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Estimation and correlation of individual facial height and total body height

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Abstract:

Background: Balance in physical proportions is one the most important criteria for ideal esthetics. Facial features play a vital role in esthetics. However there are various facial heights like upper facial height (UFH), middle facial height (MFH) and lower facial height (LFH). Aim: To access correlation between individual total body height (TBH) and various facial heights (UFH, MFH and LFH). Objectives: To correlate total, upper, middle, lower third facial height with individuals total body height. To find out gender significance present if any. Materials and method: A total of 1000 students with equal sex distribution were examined, using a measuring tape. One observer measured all the various heights of all the individuals. Another observer recorded all the observations. Conclusions: Males were observed to have more TBH, TFH, UFH, MFH and LFH. Facial proportions of the samples did not match the normal acceptable proportions. No significant Correlation was found in relation to TBH v/s TFH, UFH, MFH and LFH. In majority of samples as TBH increased TFH, MFH and LFH increased till 180cms. In majority of samples as TBH increased UFH decreased. Thus TBH can be a precursor for TFH, MFH and LFH. Even though females had lesser TBH in comparison to males, deviation of UFH & MFH was observed to be highest in females. Since there was a reasonable deviation observed both in males and females in relation to LFH in comparison UFH AND LFH, LFH can be considered a more reliable indicator for TBH and TFH.

Key Words: Body Height, Facial Height, Lower Facial Height, Middle Facial Height, Upper Facial Height

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Introduction: Facial anthropometric studies involving facial height have far-reaching implications in health-related fields.[1-6] Facial type in relation to morphological characteristics is an important factor to be considered in orthodontic treatment.[7-13] Three parts of Facial height measurements were[14-16] recognized. Upper third of face is from hairline to supraorbital ridge (UFH). Middle third of face represents from supraorbital ridge to base of nose (MFH). Lower third of face represents from base of nose to chin (LFH). Literature suggests that both are interrelated.[17,18] Very few studies were observed relating to correlation between facial height and body height.[16-20] Our aim was to assess correlation of total, upper, middle, lower third facial height with total body height.

Methodology:

A clustered sampling was followed for selection of the students was followed. 1000 male and female students with equal sex distribution were examined. Students aged between 22-24 years were selected who were student of medical and dental. Physically abnormal subjects, subjects suffering from gait disorder and developmental abnormalities were excluded. Subjects who had undergone orthodontic treatment were also excluded. A measuring tape was used. Three observers were selected initially and they were made to measure a group of students comprising of 10 individuals. After 1 week the same group of students was re-measured by the same observers. Observer who had least variation in observation was selected for taking measurements. First the sample was made to remove the shoes or sandals and was made to stand in an upright position against the flat wall with the eyes looking straight, mandible parallel to the floor, hands positioned by their side and feet facing in forward direction. Body height of the individual was measured using a measuring tape and noted. In the same position, facial height of the individual was measured and noted with the help of divider and ruler in three parts as mentioned above.

Results and observations:

After completion of survey, we analyzed the data in the following way:

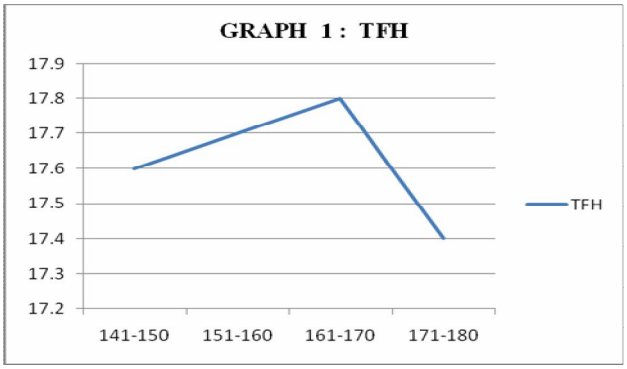
Maximum height observed in the sample was 186centimeters (cms) and 172cms in males and females respectively. Least height of 157cms and 145cms in males and females respectively was observed. However Maximum samples had the total body and total facial height of 161-170 and 17-19cms respectively. To analyze the data and differentiate which part of the face correlates to the maximum, the total facial height was further subdivided into upper facial height (UFH), middle facial height (MFH) and lower facial height (LFH).

Since there was a very wide range of variation in the total body height measured they were further subdivided in subgroups having an interval of 10cms for e.g. 141-150, 151-160 and so on till 190cms in which each interval will be interpreted as follows.

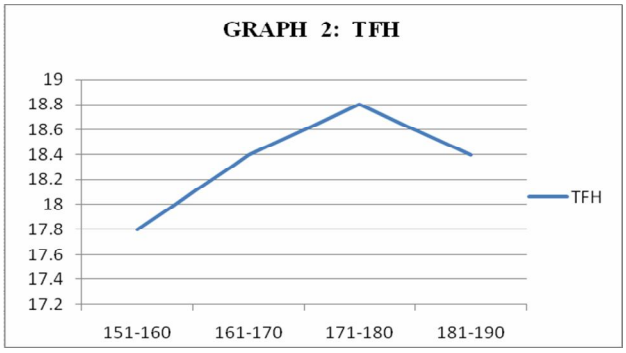
Chi square test denoted statistical significance revealing a “p” value of 0.03 for gender significance. Paired ‘T’ was used for individual intervals for combination of TBH to UFH, MFH and LFH. It was observed that combination of TBH to UFH and MFH did not reveal any statistical significance. Statistical significance was observed in combination of TBH to LFH with a ‘p’ value of 0.01 till 180cms height.

