

Ossification of Superior Transverse Scapular Ligament and its Clinical Implications

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تعظم الرباط الكتفي العلوي المستعرض ومقتضياته السريرية

سريجيت داس، راجيش سوري، فيجي كابور

المخلص: يجسر الرباط الكتفي العلوي المستعرض الثُلْمَةُ فَوْقَ عَظْمِ الكَتِفِ ليحولها من ثلثة إلى ثقب في أعلى عظم الكتف. والذي تمر من خلاله الأوعية والأعصاب الكتفية العلوية. غالباً ما يتعظم الرباط الكتفي العلوي المستعرض مسبباً ضغطاً على هذه الأوعية والأعصاب مؤدياً إلى الإحساس بالألم في منطقة الكتف مع ضعف وضمور في عضلة فوق الناتئ الشوكي وعضلة تحت الناتئ الشوكي. وعليه يتوجب التمييز بين هذه الحالة وحالات أخرى مثل حالة تمزق العضلة الكتفية المديرة. أما تشخيص الحالات التي لا يرافقها أعراض كهذه صعباً. يستعرض هذا التقرير حالة غير عادية لعينة تعظم فيها الرباط الكتفي العلوي المستعرض. ويناقش خصائصها التشريحية والنشاعية والدلالات السريرية التي من الممكن استنتاجها في هذه الحالة.

مفتاح الكلمات: الكتفي، اللوجي، الرباط المستعرض، تعظم، أنفخاخ، تقرير حالة

ABSTRACT The superior transverse scapular ligament (STSL) bridges the suprascapular notch, converting it into a suprascapular foramen. The suprascapular nerves and the vessels traverse through the suprascapular foramen of the scapula. Often the STSL is ossified to produce compression of the suprascapular nerves producing resultant symptoms. The entrapment of the suprascapular nerve by the ossified STSL may result in symptoms like pain in the shoulder region and also result in wasting and weakness of the supraspinatus and infraspinatus muscles. Such a condition has to be differentiated from other conditions like rotator cuff tears. Often asymptomatic cases make the diagnosis difficult. The present study reports the anomalous ossified STSL detected in a bone specimen, discusses its anatomical and radiological aspects and describes its clinical implications.

Keywords: Scapula; Ligament; Anomalies; Ossification; Entrapment; Case report.

THE SUPRASCAPULAR NOTCH IS CONVERTED into a foramen by the STSL with the suprascapular nerve passing through the foramen and the suprascapular vessels passing above the STSL.¹ The STSL has been reported to be ossified as in conventional anatomy text books.¹ Past research studies have reported the STSL to be calcified and partially or completely ossified.² The variations of the suprascapular notch and the STSL have been known to predispose to suprascapular nerve entrapment.³

Many past research studies on the ossification of the STSL have described it to be a cause of a suprascapular nerve entrapment syndrome.²⁻⁷ Thus, the role of STSL in causing suprascapular nerve entrapment is

a known fact and better understanding of the topographical anatomy may be helpful for clinicians, surgeons and academicians in day to day practice.

While many of the past research studies have described the anatomy and clinical study of ossified STSL, there is a paucity of literature on the anatomico-radiological study of the ossified STSL. The present study aims to report the morphology of ossified STSL and its radiological findings in a bone specimen and to discuss its clinical implications. In conclusion, anatomical and radiological knowledge of the ossified STSL may be helpful in diagnosis and treatment of suprascapular nerve entrapment.

