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ANTHROPOMETRIC MEASUREMENTS OF HUMAN FACE IN BASRAH

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Abstract

Anthropometry is the systematic quantitative representation of the human body, it is used to measure the absolute and relative variability in size and shape of the human body. Over the centuries, there have been remarkable changes in anthropometric measurements due to geographical, cultural, genetic and environmental factors. The studying of human face and the assessment of facial dimensions attract the attention of the artists, poets and scientists and takes a prime importance in medical and dental fields in both diagnosis and treatment planning. Anthropometry also used for the design of clothing and equipment, e.g. Gas masks, oxygen masks, dust masks and respirators as well as design of military and industrial helmets. There had been no studies done on facial measurement in Basrah therefore, this study is to be considered as the first in this field and the baseline for further studies. This study had attempted to quantitatively measure the human face in different ethnic groups of the local population and to identify the differences between individuals of different races and sexes, also to identify the differences between the people of Basrah and other people worldwide. These differences which are responsible for the special facial features in different ethnic groups should be maintained during reconstructive or aesthetic surgery otherwise the patients will lose their ethnic features.

The people of Basrah have different racial and ethnic background, there are Semites which are the Arabs and Syrian (Assyrian & Chaldean), Arian, who are the Armenian, Kurdish and Persian, and then there is the mixed group result from interracial marriages.

This study is a cross sectional study with a comparative component conducted in Basrah governorate. The data was randomly collected from volunteers, for the period from February to July 2013. Raw data used in this study was originated from a total number of 1000 Iraqi adults (526 females and 474 males) living throughout Basrah governorate and were used to create a database for statistical analysis.

The result of this study shows that there are differences between the races and between the local people and the surrounding countries and indeed there is a great difference from the standard measurement advocated by western researchers.

Introduction

The human face is a living mirror held out to the world, it has the power to attract charm, brighten and seduce. A common expression is "I may forget a name, but I'd never forget a face'

Anthropometry is a systematic quantitative representation of the human individual for the purpose of understanding human physical variations[1]. Over the centuries, there have been remarkable changes in anthropometric measurements due to geographical, cultural, genetic and environmental factors. The assessment of facial dimension attracts the attention of the artists, poets and scientist and takes a prime importance in medical and dental fields in diagnosis and treatment planning[2]. The modern facial anthropometric measurement applied by Farkas L.G. who studied facial morphology and compared different phenotype norms of population[3]. Anthropometry is used for the design of clothing and equipment, for example, through anthropometric techniques to establish human dimensions,

gas masks oxygen masks, dust masks and respirators as well as designed of military and industrial helmets[4].

There had been no studies or researches done about work on facial measurement in Basrah (as far as researchers know); therefore, this study is to be considered as the first in this field and the baseline for further studies. This study had attempted to quantitatively measure the human face in different ethnic groups of the local population and to identify the differences between individuals of different races and sexes.

The anthropometric differences between the people of Basrah and people worldwide is due to the differences and the variations in bone, cartilage and soft tissue covering in different ethnic group. These differences are responsible for the special facial features in different ethnic groups. It should be maintained during reconstructive or aesthetic surgery and not to apply the western measurements e.g. neoclassical canons otherwise the patients will lose their ethnic features[5]. The patients don't wish to lose their ethnic identity but simply hope to enhance their beauty by bringing the features that are out of proportions back toward proportions of their ethnic group.

The following are considered as the racial and ethnic background in Basrah:

Semites: Arabs, Syrian (Assyrian & Chaldean).

Arian : Armenian, Kurdish and Persian.

Mixed.

In medicine, all these information will be used to reconstruct the ideal model for each race and sex, and such information will be used in plastic and maxillofacial surgery, orthodontic diagnosis, forensic medicine, psychology and psychiatry, surgical simulator, face recognition and many other practical applications. Clinicians working in these fields by using these data will be able to estimate the normal and abnormal growth, planning and evaluating surgical treatment. Anthropometry has the advantage of being inexpensive, simple to be applied and non-invasive[6].

Modern facial soft-tissue anthropometry described by L.G. Farkas who has a major influence on measuring and comparing more than 100 dimensions and proportions, he defined standards for almost every soft-tissue measurement in the head and face in more than 120 publications and defined the role of anthropometry on the aesthetics of women's faces[7], he revised the classic canons for facial proportions in art to correlate these to current norms[8]. Farkas's used a total of 47 landmark points to describe the face, and investigate the applicability of neoclassical facial canons, studying samples of North American Caucasians[9]. Subsequently the applicability of these canons was also tested on several other ethnic groups including African-Americans[10], Turkish[11], Vietnamese, Thai and Chinese individuals[12]. In these studies measurements were directly obtained using anthropometric tools.

