

Morphometric Variation of Acromion Process in A Bangladeshi Population

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Abstract

A cross-sectional, descriptive study was done on 150 (70 right and 80 left) fully ossified dry human scapulae of Bangladeshi people to find out the variation in length and breadth of the acromion process. Sample collection was carried out in the Department of Anatomy, Mymensingh Medical College, Bangladesh, between January and December of 2019. Any kind of damaged or broken scapulae were excluded to maintain standard measurement. Length and breadth were measured with the help of digital Vernier slide calipers. The mean (\pm SD) length was 41.77 ± 5.87 mm and 40.84 ± 6.262 mm on right and left sided scapulae respectively and the mean (\pm SD) breadth was 22.19 ± 3.08 mm on right sided scapulae and 22.1 ± 2.69 mm on left sided scapulae. These data are important to compare Bangladeshi scapulae to those from various other races that could contribute to demographic studies of shoulder disease probability and management in Bangladeshi population.

CBMJ 2023 July: vol. 12 no. 02 P: 183-187

Keywords: Length, breadth, acromion process, scapula, Bangladeshi people

Introduction

The acromion projects forwards almost at a right angle, from the lateral end of the spine of the scapula in human body. The lower border of the crest of the spine becomes continuous with the lateral border of the acromion at the acromial angle which forms a subcutaneous bony landmark.¹ The anatomy of the acromion and related structures in the shoulder joint is of importance and useful to successfully carry out interpretation of images and surgical procedures in pathologies associated with this joint. Acromion morphology is believed to play a key role in impingement syndrome and the pathogenesis of rotator cuff diseases.¹ There is a limitation of published work on study of morphometry, i.e., length and breadth of the acromion process in our Bangladeshi population. We usually depend on foreign articles and textbooks. Hence, the present study was proposed to create an information pool of our own for further

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standardization in anatomical research as well as minimize the dependency on foreign standard measurement.

Methods

The study was performed in the Department of Anatomy of Mymensingh Medical College, Bangladesh, from January to December of 2019. A total of fully ossified dry 150 human scapulae were collected. Out of 150 scapulae, 70 were from the right side and 80 were from the left. The bones were isolated and inspected macroscopically. Damaged, broken scapulae were excluded from this study.

Morphometric evaluation of the collected specimens, i.e., determination of the lengths and the breadths of the acromion processes were done. All the measurements were taken by using digital Vernier slide calipers and recorded in millimeters. The length of the acromion process was measured based on the distance between the tip and midpoint of posterior border of the acromion process (Fig. 1), while the breadth was determined by the distance between the medial and lateral borders at the midpoint of the acromion process (Fig. 2).



Fig. 1: Measuring the length of the acromion process in a dry scapula.



Fig. 2: Measuring the breadth of the acromion process in a dry scapula.

Data was analyzed using SPSS version 25.0 and mean values presented in tables. Descriptive statistics like mean and standard deviation were used to analyze the data obtained.

Results

The lengths of the acromion processes on the right and left sides were found from 30-57.20 mm with the average 41.77 ± 5.87 mm and 18.90-53.10 mm with the average 40.84 ± 6.262 mm respectively (Table-I, Fig. 3 & 4).

The breadths of the acromion processes were found to be varying from 15.20 mm to 30.90 mm with an average of 22.19 ± 3.08 mm and from 14.70 mm to 28 mm with an average of 22.10 ± 2.69 mm on the right and the left side respectively (Table-I, Fig. 5 & 6).

Table I: Measurement of Length and Breadth of Acromion Process

Variable	Side	Range (mm)		Mean (mm)	±SD (mm)
		Minimum	Maximum		
Length	Right	30	57.20	41.77	5.87
	Left	18.90	53.10	40.84	6.262
Breadth	Right	15.20	30.90	22.19	3.08
	Left	14.70	28	22.10	2.69