Discussion:

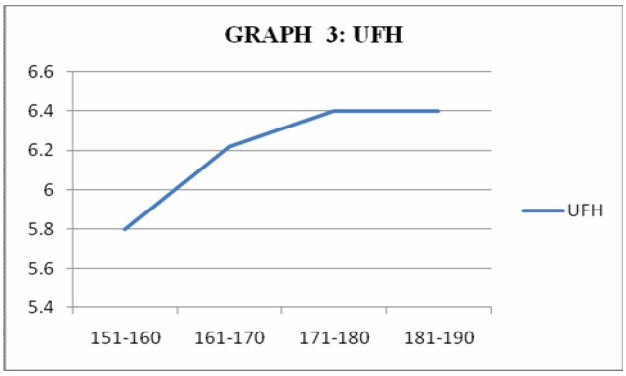
Morphological characteristics are an important factor to be considered in orthodontic treatment.[19] Whenever we examine a patient, our prime concern would be only on the face. Maximum height observed in the sample was 186cms and 172cms in males and females respectively. Least height of 157cms and 145cms in males and females respectively was observed. This was in correlation with one of the study.[20] However maximum samples had the total body and total facial height of 161-170



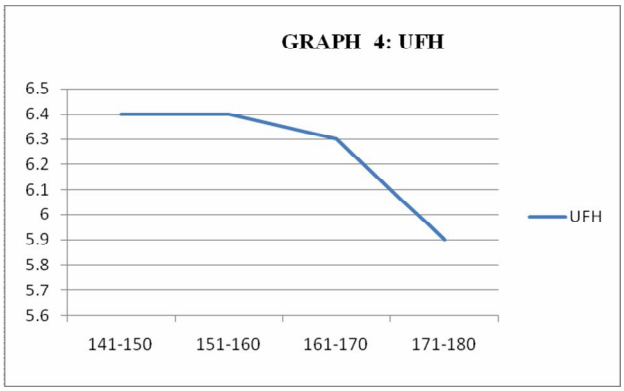
GR 1: Correlation of TFH to TBH in females.



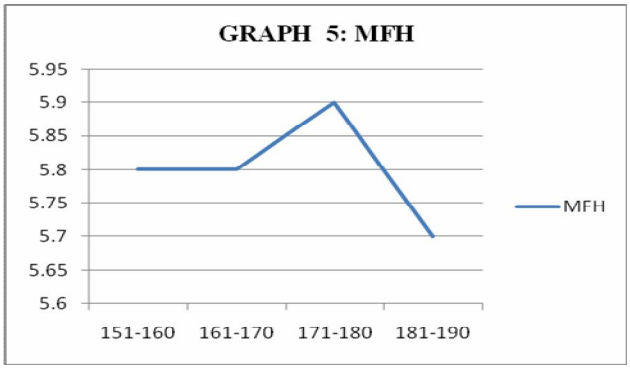
GR 2: Correlation of UFH to TBH in females.



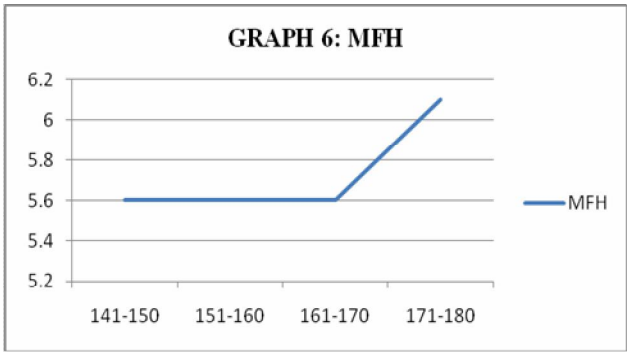
GR-3: Correlation of UFH to TBH in males



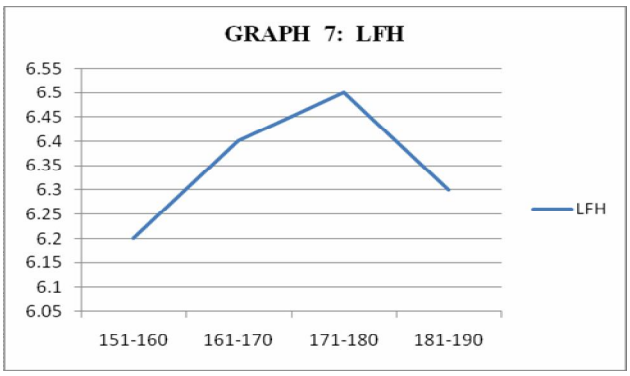
GR-4: Correlation of UFH to TBH in females