The neoclassical canons used to evaluate facial aesthetics as a crucial for planning of orthognathic, facial plastic surgery and orthodontic treatment dividing the face horizontally and vertically. In horizontal facial thirds" the face is divided horizontally into three regions of equivalent height[13]. These facial thirds are rarely equal. In Caucasians, the middle third is often less than the upper third and the middle and upper thirds are less than the lower third. In East Asians, the middle third of the face is often greater than the upper third and equal to the lower third, and the upper third is less than the lower third[14]

The lower third is further divided into its own thirds, defining the upper lip, lower lip, and the chin[15] Figure 1.

The neoclassical canon of facial proportions divide the face vertically into five fifths, the width of each eye, the Intercanthal distance and the nasal width each measured one-fifth (Figure 2).

However, studies using direct anthropometry found that in white and Asian subjects there are variations in these proportions, with the width of the eyes and nasal widths often being either less or greater than the inter canthal distance[16,17].

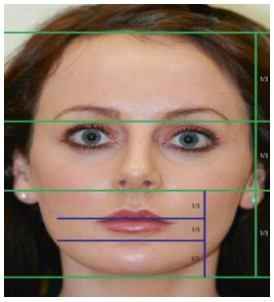


Figure 1: Horizontal facial proportions[21]

Figure 2: Vertical facial proportion

The eye usually measures one-fifth the width of the face[18]

The study objectives

The specific aim of this study is to perform a systematic analysis of the available population data in order to quantify the relative degree of inter-ethnic variability that exists in various facial features.

Explore gender differences in relation to races and the applicability of the standard anthropometric measurements with their variants.

To evaluate anthropometry as a method for facial identification and determine the degree of accuracy with which identification can be made.

Methodology

This is a cross sectional study with a comparative component conducted in Basrah governorate for the period from February to July 2013. The data was randomly collected from volunteers, Raw data used in this study was originated from a total number of 1000 Iraqi adults (526 females and 474 males) living throughout Basrah governorate and were used to create a database for statistical analysis. Although, it was difficult to have a pure race due to mix marriages but all efforts were done to get a pure sample to the best of our ability.

The subjects participated in this study had to meet the following criteria: They should be 18 years of age and above to minimize the effects of ageing on the facial measurements.

No obvious facial deformities.

No history of chronic diseases that may alter the craniofacial morphology.

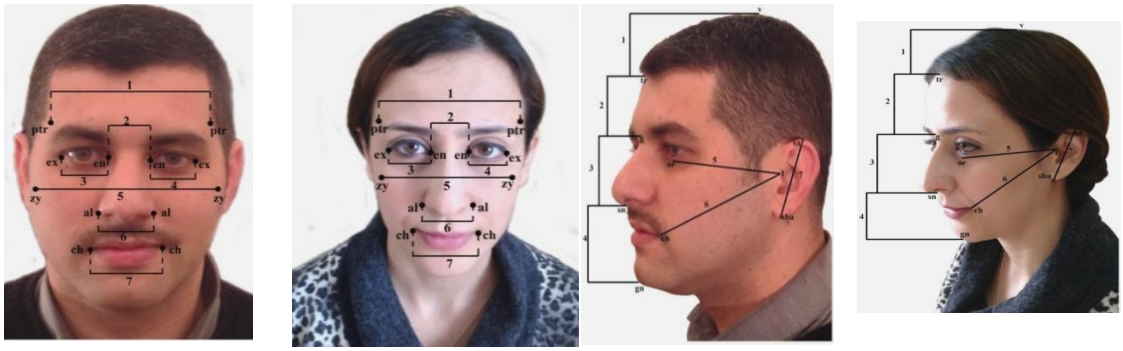
No history of medical treatment that could produce distortion of normal facial landmarks.

No history of maxillofacial, plastic or reconstructive surgery.

No major trauma.

