



MORPHOMETRY OF SCAPULA AND ITS CLINICAL IMPORTANCE

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ABSTRACT

INTRODUCTION: Morphometric details of scapula are crucial for understanding abnormalities such as glenohumeral instability, dislocation, impingement syndrome, rotator cuff injuries, suprascapular nerve entrapment, snapping shoulder etc.

MATERIAL AND METHOD: The material for the present study comprised of 30 adult scapulae of unknown sex, obtained from the Department of Anatomy, SKIMS Medical college, Srinagar. All measurements were taken by vernier caliper.

RESULTS AND CONCLUSION: Maximum length of scapula, Anterior width of scapula and Anterior posterior thickness of the medial and lateral borders of the body of scapula were measured. These parameters provide useful information for various surgical procedures involving fixation of scapula fracture, resection and reconstruction of scapula for a high grade sarcoma and the re-establishment of the glenohumeral joint.

KEYWORDS : morphometry, scapula, resection , reconstruction.

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. Scapula, a large flat triangular bone is situated on the back of the body and plays an important role in forming the articular surfaces for shoulder and acromioclavicular joint.¹ Anatomical considerations of scapula are crucial for understanding its specific abnormalities such as glenohumeral instability, dislocation, impingement syndrome, rotator cuff injuries, suprascapular nerve entrapment, snapping shoulder etc. Detailed morphometric knowledge of scapula is essential for various surgical procedures such as glenohumeral arthroplasty, scapulectomy and scapula replacement.^{2,3} The geometric anatomy of the scapula is of fundamental importance in the pathomechanics of rotator cuff disease, total shoulder arthroplasty and recurrent shoulder dislocation.⁴

MATERIAL AND METHOD:

The material for the present study comprised of 30 adult scapulae of unknown sex, obtained from the Department of Anatomy, SKIMS Medical college, Srinagar. Dry adult scapulae of unknown sex taken for study were free from physical deformity or abrasion and were complete in all respects. All measurements were taken by Vernier Caliper. All measurements were taken in cm.

The following parameters were measured:

1. Maximum length of scapula: It was measured with the help of Vernier caliper from the tip of superior angle to the tip of inferior angle.
2. Anterior width of scapula: It was measured with the help of Vernier caliper from the medial edge of the scapula where the spine of scapula joined its medial border to the anterior rim of the glenoid.
3. Posterior width of scapula: It was measured with the help of Vernier caliper from the medial edge of the scapula where the spine of scapula joined its medial border to the posterior rim of the glenoid.
4. Anterior posterior thickness of the medial border of the body of scapula: It was measured half way and 1cm inwards by using the Vernier caliper.
5. Anterior -posterior thickness of the lateral border of the body of scapula: It was measured half way 1cm inwards by using the Vernier caliper.

OBSERVATION AND RESULT:

Statistical measurements regarding morphometry of body of scapula are shown as under:

S.No	Parameter	Mean	S.D
1	Maximum Length	14.48	1.26
2	Ant. Width of scapula	10.3	0.75
3	Post. Width of scapula	10.17	0.75
4	Anteropost thickness of medial border	0.10	0.04
5	Anteropost thickness of lateral border	0.90	0.17

DISCUSSION:

The mean length of scapula was found to be 14.48 ± 1.25 cm. With mean of 14.58 ± 1.19 cm on right side and mean of 14.37 ± 1.32 cm and on left side. When compared length was more on right side as compared to left side. Von Schroeder et al.⁵ (2001), Coskun et al.⁶, (2006), Ozer et al.⁷, (2006) [as maximum scapular height], Burke (2008)⁸, Paraskevas et al.⁹, and (2008) studied the maximum length. Results of study of Von Schroeder et al., and Burke et al., are slightly higher than the present study and results of study conducted by Piyawinjong et al., (2004) and Coskun et al., (2006) are less than present study. Mean length of present study corresponds to that of Ozer et al., and to some extent with that of Paraskevas et al., (2008). This could be attributed to racial factors. **Anterior width of scapula.** 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 provided forensic anthropologists means of estimating stature through linear regression formulae. The mean anterior width of scapula was found to be 10.30 ± 0.78 cm, with mean of 10.35 ± 0.74 cm on right side; and 10.24 ± 0.75 as mean, on left side. **Posterior width of scapulae:** The mean posterior width of scapula was found to be 10.17 ± 0.77 cm, with mean of 10.23 ± 0.73 cm on right side; and 10.10 ± 0.81 as mean on left side. The anterior as well as posterior width of the scapula was found to be more on right side as compared to left side. Von Schroeder et al., (2001) also worked upon this parameter i.e. breadth of the scapula and reported that the mean breadth was found to be 10.60 cm, whereas Burke (2008) also measured the same parameter and found mean breadth to be 10.24 ± 0.77 cm. The results of the present study are having statistically significant correlation with that of study of Piyawinjong et al., (2004). **Anterior-posterior thickness of medial border of the body of scapula:** Amongst the medial and lateral borders, the lateral borders were thicker than the medial border. Thickness of lateral border is sufficient to

support fixation in arthrodesis procedure for scapula instability or scapulothoracic arthrodesis in fascioscapulohumeral muscular dystrophy. The mean antero - posterior thickness of medial border of scapula was found to be 0.10 ± 0.40 cm, with mean of 0.10 ± 0.05 cm on right side; and 0.10 ± 0.41 cm as mean on left side. Various workers have evaluated the antero- posterior thickness of medial border like Von Schroeder et al., (2001) and Piyawinijwong et al., (2004). However results of present study are slightly less than that of Piyawinijwong et al., (2004) and are not in accordance with Von Schroeder et al., (2001). **Anterio- posterior thickness of lateral border of the body of scapula:** Lateral border of scapula can be used as an implanted site for endosseous dental implant in microvascular mandibular reconstruction as it has enough bone mass. The mean antero- posterior thickness of lateral border of scapula was found to be 0.90 ± 0.17 cm , with mean of 0.93 ± 0.18 cm on right side; and 0.87 ± 0.16 cm on left side. Values on right side were more than that on left side. Earlier Piyawinijwong et al., (2004) had measured this parameter. Results of present study approximately coincide with their study on left side. Values on right side were more than that on left side. Earlier Piyawinijwong et al., (2004) had measured this parameter. Results of present study approximately coincide with their study.

CONCLUSION:

These parameters provide useful and pertinent information for various surgical procedures involving fixation of scapula fracture, resection and reconstruction of scapula for a high grade sarcoma and the re-establishment of the glenohumeral joint. Maximum length, anterior width, posterior width of body of scapula, antero-posterior thickness of medial and lateral borders was more on right side as compared to left side, this may be due to active indulging of right limb over the left limb. The dimensions of body of scapula are helpful to anthropologists in determining the ancestry and to some extent to orthopedicians in open reduction and internal fixation of fractures of body of scapula .The thickness of lateral border of scapula is sufficient to support fixation in arthrodesis procedure for scapular instability or scapulothoracic arthrodesis in fascio-scapulo-humeral muscular dystrophy. Lateral border of scapula can be used as an implanted site for endosseous dental implant in microvascular mandibular reconstruction as it has enough bone mass.

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