

# A morphometric study on distance between spine, suprascapular notch and spinoglenoid notch of scapula

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## Abstract

In several patients suffering from shoulder pain, where conservative management responds poorly, it is important to consider interventional options. So, this study is done to evaluate the area where the suprascapular nerve is present in contact with scapula, for surgery to relieve nerve entrapment, to give nerve block or to give regional anaesthesia in suprascapular fossa. The measurements are taken on the spine of the scapula as it is palpable landmark in shoulder region. Perpendicular distance between middle of spine of scapula to superior border of scapula, from here to suprascapular notch, and to supraglenoid tubercle is taken on dry scapulae. In present study Perpendicular distance between middle of spine of scapula to superior border of scapula 22.45-34.71mm on right side, 22.31-32.75mm left side; from here to suprascapular notch 5.32-15.06mm right scapulae, 10.09-14.01left scapulae; From parameter no.1 to supraglenoid tubercle 19.07-32.07mm on right scapulae, 38.58-45.41on left scapulae are obtained. The obtained result may act as a guide as landmark for anatomy, comparative anatomy, anthropological study, surgical view, anaesthetical and analgesia purpose for suprascapular nerve as an alternate to Electromyography, ultrasound, CT guided and nerve stimulator guided approaches.

**Key Word:** Scapula, suprascapular fossa, spine of scapula, suprascapular notch, spinoglenoid notch

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## INTRODUCTION

The most common etiologies of chronic shoulder disorders include rotator cuff syndrome, glenohumeral joint osteoarthritis, adhesive capsulitis, posttraumatic pain, and persistent pain following surgery.<sup>1</sup> Other causes can be rheumatologic disorders like osteoarthritis, fibromyalgia, rheumatoid arthritis or secondary to the damage of nerves supplying shoulder joint due to trauma or neurodegenerative diseases like diabetes, chronic

alcoholism, etc.<sup>2</sup> The suprascapular fossa lies above the spine of the scapula on its posterior surface. The part of the suprascapular fossa between suprascapular notch and spinoglenoid notch is the site where suprascapular nerve and suprascapular vessels lies in direct contact with the bone. The nerve passes through the suprascapular foramen, vessels above to the suprascapular ligament. The suprascapular nerve is a mixed nerve, possessing both motor and sensory fibers, accounting for 70% of sensory supply to the shoulder joint. After arising from upper trunk of brachial plexus it enters the supraspinous fossa through the suprascapular notch and exits the suprascapular fossa to infrascapular fossa lateral to the spinoglenoid notch.<sup>3</sup> This study is done to evaluate the area where the suprascapular nerve is present in contact with scapula, for surgery to relieve nerve entrapment, to give nerve block or to give regional anaesthesia in suprascapular fossa. The measurements are taken on the spine of the scapula as it is palpable landmark in shoulder region.

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## MATERIALS AND METHODS

Study was done on 110 dry scapulae of both the sides in Department of anatomy, GMERS medical college Gotri and GMERS medical college Sola, Ahmadabad, Gujarat.

- Perpendicular distance between middle of spine of scapula to superior border of scapula i.e. parameter no.1, from here to suprascapular notch i.e. parameter no.2, and to supraglenoid tubercle

i.e. parameter no.3 measured by digital vernier caliper after fixing scapula on osterometric board.

- In case of absence of suprascapular notch, base of the coracoid process was taken into consideration.
- Measurements were taken by both investigators.
- Statistical analysis mean, standard deviation was calculated and analyzed.

## OBSERVATIONS AND RESULTS

In present study the area of suprascapular fossa between middle of spine, to suprascapular notch and spinoglenoid notch at supraglenoid tubercle was measured where the suprascapular nerve lies in.



