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Original Article

Study of morphological features of clavicle in the population of vidarbha region of maharashtra

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ABSTRACT

OBJECTIVES: Morphometric study is concerned with the study of morphology and measurement of various parameters. Since according to geographical area, nutritional status and race variations exists in humans beings, we planned the present study to know the morphological differences in the clavicle of the population of Vidarbha region of Maharashtra India. MATERIALS AND METHODS: Sixty fully ossified clavicle belonging to 48 males and 12 females were studied. Different parameters used were rhomboid impression and subclavian groove. Rhomboid impression was divided into six different types as Type-1 to Type- 6. Rhomboid impression and subclavian groove was assessed in areas as absent, small, medium or large in both sexes. RESULTS: Type- 1 and Type- 2 rhomboid impression occurs more frequently on both the sides. Large size (52.08%) rhomboid impression was present in male clavicle while in females medium size (41.65%) was more common. Large size subclavian groove was more common (43.75%) in male clavicles while in female small size (45.83%) was more common. CONCLUSION: Morphological features can be used to some extent for differentiation of sex. However the accuracy of the result is multiplied many folds if these are coupled with the metrical methods.

1. Introduction

Morphometric study is concerned with the study of morphology and measurement of various parameters. Anthropometry is an advanced branch in the research field where the human skeleton is carried out to establish the individual identity like age, sex, stature, race etc. Determination of sex of the skeletal remains of an individual from an examination of a single bone except the hip bone is considered to be almost an impossible task. Even when entire human body, pelvis and skull are available not more than 90% accuracy can be achieved1. Attempt has been made to study the characters of other bones, which could be helpful in identification of the sex.

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2.Material and Methods

The present study was carried out in the department of anatomy, Government Medical College, Nagpur, Vidarbha Maharashtra, India. 60 fully ossified clavicle belonging to 48 males and 12 females were collected from different medical colleges of the region. The bones of each side of both sexes were numbered and kept separately. Bones showing pathological deformity or fractures were excluded from the study. Some specimens were damaged during the course of dissection or in subsequent cleaning of the bones. However a great majority were intact for complete study. Measurements were taken with the help of osteometric board[2], vernier caliper and spreading caliper[3]. Different parameters used were rhomboid impression and subclavian groove.

Rhomboid impression was divided into six different types as per AJE Cave classification[4].

1. Type 1 ------- Flat and Rough surface.
2. Type 2 ------- Flat and Smooth surface.
3. Type 3 ------- Depressed and Rough surface.
4. Type 4 ------- Depressed and Smooth surface.
5. Type 5 ------- Elevated and Rough surface.
6. Type 6 ------- Elevated and Smooth surface.

Rhomboid impression was assessed in areas as absent, small, medium or large in case of males and females as per L.J.Ray[5] recommendation. Subclavian groove was also assessed as absent, small, medium or large size[5] in both sexes.

3.Results:

We observed that the type 1 and 2 rhomboid impression occurs more frequently on both the sides, while type 3 occurs more on right side and type 5 occurs more frequently on left side. Table- 1

Table- 1: Percentage of various types of rhomboid impression

Rhomboid Impression (Types)	Right Clavicle (N= 60)	Left Clavicle (N= 60)
1 - Flat & rough	18 (30.0%)	20 (33.33%)
2 - Flat & Smooth	14 (23.33%)	18 (30.0%)
3 - Depressed & Rough	11 (18.33%)	09 (15.0%)
4 - Depressed & Smooth	10 (16.66%)	05 (8.33%)
5 - Elevated & Rough	05 (8.33%)	07 (11.6%)
6 - Elevated & Smooth	02 (3.33%)	01 (1.66%)

In the present study we found that in majority of cases large size (52.08%) rhomboid impression was present in male clavicle. While in case of females, medium size (41.65%) of rhomboid impression was present in majority of clavicles. Rhomboid impression was present in all 120 clavicles though it is well marked in males as compared to females. Small size rhomboid impression was present in least number of male and female clavicles. Table- 2

Table- 2: Various size of rhomboid impression.

