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Estimation of stature and sexual dimorphism from dimensions of palm and sole in living and in cadavers

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Abstract

Aim: To study the sexual dimorphism from the dimensions of palm and sole in living and in cadavers.

Material and Method: The present study consists of a cross-sectional sample of 200 male and females and 50 cadavers from western part of Maharashtra above 25 years age. The study was conducted in Karad Tehsil of district Satara in the state of Maharashtra.

Results: female the mean value of right hand length is (16.64 ± 0.838) and left hand length is (16.54 ± 0.806) , our findings correlate with Kewal Krishan (2007) study While slightly differ from study of Dr O.P. Jasuja (2004) among the Jat Sikhs and Anitha Oommen, (2005) both the workers sample size compared to present study is less. It may be due to racial and regional differences.

Conclusion: It is concluded that the dimensions of hands and feet can provide good reliability in estimation of stature in forensic examinations. Stature prediction is more accurate and reliable in case of females than in males. It is also observed that a single dimension of hand or foot can estimate stature of a unknown person with a great accuracy and a small.

Keywords: sexual dimorphism, cadavers, living

Introduction

All the human being occupies this globe to the same species i.e. Homosapiens^[1]. No two individuals are alike in all their measurable traits, even genetically identical twins (Monozygotic) differ in some respects. These traits tend to undergo change in varying degrees from birth to death, and skeletal development is influenced by number of factors producing differences in skeletal proportions between different geographical areas, it is desirable to have some means of giving quantitative expression to variations which such traits exhibit^[2]. Anthropometry is a series of systematized measuring techniques that express quantitatively the dimensions of human body and skeleton. The ultimate aim of using anthropometry in forensic science is to help the law enforcement agencies in achieving „personal identity“ in case of unknown human remains^[2]. Here is always need for such studies which help in identifying the deceased from fragmentary and dismembered human remains. In such situation measurements of hands and feet provide good approximation about the height of person^[10].

Some authors are successfully tried to estimate stature from percutaneous body measurements,^[11] some from the isolated long bones and other bones, and some focused their attention on estimation of stature using radiographic materials. Purpose of present study is to analyze the anthropometric relationship between dimensions of hands and feet with stature and to devise regression formulae to estimate stature from these dimensions and also sexual dimorphism. Present study includes estimation of length and breadth of right and left hand, foot length and foot width and height of individuals. An attempt is made to finalize the correlation and regression equation for the above said measurements. This could be of help for identification of body parts in medico legal cases and in war casualties.

Materials and Methods

The present study consists of a cross-sectional sample of 200 male and females and 50 cadavers from western part of Maharashtra above 25 years age. The study was conducted in Karad Tehsil of district Satara in the state of Maharashtra.

Karad is geographically located at latitude 17.28° North of equator and 74.20 East of the prime meridian on the map of the world. The Karad town is situated at an altitude of 1857 feet (566 meters) above the sea level on Mumbai Bangalore National highway No -4 Temperature varies considerably in the region Maximum temperature exceeds 38°C in summer month and minimum temperature goes down around 26°C in winter months. The sample for the present

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study taken from different medical colleges in western part of Maharashtra. Four anthropometric measurements viz. Hand Length, Hand Breadth, Foot Length, Foot Breadth were taken independently on the right and left side of each individual. Beside these, stature of each individual was also recorded. (FIG.1,2)

Plantar aspect of the foot is called as sole. Solar breadth is taken from the one margin to other of foot as foot breadth. It is the distance between the points of the anterior epiphyses (distal) of the 1st metatarsal, the most prominent of the inner side of the foot (metatarsal-tibiale), and the joint of the anterior epiphyses of the 5th metatarsal, the most prominent of the outer side (metatarsal-fibulare). The measurement which is taken in the dorsal region of the foot 'loaded' as in the preceding measurement is oblique with regard to length.