The data were collected through a direct interview. Verbal consent from the participants was obtained. A special questionnaire form (Appendix I) was prepared for the purpose of data collection. Surface landmarks were noted on the face before taking the standard measurements; all measurements were taken with the head orientation with the Frankfurt horizontal plane parallel to the floor The facial midline was determined by three anatomical landmarks, the nasion (root of the nose), the subnasal (base of the columella), and the menton (lower point on the anterior border of the chin). Ten standard anthropometric measurements were obtained in this study. Anthropometric evaluation begins with the identification of particular locations on the subject, called landmark points which defines in terms of visible or palpable features (skin or bones) on the subject (Figures 3 &4). Series of measurements

between these landmarks were then taken using carefully specified procedures and measuring instruments such as calipers, goniometer and measuring tape, our data were taken in millimeters. (Figure 5)



(anterior view) (lateral view)

Figure 3 &4 : landmarks and measurements: 1: Intercanthal distance (en-en1: Upper face height (tr-g), 2:Eye-fissure width (right) (ex-en) 2: Middle face height (g-sn), 3: Eye-fissure width (left) (ex-en), 3: Lower face height (sn-gn), 4: Nose width (al-al) 4:Length of the ear (sa-sba). 5: Mouth width (ch-ch)

The statistical analysis used in this research was computer program SPSS version 15.0. T-test was performed as comparison test, to examine the differences between the population regarding its races and ages of the sample. A P-value of <0.005 was considered to indicate significance and P value of equal or less than 0.001 regarded as highly significant. The general characteristics of the study group included in this study were explored using mean and SDV.

Results

The total numbers of females included in our study were 526, distributed according to their races. They were 368 (69.96%) Arab female, 77 (14.64 %) Arian female and 81 (15.40 %) mixed female. The total numbers of males included in the study were 474, distributed according to their races. They were 391(82.48%) Arab male, 55 (11.6 %) Arian male and 28 (5.9 %) mixed male as shown in Figure 5.

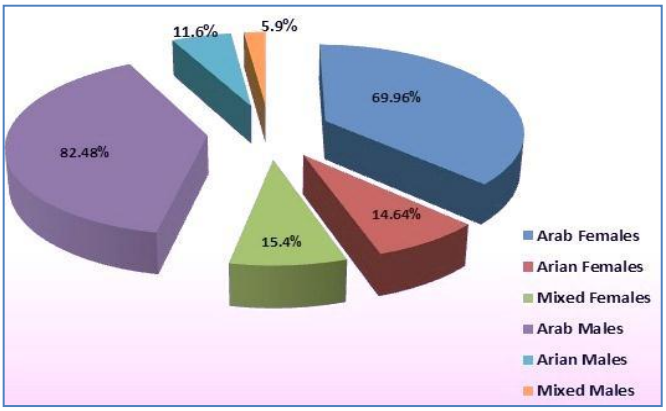


Figure 5: Distribution of males and females according to race

Evaluation of the craniofacial measurements in females' sample:
A statistically significant differences were existed between Arab and Arian female in 3 out of 10 variables measurements (P <0.05) (Table I). The length of the Rt and Lt ear in Arab female was 63.2±4.9 while in Arian female was 65.1±4.9. The upper third face height (tr-g) in Arab females was 58.6±21.6, while in Arian females 52.6±6.4. All other measurements show no statistical significant differences between them.

Table I: Comparison of head and face measurements between Arab and Arian females (mm)

Variables (Measurements)	Arab Females (Mean±STD)	Arian Females (Mean±STD)	P-value
Eye - fissure width Rt (en-ex Rt)	33±2.5	33.9±2.4	NS
Eye - fissure width Lt (en-ex Lt)	33±2.5	33.9±2.4	NS
Intercanthal distance (en-en)	31.6±2.2	32±2.3	NS
Nose width (al-al)	34.5±3.5	34.3±2.7	NS
Mouth width (ch-ch)	47.5±4.1	48.4±3.9	NS
Length ear Rt (sa-sba)	63.2±4.9	65.1±4.9	< 0.05
Length ear Lt (sa-sba)	63.2±4.9	65.1±4.9	< 0.05
Upper third face height (tr-g)	58.6±21.6	52.6±6.4	< 0.05
Middle third face height (g-sn)	57.5±4.3	56.5±4.5	NS
Lower third face height (sn-gn)	58.9±4.7	57.2±4.5	NS

The comparison between Arab and mixed females were summarized in Table (II), which show statistical significant differences in only 1 out of 10 variables (measurements) used in this study. The mean measurement of the lower third face hight (sn–gn) in Arab female was 58.9±4.7 while in mixed female was 58.4±4.7. All other measurements were not significant between Arab and mixed females (Table II).

