

The Facial Configuration in a Sample of Chinese Boys

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Anthropologists have relied amongst others on the facial configuration to differentiate various racial groups. Orthodontists have likewise studied cephalofacial relationships in many population samples¹⁻⁹ for diagnostic purposes using various methods of analysis but without much concern for differences in the face in terms of ethnic origin.

The present study was undertaken to establish a facial pattern in a sample of Chinese boys at average orthodontic age and to provide information of their racial characteristics for clinical diagnosis and treatment planning.

METHOD AND MATERIALS

Fifty boys with an average age of 11.8 years were selected from almost 900 primary school children in Taipei, Taiwan. Selection was made on the basis of neutroclusion of the permanent first molars and optimal labiolingual relationship of the incisors, as well as physiological balance and harmony of the facial musculature. In these boys twenty-four permanent teeth were present and in satisfactory occlusion except that a few permanent second molars were only partially erupted.

Radiographs were obtained in natural head position; the anterior margin of the cassette and film, respectively, represented the vertical line. The lateral head radiographs were taken by using a cephalometrix unit. Tracings of the radiographs were made on cellophane sleeves. On each tracing the skeletal profile was drawn by connecting nasion (N) to the center of sella (S) and to the line tangent to the frontal bone and to the tip of the nasal bone (R-rhinion), anterior nasal spine (Ans),

subnasale (Sn), prosthion (Pr), infra-dentale (Id), supramentale (Sm), pogonion (Po), gnathion (Gn) and continuing along the mandibular plane to a line tangent to the posterior border of the ramus.

The following eleven angles were made on each tracing: frontonasal, nasal bone (S-N-R), nasomaxillary, R-Ans-Sn, subnasal (Ans-Sn-Pr), alveolar (Sn-Pr and Sm-Id), Supramental (Id-Sm-Po), chin, gonial, SN-Ramus, and incisal. Four linear measurements were also made: nasal bone (N-R), anterior cranial base (S-N), mandibular body, and facial height (N-Gn).

RESULTS

The means, standard deviations, standard errors of the means, and the minimum and maximum values of each measurement are presented in Table I. The mean values were used to draw the facial composite for Chinese boys (Fig. 1). The facial configuration of the boys was compared with a sample of Caucasian children (Steiner's norm) using the anterior vertical line as reference line (Fig. 2). The Steiner's norm was oriented by an eighty-five degree angle of SN to the vertical confirming the findings of Moorrees and Kean.¹⁰ Deflection of the cranial base of five degrees in the Chinese from that in Caucasians has been illustrated and this downward inclination of the cranial base may be the most important characteristic for the Chinese. The nasal bone angle was about three S.D. smaller than in Caucasian children indicating that the nasal bone is vertically positioned in Chinese. The contour of the frontal bone was straighter in the Chinese sample than in the Caucasian. The

TABLE I
(The Angular and Linear Measurements of the Norm of Chinese Boys)

	Mean	Standard Deviation	Standard Error of the Mean	Range
Frontonasal Angle	146.4°	7.80	3.48	125°-160°
Nasal Bone Angle	100°	4.78	2.13	87°-114°
Nasomaxillary Angle	148°	8.2	3.66	125°-168°
Angle R-Ans-Sn	172°	10.7	4.78	150°-180°
Subnasal Angle	141.7°	9.55	4.26	123°-157°
Alveolar Angle	129.4°	8.0	3.57	107°-150°
Incisal Angle	118.9°	7.74	1.08	100°-138°
Supramental Angle	151.8°	5.87	2.62	136°-180°
Chin Angle	65.8°	5.85	2.62	55°- 84°
Gonial Angle	123.3°	8.6	2.94	114°-135°
SN - Ramus Angle	89.7°	4.73	2.11	80°- 95°
Ant. Cranial Base (S-N)	64.61 mm	3.39 mm	1.51 mm	59.5- 70 mm
Nasal Bone (N-R)	22.28 mm	6.30 mm	2.81 mm	17.2- 28.9 mm
Facial Height (N-Gn)	115.27 mm	2.63 mm		108.5-124 mm
Mandibular Body	67.14 mm	11.4 mm	5.09 mm	59.3- 78.0 mm

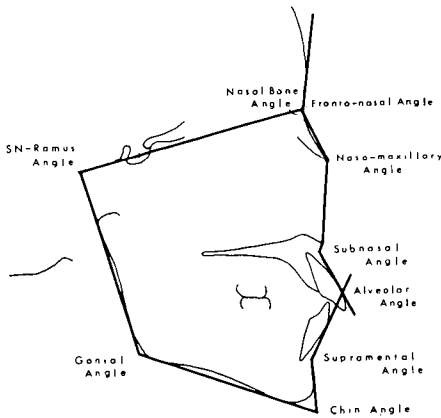


Fig. 1 The mean facial configuration of Chinese boys with an average age of 11.8 years.

nasomaxillary angle in Chinese was approximately one S.D. larger than in Caucasians suggesting a more flattened midface in the Chinese.