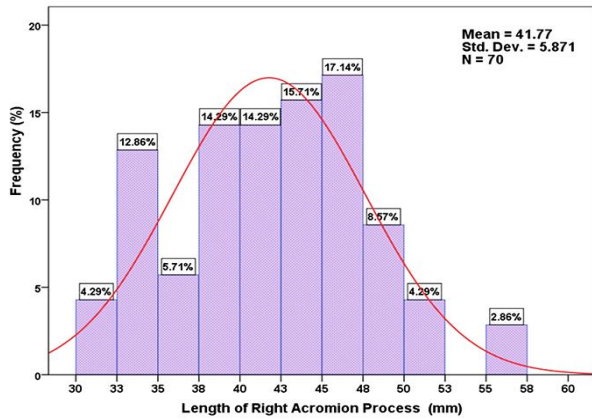


Fig. 3: Histogram Showing the Frequency Distribution of Length of Acromion Process on Right Side

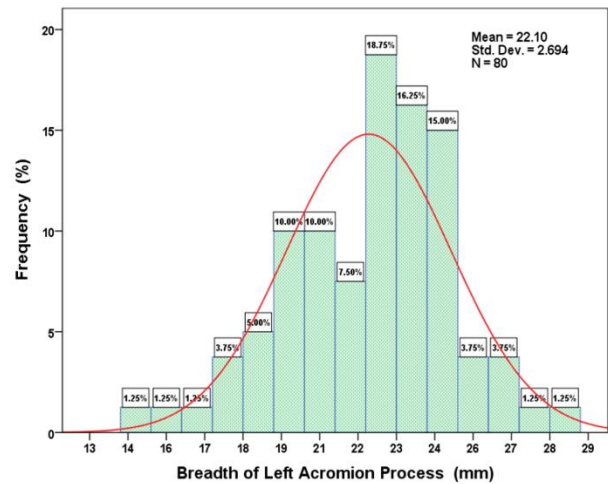


Fig. 6: Histogram Showing the Frequency Distribution of Breadth of Acromion Process on Left Side

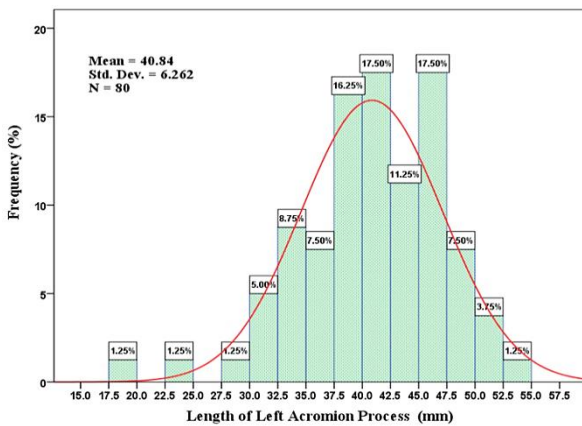


Fig. 4: Histogram Showing the Frequency Distribution of Length of Acromion Process on Left Side

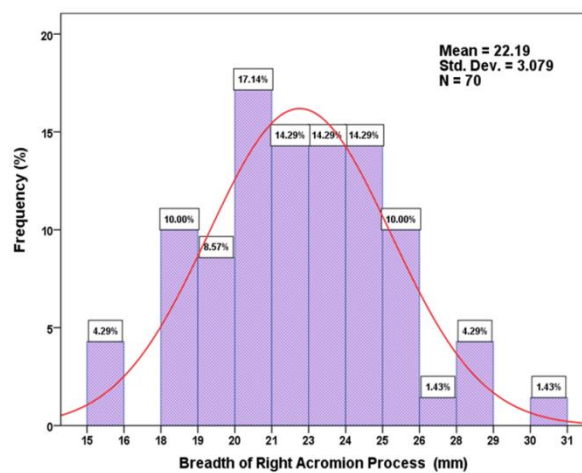


Fig. 5: Histogram Showing the Frequency Distribution of Breadth of Acromion Process on Right Side

Discussion

In our study, among Bangladeshi population, we found that the mean lengths of the acromion processes were 41.77±5.87 mm on right sided scapulae and 40.84±6.626 mm on left sided scapulae, while the mean breadths of the acromion processes were 22.19±3.08 mm and 22.1±2.69 mm on the right and the left sided scapulae respectively.