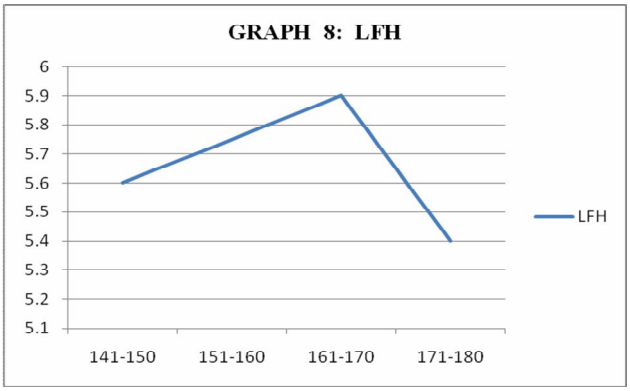
GR 5: Correlation of MFH to TBH in males.



GR-6: Correlation of MFH to TBH in females



GR-7: Correlation of LFH to TBH in males



GR 8: Correlation of LFH to TBH in females

and 17-19cms respectively having an equal number of male and female ratios of 1000 students of age ranging from 22-24 years.

To analyze the data and differentiate which part of the face correlates to the maximum, the total facial height was further subdivided into upper facial height (UFH), middle facial height (MFH) and lower facial height (LFH). Since there was a very wide range of variation in the total body height measured they were further subdivided in subgroups having an interval of 10cms for e.g. 141-150, 151-160 and so on till 190cms in which each interval will be interpreted as follows.

The first interval ranged from 141-150cms of TBH, the average value of TFH was 17.7cms, UFH 6.4cms, MFH was 5.6cms and LFH was 5.6cms in females. No male samples were observed in this group. Literature suggests ideally the value of UFH, MFH, and LFH should be in ratio of 1:1:1.[21] The value of UFH was higher than other two facial heights was observed. The probable cause for this may be wide variation in the hair line. However literature also suggests that UFH is not a reliable measurement.[15,16] In the second interval which ranged from 151-160cms TBH average TFH was 17.7cms in both males and females, UFH was 5.8 in males and 6.4 in females, MFH was 5.8 in males and 5.6 in females and LFH was 6.2 in males and 5.8 in females. When TBH increased all the facial heights also increased in comparison to first interval. The amount of increase in height was observed to be more in males in comparison to females. As physical maturity is observed to be established late in males when compared to females this could be attributed to our observation.[21] However we could not find any studies to correlate the finding. The third interval which ranges from 161-170cms of TBH, average value of TFH was 18.1cms in both genders, UFH was 6.2cms in males and 6.3cms in females, MFH was 5.8cms in males and 5.6cms in females, LFH was 6.4cms and 5.9cms in females. As the TBH increased, the value of TFH, UFH, and LFH also increased, but the value of MFH remained constant in comparison to second interval. The amount of increase is more in males than females. Probable cause for that may be due to late physical maturities in males than females.[20] We could not find any literature in relation variations observed in various facial heights.

Fourth interval ranged from 171-180cms of TBH, the average value of TFH was 18.8cms in both males and females, UFH was 6.4cms and 5.9cms, MFH was 5.9cms and 6.1cms, LFH was 6.5cms and 5.4cms in males and females respectively. We observed maximum variability in female samples especially in UFH and LFH which decreased. This represented that there was a negative correlation of TBH to various facial heights especially in females. The fifth interval ranged from 181-190cms of TBH which includes only male samples, the average value for TFH was 18.4cms, UFH was 6.4cms, MFH was 5.7cms, and LFH was 6.3cms. As the TBH increased the values of various facial heights also increased, thus TBH is in correlation with the variants of facial heights and the TFH is not in correlation with the TBH as the value of TFH decreased in comparison to the previous interval. On overall comparison, we observed that as the total body height (TBH) increased, the total facial height (TFH) also increased to some extent till 180cms. Facial proportions did not match according to the theoretical standards. The limitation of this study was it could not evaluate the factors affecting the facial height. A further study on what are the acceptable standard facial proportions and factors affecting these proportions among Indian population needs to be carried out.

Conclusions:

Following conclusion can be drawn from the study:

1. Facial proportions of the samples did not match the normal acceptable proportions.

2. No significant Correlation was found in relation to TBH v/s TFH, UFH, MFH and LFH.
3. In majority of samples as TBH increased TFH, MFH and LFH increased till 180cms.
4. In majority of samples as TBH increased UFH decreased.
5. Males were observed to have more TBH, TFH, UFH, MFH and LFH.
6. Even though females had lesser TBH in comparison to males, deviation of UFH & MFH was observed to be highest in females.
7. Thus TBH can be a precursor for TFH, MFH and LFH.
8. Since there was a reasonable deviation observed both in males and females in relation to LFH in comparison UFH AND LFH, LFH can be considered a more reliable precursor for TBH and TFH.

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