The values of the alveolar and incisal angles in Chinese were almost three S.D. smaller than those in the Caucasians indicating a marked labial inclination of the incisor teeth as well as the alveolar bone in Chinese.

The Chinese facial profile was straighter than that of Caucasians ex-

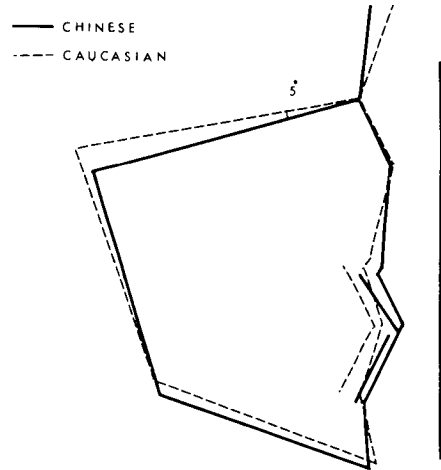


Fig. 2 Comparison of the facial configuration between Chinese and Caucasian (Steiner's norm) using the vertical line for orientation.

cept in the mouth region. The position of the mandible was similar in both groups.

The facial height, nasal bone and relationship of the ramus to the cranial base in Chinese were relatively comparable to those in Caucasians.

DISCUSSION

To develop a method of describing

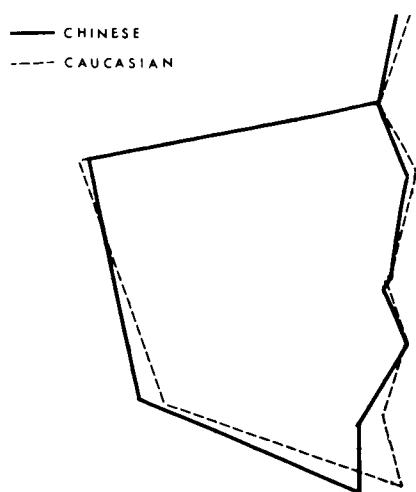


Fig. 3 Comparison of the facial configuration between Chinese and Caucasians (Steiner's norm) using S-N for orientation.

the nature of the skeletal configuration, it is important to correlate the skeletal facial profile of a subject with his actual appearance, which necessitates a comparable plane of reference for both radiographs and photographs. The vertical plane was found to best meet this requirement, as suggested by Moorrees and Kean¹⁰ for the study of prognathism.

The value of using a vertical line as reference when the head is in its natural or upright position¹¹ was clearly demonstrated in the present study. Caudal deflection of the cranial base in the Chinese sample was the most significant racial characteristic. This downward inclination of the cranial base would not have been detected if intracranial reference planes had been used.

Wong,³ relying upon the Frankfort horizontal plane for a study of American Chinese, stated that "Chinese, when compared to Down's normals, presented a Class II facial profile even though each exhibited a good profile and a normal occlusion of teeth." Chan¹² also

reported a retrognathic mandible in adult Chinese as determined by the Frankfort plane. The true profile configuration was masked in these studies because the landmarks defining the intracranial reference lines are as much subject to biologic variation as the profile landmarks.

If in the present study the anterior cranial base (SN) had been used for orientation, the Chinese boys would also have a retrognathic profile (Fig. 3) as reported by Wong³ and Chan.¹² Their findings, however, did not correspond to the actual physical appearance of their subjects.

As the forehead occupies one third of the face, its contour has an important impact on the profile configuration. The straight frontal bone in the Chinese boys certainly characterized their upper face. Flattening of the middle face in the Chinese children was accentuated by the vertically inclined nasal bone and the large nasomaxillary angle. The anterior facial profile in the boys was relatively flat but with alveolar prognathism and procumbent incisors. These features, which apparently remain in adulthood as observed by Wei,⁹ may be due to the combination of a relatively small basal arch and large tooth size, and possibly also to the great prominence of the marginal ridges of the maxillary incisors (shovel shape), which is a racial trait.¹³

This study was done mainly on children whose ancestors had migrated from the coastal provinces (Fukien and Canton) of China. Their facial pattern may be representative of the coastal provinces whereas children born to parents from northern China may have a more angular facial configuration and also a markedly different stature.

Awareness of these racial characteristics in clinical appraisal and treatment planning will undoubtedly assure better success of treatment to establish optimal harmony of the young Chinese face.

SUMMARY

A norm has been computed to describe the facial configuration of Chinese boys of orthodontic age. The relatively vertical inclination of the nasal bone and flat contour of the frontal bone contribute to the flattening of the upper face. Slight lack of chin prominence characterizes the lower face while procumbent incisors and their alveolar bone dominate the middle face. A caudal skull base inclination is probably the most specific feature for this ethnic group.

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