[14]
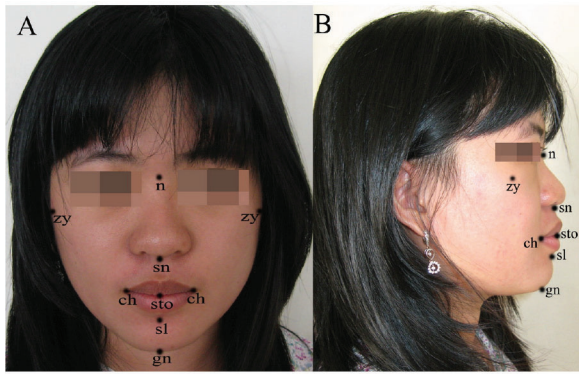
Figure 1. Facial landmarks. (A). Anterior view (B) Lateral view

Tabel 1. Definition of facial landmarks

Landmarks	Definition
Zy (zygion)	The most lateral point of the zygomatic arch
N (nasion)	The point on the midline on the nasal trunk and nasofrontalis suture
Gn (gnation)	The lowest midline point on the mandibular
Sto (stomion)	The imaginary point at the crossing of the vertical facial midline and the horizontal labial fissure between gently closed lips with teeth shut in the natural position
Sn (subnasale)	The midpoint of the angle at the columella base where the lower border of the nasal septum and the surface of the upper lip meet
Ch (chelion)	The point located at each labial commissure
Sl (sublabial)	The lower border of the lower lip or the upper border of the chin

Table 2. Mean and standard deviation of facial indices in Chinese ethnic students aged 20-22

Indices	Men	Women
Facial (n-gn/zy-zy)	89.50±5.66	86.67± 4.45
Upper facial (n-sto/zy-zy)	55.35±3.72	56.03± 2.99
Mouth - facial width (ch-ch/zy-zy)	34.69±3.04	35.22± 2.46
Lower facial height-facial height (sn-gn/n-gn)	61.22±1.77	60.20± 3.81
Chin - lower facial height (sl-gn / sn-gn)	50.63±3.61	49.64± 4.04

Table 3. The percentage of facial shape of Chinese ethnic students aged 20-22

Facial shape type	Men	Women
Hipereuriprosop	0.00%	6.06%
Euriprosop	6.67%	18.18%
Mesoprosop	40.00%	30.30%
Leptoprosop	26.67%	42.42%
Hiperleptoprosop	26.67%	3.03%

*Note: Hipereuriprosop (X-78.9); euriprosop (79.0-83.9); mesoprosop (84.0,87.9); leptoprosop (88.0-92.9); hiperleptoprosop (93.0-X)

Table 4. Result of facial indices in Chinese ethnic on previous study in Xian, P.R.C[16]

Indices	Men	Women
Facial (n-gn/zy-zy)	89.02±4.92	88.52±4.89
Upper facial (n-sto/zy-zy)	59.39±4.47	60.10±4.29
Mouth-facial width (ch-ch/zy-zy)	34.27±1.94	33.23±2.27
Lower facial height-facial height (sn-gn/n-gn)	52.03±3.88	50.20±3.21

Table 5. Result of facial indices in Chinese ethnic on previous study in Singapore[11]

Indices	Men	Women
Facial (n-gn/zy-zy)	85.48	84.36
Mouth-facial width (ch-ch/zy-zy)	34.30	34.73
Lower facial height - facial height (sn-gn/n-gn)	59.00	57.79

RESULTS

The measurement showed that the facial index (n-gn/zy-zy) in male students was 89.5±5.7, whereas in female students was 86.7±4.4. In this study, the upper facial index (n-sto/zy-zy) was greater in female students (56.0±3.0) than in male students (55.3± 3.7). The results of mouth-facial width index (ch-ch/zy-zy) showed the index in female students was greater (35.2±2.5) than male students (34.7±3.0). The results of the lower facial height–facial height index (sn-gn/n-gn) in this study indicated that the index was greater in male students than in female students. Chin–lower facial height index (sl-gn/sn-gn) showed that male students had a greater index than in female students (Table 2).

Based on the calculation of the facial index, we obtained the facial shape type was leptoprosop (tall, narrow face type) in male students, while female students had mesoprosop (average face type). Facial shape in men tended to be longer because generally the growth in men was larger than in women. In this research, 0% of male students and 6.1% female students had hipereuriprosop face, 6.7% of male students and 18.2% female students had euriprosop face, 40.0% of male students and 30.3% female students had mesoprosop face, 26.7% of male students and 42.4% female students had leptoprosop face and 26.67% of male students and 3.03% female students had hipereuriprosop face, thus the facial shape in male students mostly mesoprosop, and in female students mostly leptoprosop (Table 3).

DISCUSSION

In this study, facial index (n-sto/zy-zy) in female students was larger than male students, had similar result with previous studies in Xi'an, People's Republic of China in 2003 (Table 4) which obtained a facial index of ethnic Chinese in women was greater than in men.[16] The results of mouth-facial width index (ch-ch/zy-zy) in this study showed the index was greater in female students than in male students. Lower facial height – facial height index (sn-gn/n-gn) in this study indicated that the index was greater in male students than in female students. Lower facial height–facial height index (sn-gn/n-gn) in this study showed similar results to previous study on ethnic Chinese in Xi'an and Chinese ethnic in Singapore (Table 5).[11,16] It demonstrated a lower facial height–facial height index was greater in men than in women. Chin–lower facial height index (sl-gn/sn-gn) showed that male students had a greater index than in female students. The facial indices were influenced by gender and races/ethnicities.[7]

CONCLUSION

Chinese male students have leptoprosop facial type and higher lower facial height and chin, whereas Chinese female students have mesoprosop facial type, higher facial height and wider mouth.

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