Table II: Comparison of head and face measurements between Arab and mixed females (mm)

Variables (Measurements)	Arab Females (Mean± STD	Mixed Femals (Mean±STD)	P-value
Eye - fissure width Rt (en-exRt)	33.0±2.50	33.60±3.10	NS
Eye - fissure width Lt (en-exLt)	33.0±2.50	33.5±3.10	NS
Intercanthal distance (en-en)	31.6±2.2	31.5±2.3	NS
Nose width (al-al)	34.5±3.5	34.3±3.9	NS
Mouth width (ch-ch)	47.5±4.1	46.9±4.1	NS
Length ear Rt(sa-sba)	63.2±4.90	62.3±5.4	NS
Length ear Lt (sa-sba)	63.2±4.90	62.3±5.4	NS
Upper third face height (tr-g)	58.6±21.6	54.8±5.5	NS
Middle third face height (g-sn)	57.5±4.3	56.5±4.8	NS
Lower third face height (sn-gn)	58.9±4.7	58.4±4.7	<0.05

The comparison of head and face measurements between Arian and mixed females, only 4 out of 10 measurements show statistical significant differences. Table (III). The mean variance of the mouth width (ch–ch) was 48.4±3.9in Arian females and it was 46.9±4.1in mixed females.

The length of the Rt and Lt ear in Arian females was 65.1±4.9 while in Mixed a female was 62.3±5.4.
Lastly the facial upper third measurement of Arian females was 52.6±6.4 while in mixed females was 54.8±5.50. The comparison of head and face measurements between Arian and mixed females, only 4 out of 10 measurements show statistical significant differences. Table (III).

The mean variance of the mouth width (ch–ch) was 48.4±3.9in Arian females and it was 46.9±4.1in mixed females.
The length of the Rt and Lt ear in Arian females was 65.1±4.9 while in Mixed a female was 62.3±5.4.
Lastly the facial upper third measurement of Arian females was 52.6±6.4 while in mixed females was 54.8±5.50.

Table III: Comparison of head and face between Arian and mixed females (mm)

Variables (Measurements)	Arian Females (Mean ± STD)	Mixed Females (Mean ± STD)	P-value
Eye - fissure width Rt (en-ex Rt)	33.9±2.4	33.6±3.1	NS
Eye - fissure width Lt (en-ex Lt)	33.9±2.4	33.5±3.1	NS
Intercanthal distance (en-en)	32±2.3	31.5±2.3	NS
Nose width (al-al)	34.3±2.7	34.3±3.9	NS
Mouth width (ch-ch)	48.4±3.9	46.9±4.1	< 0.05
Length ear Rt (sa-sba)	65.1±4.9	62.3±5.4	< 0.05
Length ear Lt (sa-sba)	65.1±4.9	62.3±5.4	< 0.05
Upper third face height (tr-g)	52.6±6.4	54.8±5.5	< 0.05
Middle third face height (g_sn)	56.5±4.5	56.5±4.8	NS
Lower third face height (sn_gn)	57.2±4.5	58.4±4.7	NS

Evaluation of craniofacial measurements in male's sample

Table IV show the measurements of head and face among Arab and Arian males. There were 6 measurements shows a statistical significant differences P<0.05, including: The length of the ear in Arab males was 67.6±5.6, while in Arian males was 71.5±6.5. The facial upper third in Arab males was 61.1±9.6, while in Arian males was 60.4±8.2. The middle facial third in Arab males was 60.1±5.6, while in Arian males was 61.8±5.3. The lower facial third in Arab males was 62.7±5.8, while in Arian males was 64.7±6.1.
All the other measurements show no statistical significant differences between Arab and Arian males.

Table IV: Comparison of head and face between Arab and Arian males(mm)

P-value	Arian Males (Mean± STD)	Arab Males (Mean ±STD)	Variables (Measurements)
NS	34±2.8	33.5±2.6	Eye - fissure width Right (en-ex Rt)
NS	34±2.8	33.5±2.6	Eye - fissure width Left (en-ex Lt)
NS	33.1±2.9	32.2±2.5	Intercanthal distance (en-en)
NS	37.5±4.1	37.7±4	Nose width (al-al)
NS	51.8±4.4	49.7±4.2	Mouth width (ch-ch)
< 0.05	71.5±6.5	67.6±5.6	Length ear Rt (sa-sba)
< 0.05	71.5±6.5	67.6±5.6	Length ear Lt (sa-sba)
< 0.05	60.4±8.2	61.1±9.6	Upper third face height (tr-g)
< 0.05	61.8±5.3	60.1±5.6	Middle third face height (g-sn)
< 0.05	64.7±6.1	62.7±5.8	Lower third face height (sn-gn)

The comparison of head and face measurements between Arab and mixed males shows that there were no statistical significant differences between Arab and mixed males (Table V).

