



## MORPHOMETRIC STUDY OF COROCOID PROCESS IN ADULT HUMAN SCAPULAE.

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**ABSTRACT** **INTRODUCTION:** The scapula is the king of stability. It is an anchoring point for the postural muscles of the shoulder; it provides stability necessary for a huge combination of movements. The coracoid process forms an important part of scapular glenoid construct and is involved in many surgical procedures on shoulder joint but its unique 3 dimensional orientation makes radiological imaging difficult. Furthermore, congenital variations and minimal traumatic/iatrogenic changes in this orientation can predispose to subcoracoid impingement.

**METHOD:** The material for the present study comprised of 60 adult scapulae of unknown sex, obtained from the Department of Anatomy, Government Medical College, Jammu. The following parameters were measured on the coracoid process; Length of coracoid process, Width of coracoid process, Acromio – coracoid distance.

**RESULT:** The mean length of coracoid process was found to be  $4.05 \pm 0.357$  cm, (range= 3.4-4.9 cm) with mean of  $4.09 \pm 0.392$  cm (range = 3.5-4.9cm) on right side; and  $4.00 \pm 0.321$  as mean, (range = 3.4-4.6 cm) on left side. The mean width of coracoid process was found to be  $1.34 \pm 0.169$ cm (range = 1-1.8cm), with mean width of  $1.33 \pm 0.169$ cm (range = 1-1.7cm) on right side and  $1.35 \pm 0.168$ cm (range = 1-1.8cm) on left side. The mean acromio-coracoid distance was found to be  $2.76 \pm 0.44$ cm, (range =2-3.5cm), with mean of  $2.79 \pm 0.47$  cm (range=2-3.5cm) on right side; and  $2.73 \pm 0.41$  cm as mean (range = 2-3.3 cm) on left side.

**CONCLUSION:** Maximum scapular breadth and length of coracoid are useful in predicting the stature. In absence of intact long bones, which are most commonly used for estimating stature, and the fact that mass disasters often leave only bone fragments and commingled remains, the maximum scapular breadth provides forensic anthropologists means of estimating stature through linear regression formulae. The clinical significance rests on the causative effect of the shape of the corocoid process in relation to the impingement syndrome as well as rotator cuff rupture.

### KEYWORDS :

**INTRODUCTION:** The scapula is the king of stability. It is an anchoring point for the postural muscles of the shoulder; it provides stability necessary for a huge combination of movements. Scapular stability is vital for reducing pain, preventing injury and improving overall postural health. It increases position available for the hand in space by varying original position of the proximal humerus. Core scapular and trunk stability are necessary for distal function as well. The shoulder blade is called scapula in descriptive anatomy, but in morphological language, the name scapula is restricted to the dorsal part of the bone. The ventral part of the shoulder blade is called the coracoid bone; the two meet at an epiphyseal line that crosses the upper part of the glenoid fossa. The scapula proper and coracoid are the counterparts of the ilium and ischium of the pelvic girdle. The counterpart of the pubis is a tiny piece of bone (precoracoid) that ossifies separately at the tip of the coracoid process; it takes no part in the formation of shoulder joint<sup>1</sup>. Despite rarity of direct injury to coracoid process, the coracoid process and adjacent structures were essential for clinical research<sup>2</sup>. The coracoid process forms an important part of scapular glenoid construct and is involved in many surgical procedures on shoulder joint but its unique 3 dimensional orientation makes radiological imaging difficult. Furthermore, congenital variations and minimal traumatic/iatrogenic changes in this orientation can predispose to subcoracoid impingement<sup>3</sup>.

**MATERIAL AND METHOD:** The material for the present study comprised of 60 adult scapulae of unknown sex, obtained from the Department of Anatomy, Government Medical College, Jammu. Dry adult scapulae of either sex taken for study were free from physical deformity or abrasion and were complete in all respects i.e the upper and the lower ends were intact, so as to give the correct measurements. These scapulae were labelled from 1-60 with suffix R (right) or L (left). The following parameters were measured on the coracoid process.

**1. Length of coracoid process:** Length of coracoid process was measured with help of Vernier caliper from its tip to its horizontal part as shown in Fig 1



FIG 1. Shows length of corocoid process.

**2. Width of coracoid process:** Width of coracoid process was measured with the help of Vernier caliper in an antero -posterior direction 1cm medial to its tip as shown in Fig. 2.



FIG 2. Shows width of corocoid process.