Gosavi, Jadhav & Garud carried a study on 127 scapulae and found that the mean length of acromion process was 43.7±6 mm and mean breadth was 22.78±2.7 mm.² Singh, Pahuja & Agarwal observed 129 scapulae and found that the mean length of acromion process was 46.1 mm, while it was 46.4 mm on the right side and 45.8 mm on the left side and the mean breadth was 23.2 mm in total samples, while it was 23.4 mm on the right side and 23.0 mm on the left side.³ Singroha *et al.* studied on 100 scapulae and found that the mean length & breadth of acromion process were 45.05 mm and 25.79 mm respectively.³ El-din & Ali performed a study on

160 scapulae and found that the mean length of acromion process was 52.81 ± 4.08 mm in total samples, while it was 53.28 ± 4.11 mm on the left side and 52.33 ± 4.19 mm on the right side and the mean breadth was 32.05 ± 3.88 mm in total samples, while it was 32.01 ± 3.69 mm on the left side and 32.09 ± 3.21 mm on the right side.⁵

Mansur *et al.* studied on 67 scapulae and found the length of the acromion process of the right scapulae varied from 36 mm to 54 mm with an average of 46.46 ± 5 mm. However, this length of the acromion process of the left scapulae varied from 31 mm to 59 mm with an average 45.57 ± 5.21 mm. and the breadth of the right scapulae varied from 21 mm to 37 mm with an average of 26.63 ± 3.55 mm. However, the breadth of the acromion process of the left scapulae varied from 22 mm to 34 mm with an average of 27.23 ± 3.06 mm.⁶ Varghese & Amma studied on 50 scapulae and found that the total length of acromion process of scapula ranged from 33.4 mm to 51 mm on the left side and 31.6 to 48.2 mm on the right side and corresponding mean values were 42 ± 5.23 mm & 42.11 ± 4.14 mm respectively and the breadth ranged from 19 mm to 30.4 mm on the left side and 20.5 mm to 34.8 mm on the right side and corresponding mean values were 24.86 ± 2.88 mm & 27.36 ± 3.81 mm.⁷ Vinay & Sivan studied on 164 scapulae and found that the mean length of acromion process was 42.47 mm in total samples, while it was 42.48 mm on the right side and 42.46 mm on the left side and the mean breadth of acromion process was found as 26.57 mm in total samples, while it was 26.68 mm on the right side and 26.44 mm on the left side.⁸ Ravindranath *et al.* carried a study on 130 scapulae and found that the mean acromial length was 40.97 ± 5.25 mm and mean breadth of acromion process was 29.98 ± 4.44

mm.⁹ Kour, Kumar & Rashid performed a study on 60 scapulae and found that mean length of acromion process on the right side was 46.6 ± 5 mm (range 38-56 mm) and on the left side was 44.5 ± 5.3 mm (range 36-56 mm). and mean breadth on the right side was 7 ± 1.5 mm (range 5-10 mm) and mean on the left side was 6.6 ± 1.6 mm (range 3-10 mm).¹⁰ Saha & Vasudeva studied scapula of a north Indian population and found the mean value for acromial length 41.007 ± 6.646 mm, while acromial breadth 21.828 ± 2.934 mm.

The mean value of present study regarding length of acromion process of both sided scapulae was nearly similar to the value described by Gosavi, Jadhav and Garud,² Varghese & Amma,⁷ Vinay & Sivan,⁸ & Ravindranath *et al.*,⁹ and Saha & Vasudeva,¹¹ but lower than those of Singh, Pahuja & Agarwal,³ Singroha *et al.*,⁴ El-din & Ali,⁵ Mansur *et al.*,⁶ and Kour, Kumar & Rashid.¹⁰

The mean value of present study regarding breadth of acromion process of both sided scapulae was higher than that of Saha & Vasudeva,¹¹ nearly similar to the value described by Gosavi, Jadhav and Garud,² and Singh, Pahuja & Agarwal,³ but lower than those of Singroha *et al.*,⁴ El-din & Ali,⁵ Mansur *et al.*,⁶ Varghese & Amma,⁷ Vinay & Sivan,⁸ Ravindranath *et al.*,⁹ and Kour, Kumar & Rashid.¹⁰

Conclusion

Our data revealed that length and the breadth of the acromion process are higher on the right side than that of the left; however, the difference is not statistically significant. Though there is a shortage of literature about morphometric

evaluation of the length and the breadth of acromion process in Bangladeshi population, these morphometric data will serve as a reference base for the educators, clinicians and researchers.

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