Table V: Comparison of head and face measurements between Arab and mixed males (mm)

P-value	Mixed Males (Mean ± STD)	Arab Male (Mean ± STD)	Variables (Meassurments)
NS	34.2±1.9	33.5±2.6	Eye - fissure width Rt (en-ex Rt)
NS	34.2±1.9	33.5±2.6	Eye - fissure width Lt (en-ex Lt)
NS	32.8±2.6	32.2±2.5	Intercanthal distance (en-en)
NS	36.5±3.2	37.7±4	Nose width (al-al)
NS	49.5±4.2	49.7±4.2	Mouth width (ch-ch)
NS	65.3±4.1	67.6±5.6	Length ear Rt (sa-sba)
NS	65.3±4.1	67.6±5.6	Length ear Lt (sa-sba)
NS	60.4±8.2	61.1±9.6	Upper third face height (tr-g)
NS	61.3±4.7	60.1±5.6	Middle third face height (g-sn)
NS	61.8±6.1	62.7±5.8	Lower third face height (sn-gn)

The comparison of head and face measurements between Arian and mixed males are summarized in Table VI . There are significant differences in 3 measurements out of total 10 ($P<0.05$). The mouth width (ch-ch) in Arian males was 51.8±4.4, while in a mixed males was 49.5±4.2. The mean variance for the length of the ear (Rt- Lt) in Arian males was 71.5±6.5 while in mixed males was 65.3±4.1.

Table (VI): Comparison of head and face measurements between Arian and mixed males (mm)

P-value	Mixed Males (Mean ± STD)	Arian Males (Mean ± STD)	Variables (Measurements)
NS	34.2±1.9	34±2.8	Eye - fissure width Rt(en-exRt)
NS	34.2±1.9	34±2.8	Eye - fissure width Lt(en-exLt)
NS	32.8±2.6	33.1±2.9	Intercanthal distance(en-en)
NS	36.5±3.2	37.5±4.1	Nose width (al-al)
<0.05	49.5±4.2	51.8±4.4	Mouth width (ch-ch)
<0.05	65.3±4.1	71.5±6.5	Length ear Rt(sa-sba)
<0.05	65.3±4.1	71.5±6.5	Length ear Lt(sa-sba)
NS	60.4±8.2	60.4±8.2	Upper third face height(tr-g)
NS	61.3±4.7	61.8±5.3	Middle third face height(g-sn)
NS	61.8±6.1	64.7±6.1	Lower third face height(sn-gn)

Local measurements with other studies

Table VII and Table VIII show our results compared with the results of others studies like Persian, Turkish, Malaysian Indians and North American Caucasian, Korean American, African American.

Table VII: Comparison of the craniofacial anthropometric norms between Iraqi (Arab, Arian, Mixed), Persian, Turkish, Malaysian Indians and North American Caucasian Korean American and African American female (Mean ± SD)

African American	Korean American	North American Caucasian	Malaysian Indians	Turkish	Persian	Mixed	Arian	Arab	Landmark
32.1 ± 1.7	27.3 ± 2.0	30.7 ± 1.8	29.6 ± 1.4	33.50 ± 1.9	26.8 ± 2.3	33.60 ± 3.1	33.9 ± 2.4	33.0 ± 2.5	Eye-fissure widthRt(en-exRt)
32.1 ± 1.7	27.3 ± 2.0	30.7 ± 1.8	29.6 ± 1.4	33.39± 1.8	26.8 ± 2.3	33.5 ± 3.1	33.9 ± 2.4	33 ± 2.5	Eye-fissure width Lt(en-exLt)
31.4 ± 2.6	36.9 ± 3.4	32.5 ± 2.1	30.5 ± 1.7	31.86 ± 2.3	32.0 ± 3.0	31.5 ± 2.3	32 ± 2.3	31.6 ± 2.2	Intercanthal distance (en-en)
38.0 ± 0.28	35.5 ± 3.4	31.9 ± 1.0	35.3 ± 2.8	32.32 ± 2.8	35.2 ± 3.0	34.3 ± 3.9	34.3 ± 2.7	34.5 ± 3.5	Nose width (al-al)
51.6 ± 3.4	50.2 ± 4.0	49.8 ± 3.2	45.9 ± 3.0	48.88 ± 3.9	49.2 ± 4.3	46.9 ± 4.1	48.4 ± 3.9	47.5 ± 4.1	Mouth width (ch -ch)
		59.0 ± 3.6	60.3 ± 2.8	58.81 ± 4.2	56.0 ± 3.4	62.3 ± 5.4	65.1 ± 4.9	63.2 ± 4.9	Length ear Rt (sa-sba)
57.4 ± 3.9	67.6 ± 4.8	59.0 ± 3.6			57.0 ± 3.3	62.3 ± 5.4	65.1 ± 4.9	63.2 ± 4.9	length ear Lt (sa-sba)
55.7 ± 7.2	57.7 ± 6.4	52.7 ± 6.0		51.29 ± 7.5	46.3 ± 14.7	54.8 ± 5.5	52.6 ± 6.4	58.6 ± 21.6	Upper third face height (tr_g)
62.00 ± 4.00	67.9 ± 5.0	63.1 ± 4.4		69.21 ± 4.5	69.1 ± 4.8	56.5 ± 4.8	56.5 ± 4.5	57.5 ± 4.3	Middle third face height (g_sn)
67.00 ± 4.6	66.8 ± 5.6	64.3 ± 4.0	61.0 ± 3.9	63.44 ± 5.8	61.5 ± 4.8	58.4 ± 4.7	57.2 ± 4.,5	58.9 ± 4.7	Lower third face height (sn_gn)