Size of Rhomboid Impression	Male (N= 96)	Female (N= 24)
Absent	Nil	Nil
Small	15(15.6%)	06 (25.0%)
Medium	31 (32.29%)	10 (41.65%)
Large	50 (52.08%)	08 (33.33%)

Large size subclavian groove was found in 43.75% male clavicles while in 6.25% male clavicles it was absent. In females 11 clavicles (45.83%) were having small sized subclavian groove, while in 2 cases (8.33%) subclavian groove was absent. Table- 3

Table- 3: Percentage of various types of subclavian groove

Types of Subclavian groove	Male (N= 96)	Female (N= 24)
Absent	6 (6.25%)	2 (8.33%)
Small	14(14.58%)	11 (45.83%)
Medium	34 (35.41%)	7 (29.16%)
Large	42 (43.75%)	4 (16.66%)

3. Discussion

Morphological study of the clavicle was done with the aim to determine the occurrence of certain features, which were deviating from the normal text book description of bone and to observe status of those features in the population of Vidarbha region of Maharashtra.

In the present study we observed that there is presence of flat rhomboid impression with rough underlying surface (Type 1) in 30.0% right clavicles. Nearly similar values were observed by AJV Cave4 in 1961 which showed that there is mostly the preponderance of Type I Flat and Rough type rhomboid impression. Table- 4

Table- 4: Percentage of various types of rhomboid impression.

Rhomboid Impression	AJE Cave 1961			
	Right Clavicle	Percentage	Left Clavicle	Percentage
1- Flat & Rough	20	25.64	28	38.88
2- Flat & Smooth	21	26.92	21	29.16
3- Depressed & Rough	15	19.23	12	16.66
4- Depressed & Smooth	13	16.66	03	04.16
5- Elevated & Rough	05	06.41	08	11.11
6- Elevated & Smooth	04	05.12	00	00.00

In the present study in males 52.08% having large size rhomboid impression. Similar values were also observed by LJ Ray5 in 1959 as 69% of males having large sized rhomboid impression. As per our findings LJ Ray also found medium sized rhomboid impression more common in females. Table- 5

Table- 5: Comparison of size of rhomboid impression on the clavicle

Rhomboid Impression	LJ Ray 1959			
	Male Clavicle		Female Clavicle	
Absent	0	00.00 %	4	03.00 %
Small	10	06.00 %	29	24.00 %
Medium	40	25.00 %	60	49.00 %
Large	111	69.00 %	29	24.00 %

In a well marked clavicle the subclavian groove is sharply defined and is an obvious structure on the inferior surface of bone. It appears towards the medial end, gradually deepens and become well formed medial to the conoid tubercle at which level it may terminate or else pass for short distance lateral and anterior to it. Even in cases where the subclavian groove is readily not visible, it is usually palpable, but in some males and female specimen it would neither be seen nor felt.

The present finding shows preponderance of large size subclavian groove in males. Similar values were observed by LJ Ray[5] in 1959 and he found that large sized subclavian groove is present in males. In females small size subclavian groove is more common which is in accordance with study of LJ Ray[5] who found that in females small sized subclavian groove is more predominant.

Table- 6: Comparison of size and occurrence of subclavian groove

Subclavian groove	L.J.Ray (1959)	
	Male Clavicle	Female Clavicle
Absent	02.00 %	10.00 %
Small	28.00 %	42.00 %
Medium	61.00 %	30.00 %
Large	69.00 %	18.00 %

4. Conclusion

Morphological features deviating from the regular references showed that there is preponderance of large size rhomboid impression in males and medium sized rhomboid impression in females. Left and Right clavicles showed more commonly the appearance of flat and rough (Type 1) type of rhomboid impression. Large sized subclavian groove is more common in males because of prominent muscular and ligamentous attachment and small sized subclavian groove is more common in females. Thus morphological features can be used to some extent for differentiation of sex. However the accuracy of the result is multiplied many folds if these are coupled with the metrical methods.

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