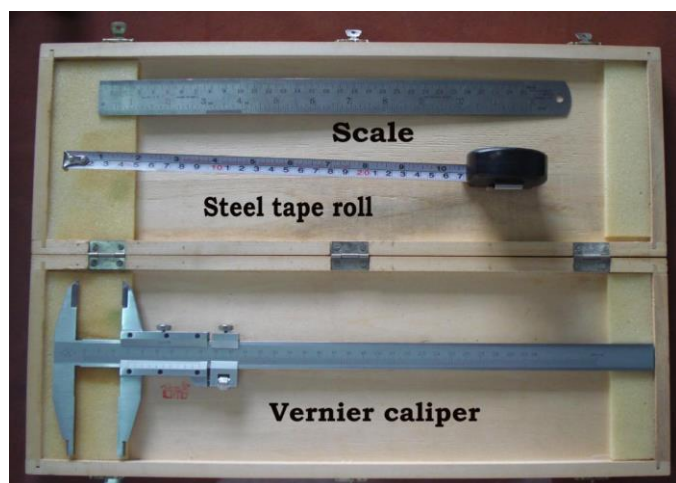


Fig 1: Photo showing the instruments used for the measurements

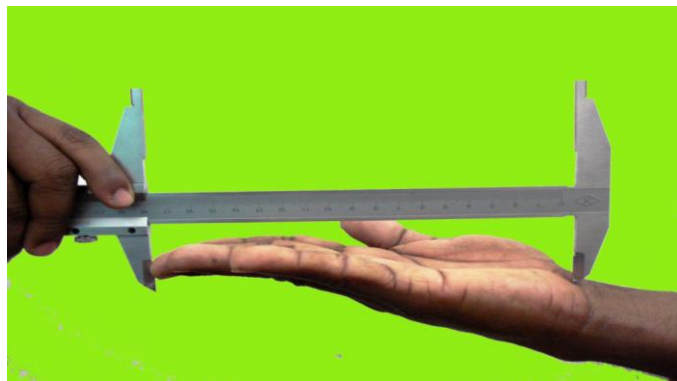


Fig 2: Showing the technique used for the hand length

Results and Discussion

The present study is carried out on 200 individuals, 10 males and 100 females residing in western part of Maharashtra belonging to age above 25 years. This study is undertaken to find out correlation between stature and four other parameters- Hand Length, Hand Breadth, Foot Length, Foot Breadth of Males as well as Females.

In the present study in male the mean value of right hand length is (18.28 ± 0.953) and left hand length is (18.17 ± 0.970) , our findings correlate with Kewal Krishan (2007) study While slightly differ from study of Dr O.P. Jasuja (2004) study among the Jat Sikhs and Anitha Oommen, (2005) both the workers sample size compared to present study is less. It may be due to racial and regional differences.

In the present study in female the mean value of right hand length is (16.64 ± 0.838) and left hand length is $(16.54 \pm$

$0.806)$, our findings correlate with Kewal Krishan (2007) study While slightly differ from study of Dr O.P. Jasuja (2004) among the Jat Sikhs and Anitha Oommen, (2005) both the workers sample size compared to present study is less. It may be due to racial and regional differences.

Very few workers had taken Hand Breadth as a parameter for the stature estimation so data available for comparison is also very limited. In the present study in male the mean value of right hand breadth is (8.19 ± 0.461) and left hand breadth is (7.99 ± 0.498) , our findings correlate with Kewal Krishan (2007) study. In the present study in female the mean value of right hand breadth is (7.43 ± 0.319) and left hand breadth is (07.29 ± 0.313) , our findings correlate with Kewal Krishan (2007) study.

In the present study in males mean value of right foot length is (24.84 ± 1.256) and left foot length is (24.76 ± 1.271) , our findings correlate with Kewal Krishan (2007) study among Rajputs of Himachal Pradesh – a North Indian. While slightly differ from others Anitha Oommen, (2005) Hilmi Ozdena (2005), Tanuj Kanchan (2008) study may be due to variable sample size, racial and regional differences. In the present study in females mean value of right foot length is (22.55 ± 1.001) and left foot length (22.41 ± 1.066) , our findings correlate with Kewal Krishan (2007), study While slightly differ from others Anitha Oommen, (2005) Hilmi Ozdena (2005), Tanuj Kanchan(2008) study may be due to ariable sample size, racial and regional differences.

In the present study in male the mean value of right foot breadth is (9.73 ± 0.510) and left foot breadth is (9.62 ± 0.522) , our findings correlate with Kewal Krishan (2007), and Hilmi Ozdena (2005) study While slightly differ from Tanuj Kanchan (2008)among Gujjars, a North Indian study may be due to variable sample size, racial and regional differences.