Table (VIII): Comparison of the craniofacial anthropometric norms between Arab, Arian, mixed, Malaysian Indians, North America Caucasian and African American males (Mean ± SD) mm

African American	NorthAmericanCaucasian	Malaysian Indians	Turkish	Persian	Mixed	Arian	Arab	Landmark
	31.3 ±		33.89 ± 2.5	28.5 ± 1.8	34.2±1.9	34±2.8	33.5±2.6	Eye-fissure width Rt (en-exRt)
33.2 ± 0.35	31.3 ± 1.4	30.7 ± 1.6	33.91 ± 2.3		34.2±1.9	34±2.8	33.5±2.6	Eye-fissure width Lt (en-exLt)
32.8 ± 0.26	32.9 ± 2.7	31.7 ± 1.9	33.17 ± 2.7	28.7 ± 2.5	32.8±2.6	33.1±2.9	32.2±2.5	Intercanthal distance (en-en)
42.1 ± 0.28	34.8 ± 2.7	39.5 ± 2.6	35.15 ± 2.9	33.4 ± 2.6	36.5±3.2	37.5±4.1	37.7±4	Nose width (al-al)
53.7 ± 0.36	53.5 ± 3.6	47.3 ± 3.3	51.55 ± 4.0	45.9 ± 4.2	49.5±4.2	51.8±4.4	49.7±4.2	Mouth width (ch-ch)
60.1 ± 0.45	62.4 ± 3.7	64.6 ± 4.0	61.49 ± 4.8	59.7 ± 4.2	65.3±4.1	71.5±6.5	67.6±5.6	Length ear Rt (sa-sba)
	62.4 ± 3.7	64.6 ± 4.0	61.49 ± 4.8	60.3 ± 4.3	65.3±4.1	71.4±6.4	67.6±5.6	length ear Lt (sa-sba)
60.2 ± 0.75	57.0 ±4.2		52.72 ± 9.6	61.3 ± 8.2	60.4±8.2	60.4±8.2	61.1±9.6	Upper third face height (tr_g)
62.4 ± 0.42	67.2 ±4.3		73.46 ± 5.1		61.3±4.7	61.8±5.3	60.1±5.6	Middle third face height (g_sn)
74.1 ± 0.51	72.6 ± 4.5	67.7 ± 3.5	70.54 ± 5.5	66.9 ± 5.3	61.8±6.1	64.7±6.1	62.7±5.8	Lower third face height (sn_gn)

Discussion

The majority of the sample numbers are from the Arab race (70% females and 84% males) that is because Arabs are the inhabitant of Basrah area and they are the majority of the population while the Arian (Persian, Armenian or Kurd) are relatively new to Basrah, and they form less number of population.

Evaluation of craniofacial anthropometric measurements in female samples:

A significant difference has been found in 5 variables (measurements) from total 10 anthropometric measurements involved in our study.

The mouth width (ch-ch) of Arian females 48.4±3.9 considered as the highest measurement among all races, while in mixed 64.9±4.1, was the lowest measurements. On comparing these measurements with other studies from surrounding countries. We found that the mouth width in the Arab race in this study was 47.5±4.1 almost similar to the Kuwaiti female measurement 47.72±3.58 and it 'was close to Saudi Arabia 48.13±3.35[19]. In Bahrain 49.37±3.56[19], Turkish 48.88±3.9[20] and Persian 49.2±4.3[21] all were considered close to the Arian females.

It is our view that the differences of the investigated parameters could be the result of geographical and social factors, or it may be the result of migration and mixing of the population in Basrah with different ethnic groups of nearby countries.

