

# Determination Of Sex By Hand Dimensions

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## Abstract

The aim of our physical anthropometric study was to determine sex (male/female) by hand dimensions. Two hundred and fifty students (125 males and 125 females) of the age above 18 years were examined in the year 2005. The average hand length and breadth were found to be about 1cm greater in males as compared to females. The hand index was calculated and has been used for the determination of sex. To conclude, the hand index more than 44 is suggestive of male and less than 44 is that of female.

## INTRODUCTION

Sex determination is the vital part of identification, which is often required in medico-legal practice. The problem of identification mainly arises when the body is recovered in advanced stage of decomposition, mutilated state, fragmented remains and skeletonized form. There are lots of researches going on for assessing stature, sex, race, etc from anthropometric measurements of different parts of body for identification purpose. Many physical anthropometric studies show the gender difference,<sup>1, 2, 3</sup>.

The present study has been conducted to find out co-relation of hand dimensions with sex (male/female).

## METHODOLOGY

The study was conducted in the Department of Forensic Medicine & Toxicology, SSR Medical College, Mauritius in the year 2005. The material consisted of 250 young and healthy students (125 males and 125 females) in the age group of 18-30 years. The hand length was measured as straight distance between distal crease of wrist joint and the most anterior projecting point i.e. tip of middle finger. The breadth of hand was measured as straight distance from the most laterally placed point on the hand of 2<sup>nd</sup> metacarpal to the most medially placed point located on the head of 5<sup>th</sup> metacarpal. The measurements were taken by using anthropometric sliding and spreading calipers, and measuring tape.

Similar to foot index,<sup>4</sup> the hand index was calculated by dividing the hand breadth by hand length and multiplied by 100. The data were statistically analyzed to determine sex by

measurements of hand.

## RESULTS

### HAND LENGTH

In males, the right hand length varied from 15.30cm to 21.00cm (mean 18.89cm & SD 0.88) and left hand length varied from 15.40cm to 20.80cm (mean 18.90cm & SD 0.87). In females, the right hand length varied from 14.80cm to 20.40cm (mean 17.22cm & SD 0.92) and left hand length varied from 14.80cm to 20.40cm (mean 17.22cm & SD 0.93).(Table1)

### Figure 1

Table 1: Measurements (cm) of Hand Length in Males and Females (n=250)

Male	Minimum	Maximum	Mean	S.D.
> Right	15.30	21.00	18.89	0.88
> Left	15.40	20.80	18.90	0.87
Female	Minimum	Maximum	Mean	S.D.
> Right	14.80	20.40	17.22	0.92
> Left	14.80	20.40	17.22	0.93

### HAND BREADTH

In males, the right hand breadth varied from 7.30cm to 9.40cm (mean 8.45cm & SD 0.40) and left hand breadth varied from 7.20cm to 9.40cm (mean 8.42cm & SD 0.40). In females, the right hand breadth varied from 6.70cm to 8.80cm (mean 7.48cm & SD 0.38) and left hand breadth varied from 6.60cm to 8.70cm (mean 7.42cm & SD 0.37).(Table 2)

**Figure 2**

Table 2: Measurements (Cm) of Hand Breadth in Males and Females (n=250)

Male	Minimum	Maximum	Mean	S.D.
> Right	7.30	9.40	8.45	0.40
> Left	7.20	9.40	8.42	0.40
Female	Minimum	Maximum	Mean	S.D.
> Right	6.70	8.80	7.48	0.38
> Left	6.60	8.70	7.42	0.37

**HAND INDEX**

In males, the hand index ranged from 44.02 (18-19 yrs) to 45.05 (19-20 yrs). In females, it ranged from 42.65 (more than 22 yrs) to 43.79 (18-19 yrs). (Table 3 & 4)

**Figure 3**

Table 3: Age Wise Distribution of Hand Index in Males (n=125)

Age group (yrs)	Hand length (mean) in cm	Hand breadth (mean) in cm	Hand Index
18 to 19 (n=7)			
> Right	19.24	8.47	44.02
> Left	19.23	8.49	44.15
19 to 20 (n=28)			
> Right	18.89	8.51	45.05
> Left	18.95	8.49	44.80
20 to 21 (n=34)			
> Right	18.83	8.39	44.56
> Left	18.87	8.35	44.25
21 to 22 (n=38)			
> Right	18.99	8.51	44.81
> Left	18.98	8.48	44.68
> 22 (n=18)			
> Right	18.64	8.33	44.69
> Left	18.61	8.31	44.65

**Figure 4**

Table 4: Age Wise Distribution of Hand Index in Females (n=125)

Age group (yrs)	Hand length (mean) in cm	Hand breadth (mean) in cm	Hand Index
18 to 19 (n=17)			
> Right	17.24	7.55	43.79
> Left	17.24	7.51	43.56
19 to 20 (n=40)			
> Right	17.29	7.47	43.20
> Left	17.29	7.42	42.91
20 to 21 (n=38)			
> Right	17.18	7.50	43.66
> Left	17.18	7.42	43.19
21 to 22 (n=23)			
> Right	17.10	7.43	43.45
> Left	17.12	7.37	43.05
> 22 (n=7)			
> Right	17.37	7.48	43.06
> Left	17.36	7.40	42.65

**DISCUSSION**

Sometimes, fragments of soft tissues are found disposed off in the open, in ditches, or rubbish dumps, etc. and this material is brought to forensic pathologist for examination. One of the important objectives of examination is identification. In our study, we tried to establish the correlation between hand index and sex. Males had an average hand length and breadth about 1cm greater than the females' hand length and breadth. These findings were consistent with the study conducted by Kodak. In all age groups, the hand index in males was found to be more than 44, and in females, it was less than 44. Therefore, this value i.e. 44 can be used as deviation point for the determination of sex. Thus the present study indicates a positive correlation between an individual's hand dimensions and gender. Thus sex can be determined by hand index with fair accuracy. Further researches are needed in this field.

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