**3. Acromio – coracoid distance:** Acromio – coracoid distance was measured with help of Vernier caliper as the most anterior border of the acromion process to the tip of coracoid process.

### RESULT:

**Table 1: Statistical measurements of the length of coracoid process. (In cms)**

S.No	Parameters	Right	Left	Total Average
1	Mean	4.09	4.00	<b>4.05</b>
2	Range	3.5 - 4.9	3.4 - 4.6	<b>3.4 - 4.9</b>
3	Standard Deviation	0.392	0.321	<b>0.357</b>

**Table 2: Statistical measurements of the width of coracoid process. (In cms)**

S.No	Parameters	Right	Left	Total Average
1	Mean	1.35	1.33	<b>1.34</b>
2	Range	1 - 1.8	1 - 1.7	<b>1-1.8</b>
3	Standard Deviation	0.169	0.170	<b>0.170</b>

**Table 3: Statistical measurements of the acromion- coracoid distance. (In cms)**

S.No	Parameters	Right	Left	Total Average
1	Mean	2.79	2.73	<b>2.76</b>
2	Range	2-3.5	2-3.3	<b>2-3.5</b>
3	Standard Deviation	0.460	0.415	<b>0.438</b>

**DISCUSSION:** the coracoid assumes a biomechanical function of a shelf structure, which is one arm of the lever through which the muscular action of the coracobrachialis, biceps and pectoralis minor muscles exerts a force on the glenoid.

Numerous paths of open surgical or arthroscopic access to the shoulder refer to the coracoid<sup>16</sup> which has been aptly defined by Matsen et al<sup>4</sup> as “the lighthouse of the shoulder”. It has been observed that the position of the apex of the coracoid process varies from one individual to another<sup>5</sup>.

**1. Length of coracoid process:** The mean length of coracoid process was found to be  $4.05 \pm 0.357$  cm, (range= 3.4-4.9 cm) with mean of  $4.09 \pm 0.392$  cm (range = 3.5-4.9cm) on right side; and  $4.00 \pm 0.321$  as mean, (range= 3.4-4.6 cm) on left side. Gallino et al<sup>6</sup>; in their study find out mean length of corocoid process as 4.11 with range 1.63-5.4. Similarly, Burke et al<sup>7</sup>; in their study find out mean length of corocoid process 4.46cm with range 3.10-5.8cm. So the results of Gallino et al<sup>6</sup>; and Burke et al<sup>7</sup>; (2008) are slightly higher than present study.

**2. Width of coracoid process:** Dimensions of coracoid are of importance to orthopedicians during both open surgical and arthroscopic access to shoulder joint. The mean width of coracoid process was found to be  $1.34 \pm 0.169$ cm (range = 1-1.8cm), with mean width of  $1.33 \pm 0.169$ cm (range = 1-1.7cm) on right side and  $1.35 \pm 0.168$ cm (range = 1-1.8cm) on left side. Results of present study are in accordance with those of Piyawinijwong et al<sup>8</sup>; they found mean width of corocoid process 1.46cm with range 1.08-1.81cm.

**3. Acromio – coracoid distance:** The dimension of acromio-coracoid distance provides useful information for portal placement for shoulder arthroscopy and acromioplasty. The mean acromio-coracoid distance was found to be  $2.76 \pm 0.44$ cm, (range =2-3.5cm), with mean of  $2.79 \pm 0.47$  cm (range=2-3.5cm) on right side; and  $2.73 \pm 0.41$ cm as mean (range = 2-3.3 cm) on left side. Various studies done on same parameter were conducted by Gallino et al<sup>6</sup>; Piyawinijwong et al<sup>8</sup> Von Schroeder et al<sup>9</sup>; which showed mean 2.7cm, 3.11cm, 2.7cm respectively.

**CONCLUSION:** The study was conducted on 60 scapulae obtained from the Department of Anatomy, Government Medical College Jammu. The morphometric analysis of the acromion process should be used like an auxillary to promote a better knowledge about the disease, that appears in this area and are vital for planning and surgical procedure on corocoid process. Maximum scapular breadth and length of coracoid are useful in predicting the stature. In absence of intact long bones, which are most commonly used for estimating stature, and the fact that mass disasters often leave only bone fragments and commingled remains.

The clinical significance rests on the causative effect of the shape of the corocoid process in relation to the impingement syndrome as well as rotator cuff rupture.

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