**Figure 1:**

Figure 1: measurements taken no1: Perpendicular distance from middle of the spine to superior border of scapula, **Figure 2:** easurements no.1- perpendicular distance from middle of the spine to superior border of scapula, no.2- from parameter no.1 to suprascapular notch, no.3- from parameter no.1 to supraglenoid tubercle



**Figure 2:**

No.	Parameter	Mean (mm)		SD (mm)		Mean $\pm$ SD or range (mm)	
		Right	left	Right	left	Right	left
1	Perpendicular distance from middle of the spine to superior border of scapula	28.58	27.53	6.13	5.22	22.45-34.71	22.31-32.75
2	From parameter no1. To suprascapular notch	10.19	12.05	4.87	1.96	5.32-15.06	10.09-14.01
3	From parameter no.1 to supraglenoid tubercle	24.57	41.97	7.50	3.44	19.07-32.07	38.58-45.41

In two scapulae of right side perpendicular distance from middle of the spine to superior border of scapula co-inside with suprascapular notch or distance between this two parameter was 00.00mm. In one scapula of right side and one from left side ossified suprascapular foramen was found. According to the result, no significant difference was found on both the sides in perpendicular distance from middle of the spine to superior border of scapula. But there is significant difference in distance from parameter no.1 to suprascapular notch and to supraglenoid tubercle on right and left sides.

## DISCUSSION

The reported annual incidence of shoulder pain in primary care is 14.7 per 1000 patients per year with a lifetime prevalence of up to 70% 4,5. In the community as many as 20% of the adult population experience shoulder symptoms at any one time and this seems to be increasing in incidence 6,7. Author Singh S *et al* documented in males the prevalent cause of shoulder pain was found peri-arthritis (36.20%) followed by rotator cuff injury (27.58%) and subacromial impingement (17.24%). While in females the prevalent cause of shoulder pain was again peri-arthritis (48.61%) followed by acromioclavicular joint arthritis (13.8%) and glenohumeral arthritis and Subacromial

impingement (11.11%). Age wise most cases of rotator cuff injury (76.47%) were young adults in 21-30 year age group while majority of cases of periarthritis, glenohumeral arthritis, AC arthritis, subacromial impingement, shoulder were seen in fifth to sixth decade with significant association of diagnosis and age<sup>8</sup>. In present study the area of suprascapular fossa between middle of spine, to suprascapular notch and spinoglenoid notch was measured where the suprascapular nerve lies in. The obtained result may be useful for anatomy, comparative anatomy, anthropological study, may be useful to judge safe area to prevent iatrogenic complications in surgery, anaesthesia and analgesia as to give suprascapular nerve block or to give regional anaesthesia. present study may act as an alternate to Electromyography, ultrasound, CT guided and nerve stimulator guided approaches. SSNB is an emerging new technique for shoulder joint pain, and shoulder region pain relief. SSNB in combination with rehabilitative therapy from beginning gives less pain during physiotherapy and better outcome as well<sup>9</sup>. Block can be given via different approaches. In traditional method for suprascapular nerve block a needle is introduced vertically in area obtained by upper border of clavicle, upper part of acromion process lateral to coracoid process found a risk of pneumothorax and injury to suprascapular vessels<sup>10,11</sup>. As originally described by Moore 12 a sterile 22 G 3.5 inch spinal needle insertion is done at a point approximately 1/3rd of the way along the scapular spine and as per described by Granirer a posterior approach for suprascapular nerve block, in which the point of entry is determined just lateral to the point of bisection of a line along the scapular spine and another from the inferior tip of the scapula to meet the scapular spine line. The needle is advanced to the bone and moved laterally into the suprascapular notch to elicit paraesthesia.<sup>13</sup> The most commonly used posterior technique involves introducing a needle perpendicular to all planes approximately 2.5 cm superior and lateral to the midpoint of the scapular spine. In various approaches for SSNB authors found the posterior approach has least risk for pneumothorax<sup>14,15,16</sup>. This anatomical landmark may be useful in suprascapular nerve block. This area can be compared with methods followed for SSNB and giving regional anaesthesia by Dangoisse and Meirr's method also<sup>17,18</sup>. The anatomical landmark is comparable with C T guided approach with showing not much difference between the two<sup>19,20</sup>.

## CONCLUSIONS

As SSNB is an emerging new technique for shoulder joint pain, and shoulder region pain relief due to many conditions. For suprascapular nerve block in present study we obtained perpendicular distance between middle of

spine of scapula to superior border of scapula 22.45-34.71mm on right side, 22.31-32.75mm left side; from here to suprascapular notch 5.32-15.06mm right scapulae, 10.09-14.01mm left scapulae; From parameter no.1 to supraglenoid tubercle 19.07-32.07mm on right scapulae, 38.58-45.41mm on left scapulae. As SSNB is an emerging new technique for shoulder joint pain, and shoulder region pain relief due to many conditions and anatomical landmark has much importance for the suprascapular nerve block this study may act as useful guide.

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