In the present study in female the mean value of right foot breadth is (8.80 ± 0.573) and left foot breadth (8.64 ± 0.556) , our findings correlate with Kewal Krishan (2007),and Hilmi Ozdena (2005) study While slightly differ from Tanuj Kanchan (2008)among Gujjars,a North Indian study may be due to variable sample size, racial and regional differences.

In the present study in male regression equation for stature estimation from right hand length shows the SEE (standard error of estimate) ± 5.14 and correlation coefficient 0.723 and left hand length SEE ± 5.20 and correlation coefficient 0.715 our findings correlate with Kewal Krishan (2007) study.

Female regression equations of right hand length and left hand length for stature estimation shows the SEE (standard error of estimate) and correlation coefficient correlate with Kewal Krishan (2007) study. Also our study strongly correlate right hand length with stature.

In present study regression constant and showing lower Values but regression coefficients showing higher values than krishan study this may due to regional differences.

Mean Actual stature in present study having lower values than Kewal Krishan (2007) and Dr. O.P. Jasuja (2003) this is due to regional differences.

Conclusion

It is observed that in males, the highest correlation is exhibited by right hand length. Thus, hand length is the best parameter for estimating stature for males. This is also supported by lower SEE in case of hand length in males. In male subjects right foot length ranging from 22.2 to 28.4cm and in females 20 to 24.5cm with help of right foot length we can determine 54% definitely male sex and 30% definitely female sex.

It is concluded that the dimensions of hands and feet can provide good reliability in estimation of stature in forensic examinations. Stature prediction is more accurate and reliable in case of females than in males. It is also observed that a single dimension of hand or foot can estimate stature of a unknown person with a great accuracy and a small.

Conflict of interest: No Conflict of interest

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References

1. Krishan K. Anthropometry in Forensic Medicine and forensic science- 'Forensic Anthropometry': The Internet journal of forensic science. 2007, 2(1).
2. Montagu AA. Handbook of Anthropometry. Springfield, Illinois, U.S.A. Charles C. Thomas Pub Ltd, 1960. Cited in 1.
3. Singh IP, Bhasin MK. Laboratory Manual on Biological Anthropology, Anthrapometry. Kamalaraj enterprise, New Delhi, 1989, 4-7. Cited in 9
4. Moenssens AA. Fingerprinting Techniques-Inbau Law Enforcement Series, Radnor, Pennsylvania: Chilton Book Company, 1995. Cited in 1.
5. Adams BJ, Byrd JE. Interobserver variation of selected postcranial skeletal remains. J forensic sciences. 2002; 47(6):1193-1202. Cited in 1
6. Topinard P. L Anthropologic: Vol, 1,2nd edition, Paris 1877- quoted by Robins LM. J forensic sciences. 1986; 31(1):143-152. Cited in 9
7. Sultan GS, Emine D, Kizilkanat. Stature Estimation Based On Hand Length and Foot Length. Clinical Anatomy. 2005; 18:589-596.
8. Chiba M, Terazawa K. Estimation of stature from somatometry of skull. Forensic Sci Int. 97:87-92. Cited in 7.
9. Joshi M. Estimation of Stature Based on Lengths of Arm, Forearm, Hands, Feet. Dissertation Submitted to Bharti Vidyapeeth Pune, 2009.
10. Krishan K, Sharma A. Estimation of stature from dimensions of hands and feet in a North Indian population. Journal of Forensic and Legal Medicine. 2007; 14:327-332.
11. Bhatnagar DP, Thapar SP, Batish MK. Identification of personal height from the somatometry of the hand in Punjabi males. Forensic Sci Int. 1984; 24:137-41.
12. Boldsen J. A statistical evaluation of the basis for predicting stature from lengths of long bones in European populations. Am J Phys Anthropology. 1984; 65:305-11.
13. Nath S, Dayal N, Chandra NS. Reconstruction of stature on the basis of percutaneous lengths of forearm bones among Mundas of Midnapore district, West Bengal. Hum Sci. 1988; 37:170-5.
14. Abdel-Malek AK, Ahmed AM, Sharkawi SAA, Hamid NMA. Prediction of stature from hand measurements. Forensic Sci Int. 1990; 46:181-7.
15. Jason DR, Taylor K. Estimation of stature from the length of the cervical, thoracic and lumbar segments of the spine in American Whites and Blacks. J Forensic Sci. 1995; 40:59-62.