Indeed, Basrah with its coastal shore, during the centuries, has constituted one of the principal commercial rote between the Turkey, Iran, Middle East and Far East, which result in mixing of the races. As the Arian measurement was closed to the Persian, Turk, and North American Caucasian measurement, so we can consider that the Arab, Arian, Persian, Turk, and North American Caucasian are all Caucasoid sub group according to Coon classification of races[6].

There is a significant difference in measuring the length of the ear among different races. The largest measurement was in Arian 65.1±4.9, the shortest measurement was in mixed females 62.3±5.4. Other studies shows that the shortest length of the ear was in Persian 56.0±3.4 for the right ear and 57.0±3.3 for the left ear[21] and in African American 57.4±3.9[22], while the longest was found in Korean American females 67.6±4.8[23] which was closed to Arian females.

The mixed female measurement was close to the North American Caucasian 59.0±3.6[24].

The maximum measurement of the upper third face height (tr-g) was found in Arab females 58.6±21.6, while the minimum measurement was among Arian females 52.6±6.4. When we compared the above result with the other studies we found that in Turkish measurement it was 51.24±7.5[20] was close to Arian female. Mixed female 54.8±5.5 was close to African American measurement 55.7±7.2[22], while in Arab race it was close to Korean American measurement 57.7±6.4[23] Due to social and transportation changes, populations from around the world can mate, making successive generations more admixed. This leads to racial features becoming more homogeneous.

The measurement of the lower third face height (sn-gn) in different races shows a significant difference between females. The maximum measurement was among Arab females 58.9±4.7, while the minimum was among Arian females 57.2±4.5. These measurements were close to each other. Other studies show that the highest measurement was in African American (67.0±4.6)[22] and lowest in Malaysian Indian 61.0±3.9[25], which is close to the measurement of the Arab female races. So we can consider that the local females have the lowest

measurement of the lower third of the face.

Although there is no significant differences in nose width (al-al) measurement between races of our females sample, the highest measurement was in Arab females 34.3 ± 2.7 which was close to the measurement of Persian 35.2± 3.0[21], the highest measurement was among African American female 38.0 ± 0.28[22]and the lowest measurement was in North American Caucasian 31.9±1.0[24]. The Arabs are somewhere in between. This is agreed with Farkas et al observation who found that in hot and moist climates the nasal aperture become much wider as in all African and Asian group in both genders, than those who lives in cold places[26], there are no significant differences in the inter canthal distance (en-en) between races in this study. On comparing our results with other studies, we found that the inter canthal distance in Korean American is 36.9±3.4[23] was the highest measurement, while Malaysian Indians 30.5±1.7[25] was the lowest other results are somewhere in between.

There is no significant differences in the measurement of ocular width (en-ex).the Arian females 33.9 ±2.4 considered as the highest measurement among other studies while The lowest measurement were noticed in Persian 26.8 ± 2.3[21] and Malaysian Indian 29.6 ± 1.4[25]. These results agreed with Bali et al who reported that the people living in high altitude show wider inter canthal width and ocular width which means it is significantly affected by climate[28]. So we may conclude that beside racial and ethnical factors, geographical factor can also affect the shape of the face.

Evaluation of craniofacial anthropometric measurements in male sample:

The results of craniofacial Anthropometric measurements of the males with its different races were compared with other worldwide studies. A significant difference has been found in 6 variables out of a total 10 anthropometric measurement involved in this study.

An interesting observation was found in measurement of the mouth width (ch–ch). The Arian race 51.8±4.4 was the highest measurement and was close to Turkish measurement 51.55±4.0[20], also it is close to the measurement of Kuwait 52.53±3.60, Saudi Arabia 52.62±3.87 and Bahrain 53.59±2.64[19]. We found that the measurement was very close between Arab 49.7±4.2 and mixed males 49.5±4.2.

There is a statistical significant difference in measuring the length of the ear among males. The maximum measurement was notice in Arian 71.5±6.5, Arab 67.6±5.6 and the minimum was in mixed 65.3±4.1. On comparing our result with other studies, we found that measurement of mixed and Arab males were close to Malaysian Indian 64.6±4.0[25]So the Arian has the longest ear which is 5mm different.

There were a little differences between the races regarding the of the upper third face height (tr-g). Although the highest measurement was among Arab males 61.1±9.6 which was higher than the Turkish measurement 52.72±9.6)[20] but it is close to the Persian measurement 61.3±8.2[21].

Same result was notice in measuring the middle third face height (g-sn). Little difference was found between males. The highest measurement was in Arian males 61.8±5.3, which is close to the African American measurement 62.4±0.42[22] and was lower than Turkish study73.46±5[20].

