

## Original Article

## The acromial morphology and its implication in impingement syndrome: An anatomical study

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## ABSTRACT

**Introduction:** Resection of acromion in case of impingement syndrome is a controversial issue. It is associated with the risk of instability of humeral head. The aim of our study was to determine the morphometry of acromion so that the decision for arthroscopic resection becomes easier in these cases. The morphometry of acromion was also correlated with other parameters of scapula.

**Material and methods:** The study was conducted in sixty one intact dry adult scapulae of unknown sex. Various parametric and nonparametric data from scapulae were taken.

**Result:** Type I (flat), Type II (curved) and Type III (hooked) were found in 24.59%, 49.18% and 26.22% scapulae respectively. The average scapular length and breadth were  $135.96 \pm 11.96$  mm and  $98.8 \pm 7.56$  mm respectively. Mean value of length, breadth, and thickness of acromion were 41.23 mm, 22.12 mm and 7.01 mm respectively. The thickness of acromion was less than 8 mm in 86.67% of scapulae. In 13.33% cases the thickness was  $>8$  mm. A statistically significant positive correlation was also found between the length of acromion and the length and breadth of scapula.

**Discussion:** Our study may suggest that in Indian population, 13.33% population is at risk of impingement syndrome according to the thickness of acromion. In addition, angles of acromion tilt and acromion slope are larger in Indian scapulae as compare to that of other countries. This knowledge would be useful for orthopaedic surgeons and radiologists.

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## 1. Introduction

The shoulder impingement syndrome is characterized by pain in shoulder while raising arm, associated with weakness caused by catching muscle tendons in the shoulder. Involved rotator cuff tendon is a tough rubbery cord that connects the shoulder muscles to arm. In relation to it is a subacromial space which is a narrow space transferring the tendon and muscle. Pain is aggravated while raising the arm overhead. Possible causes for shoulder impingement syndrome are narrowing of subacromial space, bone spur under the bony roof at the top of subacromial space, inflammation of fluid filled space, swelling or thickening of rotator cuff tendon, calcium deposits within the tendon. Acromioplasty is a vital surgery in cases of rotator cuff surgeries. The advantages of acromioplasty is to improve subacromial space for visualization during surgery of rotator cuff repair and allow free movement of structure underneath

and reduce compression of rotator cuff. Usually, large incision is necessary for rotator cuff repair.<sup>1</sup> As per the studies done by Blevin et al.<sup>2</sup> and Gartsman et al.,<sup>3</sup> endoscopic repair of rotator cuff along with acromioplasty leads to satisfactory improvement in pain score. Although acromioplasty leads to significant improvement in symptoms, it is done only after assessment of patients on the basis of their symptoms and radiograph of shoulder to yield best results.

Despite the various etiologies playing role in rotator cuff tear, positional morphology (linear and angular) of acromion that affect tear is still unclear. In our study, we evaluated nonparametric and parametric data of acromion and discussed their relation with the scapular parameters.

## 2. Material and methods

The current study was conducted on 61 dry intact adult scapulae of unknown sex and age procured from departmental collection. Institute ethical committee has exempted us for consent as samples were cadaveric scapulae. On each bone, fixed points were marked for parametric data. Nonparametric and parametric data were compiled.

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### 2.1. Nonparametric data

1. Shape of acromion from dorsal view (Fig. 1)
2. Type of acromion according to curve: Flat (Type I), Curved (Type II), Hooked (Type III)<sup>4</sup>

