



Estimation of Length of Tibia with Help of Lower end Tibial Index

KEYWORDS

tibial index, tibial length, stature estimation

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ABSTRACT

Introduction: - Stature estimation is one of the important parameters in establishment of the identity of a person. Anthropometry provides scientific method and technique for taking various measurements in different geographic regions and races. The Tibia itself is a complex anatomic unit so anthropometric study was devised on the same. **Materials and Methods:** 100 dry adult human tibia (50 Right and 50 Left) were studied. Maximum breadth of lower end of tibia and vertical height of medial malleolus was measured by using vernier calliper. Total length of tibia was measured by using osteometric board. **Results:** - The study was aimed to determine length of tibia with help of calculating tibial index with help of measured parameters of the tibia. The details of data obtained with relevant review of literature will be discussed. **Conclusion:** The knowledge of the morphometric values of tibial segments is important in forensic, anatomist, and archeological cases in order to identify unknown bodies and stature.

INTRODUCTION

Tibia accounts for 22% of the total body length¹. The lower limb length is the greatest contributor to the standing height.²⁻⁵ Certain long bones and appendages are used in calculation of height of a person.⁶⁻⁸ Establishing the identity of an individual from mutilated, decomposed and amputated body fragments has become an important necessity in recent times due to natural disasters like earthquakes, cyclones and tsunamis.⁹ Tibia is important bone in the body and is used for estimation of stature of individual. In medico-legal cases sometimes a small part of the bone is available. So it is important to know relation of tibial lower end index to the total length of tibia. The study will be important to the forensic scientists, and anatomist to estimate the length of tibia and height of individual from small fragment of bone in medico-legal cases.

MATERIALS AND METHODS --

In present study 100 dry adult human tibia (50 Right and 50 Left) were studied. Maximum breadth of lower end of tibia and vertical height of medial malleolus was measured by using vernier calliper. Total length of tibia was measured by using osteometric board as shown in fig.1.

Tibial lower end index was calculated by using following formula.

$$\text{Tibial lower end index} = \frac{\text{Vertical height of medial malleolus.}}{\text{Breadth of lower end.}} \times 100.$$

RESULTS & DISCUSSION:-

Estimation of stature from bones of extremities plays an important role in identification of unknown bodies, parts of the bodies or skeletal remains. Many scientists have worked on estimation of stature from the total length of tibia. In present study we have made an attempt to see the correlation between length of tibia and tibial lower

end index. Tibial lower end index calculated by using formula, vertical height of medial malleolus of tibia divided by breadth of lower end of tibia multiply by 100. On Right side the tibial lower end index was 37.03, while the mean length was 37.14 cm. On left side the tibial lower end index was 36.93, while mean tibial length was 36.97 cm. So if we know the tibial lower end index it will be almost same as that of tibial length expressed in centimeters (cm). Many research workers worked for the estimation of stature of an individual from measurements of the long bones. Trotter and Gleser⁷ had designed the most commonly used equations. The lower limb length is the greatest contributor to standing height¹⁰; hence most of the predictive equations are based on the length of the long bones of the lower limb, the femur, tibia, and fibula.

Table No.1. Showing different parameters i.e tibial length, breadth of lower end of tibia, height of medial malleolus of tibia, tibial index.

	Tibia length (mm)		Lower End Width (w) (mm)		Height of medial malleolus (H) (mm)		H/W *100 (lower end tibial index)	
	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt
mean	371.43	369.72	41.36	41.82	15.28	15.40	37.03	36.93
SD	21.65	26.56	3.42	3.41	1.37	1.52	2.77	3.49
Max	431	427	51.97	50.74	18.06	17.87	42.06	43.79
Min	336	294	33.18	33.4	11.55	11.23	29.72	27.61

CONCLUSION

In the present study, tibial lower end index was calculated. Total length of dry tibia was measured and calculated the correlation between them. So the knowledge of the morphometric values of tibial segments is important in forensic, anatomic and archeological cases in order to identify unknown bodies and stature.

Fig.1 showing method of measurements of different parameters i.e tibial length,breadth of lower end of tibia, height of medial malleolus of tibia.



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