Although there is a differences in measuring the of the lower third face height (sn-gn) among males. The highest measurement was in Arian race 64.7±6.1 and the lowest measurement was in mixed race 61.8±6.1. Other studies show that Turkish measurement was 70.54±5.5[20], Persian measurement 66.9 ±5.3[21], Malaysian Indian 67.7±3.5[25] all were higher than our result. So it can be considered that the lower face height is one of the characteristic features of males

of different races compared with the other studies done in the surrounding countries.

There is no significant differences in nose width (al-al) measurement between races of our male sample, the measurement of Arab male 34.7 ± 4.0 and in Arian male was 34.5 ± 4.1, on comparing with the other studies we found that the lowest measurements was in Persian 33.4± 2.6[21], the highest measurement was among African American 42.1± 0.28[22] and our measurements are somewhere in between. Anthropological studies by Oladipo. G. S, et al[27] suggested that the shape of the nose can be influenced by environmental climatic condition, broad nose is associated with hot moist climate and small nasal width is associated with cool and dry condition.

There is no significant difference in the inter canthal distance (en-en) measurements between races of our sample. On comparing the results we have with other studies, we found that Arian race 33.1±2.9 having the highest measurement among other studies while Persian 28.7±2.5[21] and Malaysian Indiansn31.7±1.9[25] were the lowest, other measurements including the Arab and mixed races were somewhere in between.

The sample measurement shows no significant differences in the measurement of ocular width (en-ex), in which the Arian 34±2.8 and mixed 34.2±1.9 were considered the highest measurement among other studies. The lowest measurement was noticed in Persian measurement 28.5 ± 1.8[21] and Malaysian Indian 30.7 ± 1.6[25].These results agreed with Bali et al who reported that the individual who are living at high altitude has significantly wider inter canthal width and biocular width, thus larger inter canthal index[28]. Thus it may conclude that beside racial and ethnical factors, geographical factor can affect the form of the face. That is why the people of similar group show variations in facial form.

Conclusion

This study provide objective and preliminary database for facial anthropometric measurements in adults for both sexes who are living in Basrah city.

This data base can be used as a reference for facial analyses that will be further useful as essential tool to the Researchers, Anatomists, Anthropologist, Clinicians and Forensic experts and to serve as a future framework in this field.

This study determined the possible effect of ethnicity on the diversity of the facial features that exist in some facial appearance within races (Arab, Arian, and Mixed) of the studied sample. Other factors that have a great effect on facial measurement of the ethnic groups living in Basrah are genetic, environmental and demographical, cultural and geographical location.

Mixed race give a feature which is different from other races, which may be concluded that interracial marriages will create anew and distinctive identities. The more population heterogenousity, the more new facial measurements and proportion will emerge from inter racial mixing.

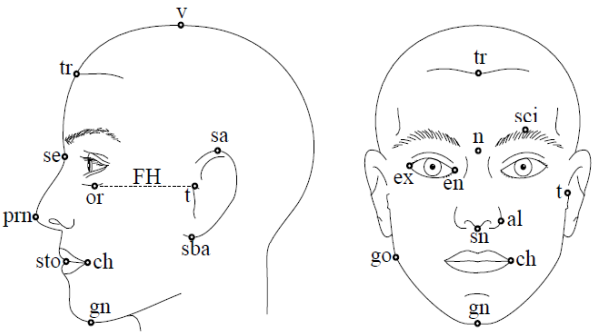
Statistically significant differences were existed in facial measurement in more than five parameters from the total ten measurements within the races of the sample studied.

No statistical significant differences were found in the measurement of cephalic, orbital and nasal index between races of our sample as they are significantly affected by climate and environmental factor.

Our sample measurements seem to be ethnically closer to the Arabs gulf countries, Turkish, Persian and North American, and they share many similar craniofacial measurements, as they are subgroups of Caucasoid race.

Appendix 1: Three-dimensional geometric measurement of human face In Basrah

ID Number: ……..
Age: 18- 29 y 30 -40 y
Sex: M F
Social background: Race: …….. Tribe: ……
Medial canthus (en)-Lateral canthus (ex) Rt.. Lt…
Medial canthus (en) – Medial canthus (en) …….
Rt. Ala (al) – Lt. Ala (al) …….
RT mouth angle (ch) – Lt. Angle (ch)…….
Mouth angle (ch) – Tragus (t) Rt …….. Lt …..
Length of ear Rt …… Lt ……
Upper third, Hair line(tr) (Hair line) -Glabella(g) …
Middle third, Glabella(g)– subnasale(sn) ……..
Lower third, Nasolabial angle(sn)–Ganthion(gn) (Chin)



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