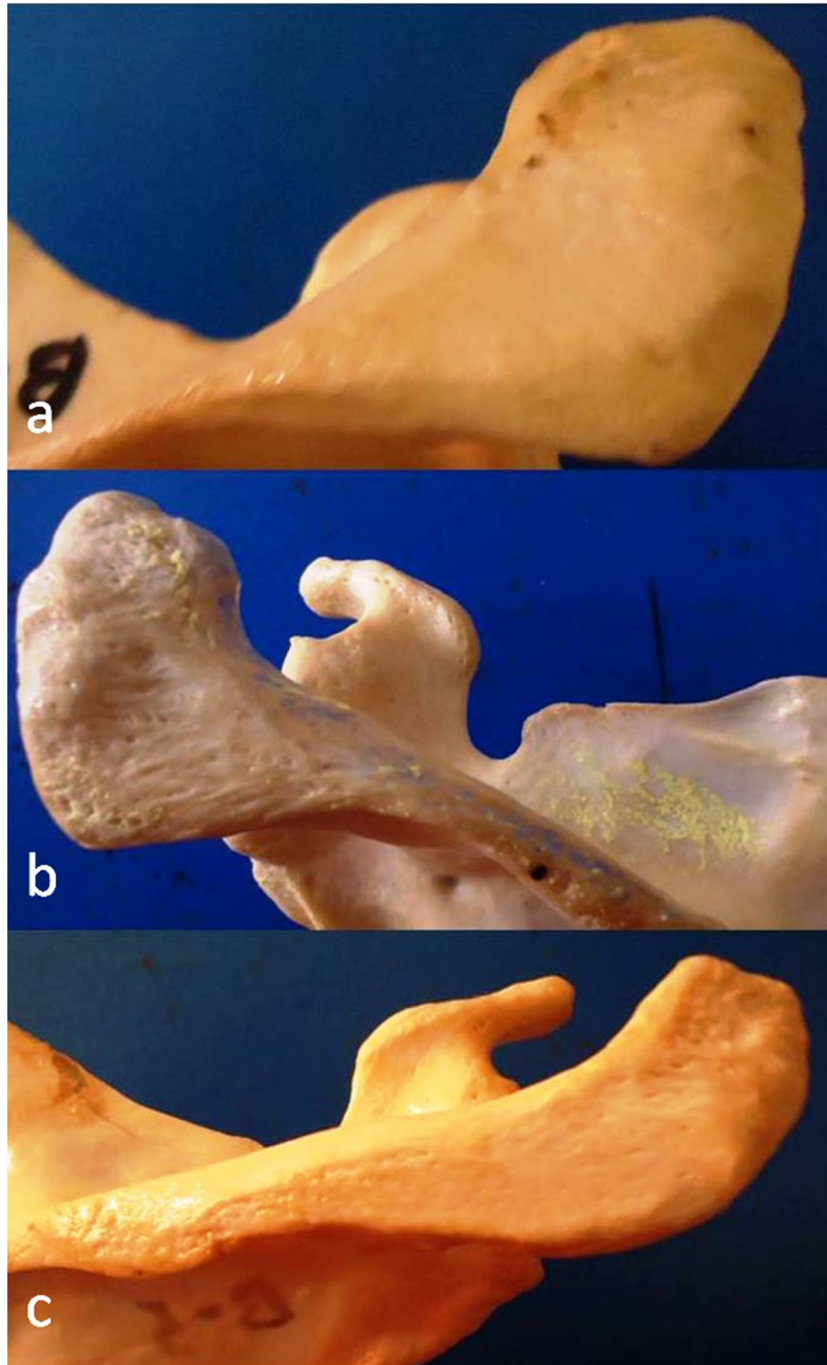
### 2.2. Parametric data

For parametric data, the following points were taken (Fig. 2)

- A Highest point on acromion
- B Lowest point on acromion
- C Lateral most point on acromion
- D Medial most point on acromion

E Point 1 cm medial to point 'C' and 1 cm below to point 'A'  
 F Lateral most point on the coracoid process of scapula  
 G Point on the dorsum of coracoid process of scapula  
 H Highest point on supraglenoid tubercle  
 Scapular length and scapular breadth along with other parameters were measured with digital caliper (accurate to 0.01 mm). Two authors took measurements independently to avoid the interobserver errors. Mean of these values were final values.

- AB Maximum length of acromion
- CD Maximum width of acromion
- E Maximum Thickness of acromion
- AF Distance from acromion tip to coracoid tip
- AG Distance from acromion tip to dorsum of coracoid



**Fig. 1.** Shape of acromion according to dorsal view: a) quadrangular, b) triangular, c) tubular.

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