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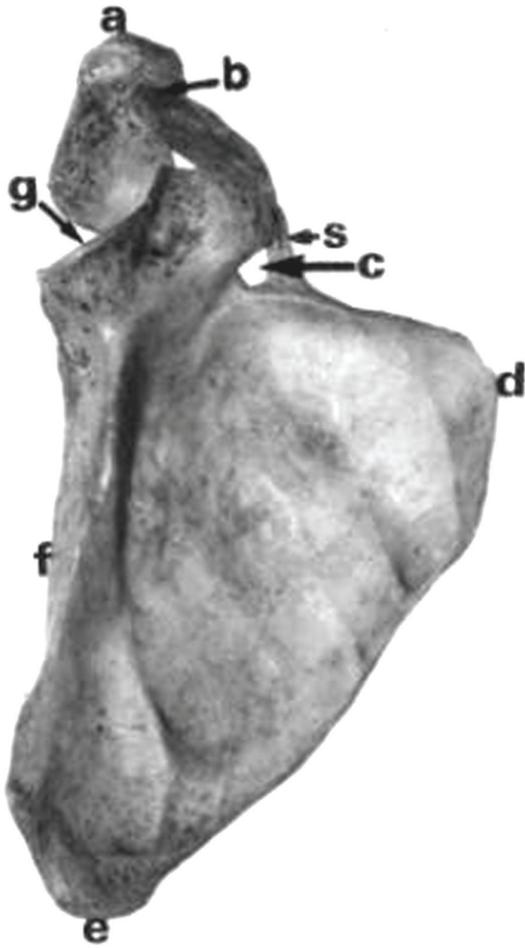


Figure 1: Photograph of the scapula (anterior view) showing:

- a:* Acromion process
- b:* Coracoid process
- c:* Suprascapular foramen
- d:* Lateral angle
- e:* Inferior angle
- f:* Medial border
- g:* Glenoid cavity
- S:* Ossified superior transverse scapular ligament

CASE REPORT

During routine undergraduate osteological teaching for medical students, ossification of STSL was noted only in a scapula. The anomalous bone specimen was studied in detail and the specimen was photographed [Figure 1]. A skiagram was also obtained for the bone specimen [Figure 2]

The scapula showed ossification of the STSL ('S' in Figure 1). The suprascapular foramen ('C' in Figure

1) measured 1.2 cm as its maximum vertical height and 0.8 cm as its maximum transverse diameter. The distance of the suprascapular foramen from the lateral angle of the scapula measured 5.5 cm, while the distance from the glenoid notch measured 2.7 cm. The STSL measured 2 cm x 0.7 cm. The lateral border of the scapula had a projection in its lower portion. No other deformities were noted in the bone specimen. The X-ray of the specimen (oblique view) revealed a small suprascapular foramen (marked with a lead pin in Figure 2) and the completely ossified STSL (marked with an arrow in Figure 2).

DISCUSSION

The suprascapular nerve has a motor supply to the supraspinatus and the infraspinatus muscle, but it does not innervate the skin. In case of irritation of the nerve, the pain is deep and poorly localized and this is perhaps the reason why the cause of the pain and tenderness is difficult to discover in any individual.⁸ Often, by the time the patient approaches the clinician with complaints, the muscle atrophy will have already begun.⁸ An early and correct diagnosis requires a thorough anatomical knowledge of the course of the nerve and its possible sites of entrapment.

The suprascapular nerve entrapment may be due to traumatic or non-traumatic causes. The suprascapular nerve is commonly susceptible to compression mainly at two major sites i.e. at the level of the suprascapular notch and at the base of the scapular spine.⁹ The suprascapular nerve passes through the suprascapular foramen and there is a possibility that the nerve may be compressed by the STSL, especially if it is ossified. The research reports have defined the shape of the suprascapular notch or the ossification of the STSL to predispose to suprascapular nerve entrapment.² Research reports have described a 'U' shaped suprascapular notch in 77% and a 'V' shaped notch in 23% of individuals, respectively.² In the present bone specimen, we noted a foramen, which had the STSL fully ossified. Admittedly, in the absence of any clinical history of the patient, it is difficult to comment on the clinical status, but we presume that in this individual there may have been entrapment of the suprascapular nerve.

The ossification of the STSL has been reported to be 18% for the partial and 5% for the complete type.² Past studies have reported a 3.7% - 4% incidence of partial ossification of STSL.^{10,11} It is thus evident, that the extreme rarity of complete ossification of STSL as

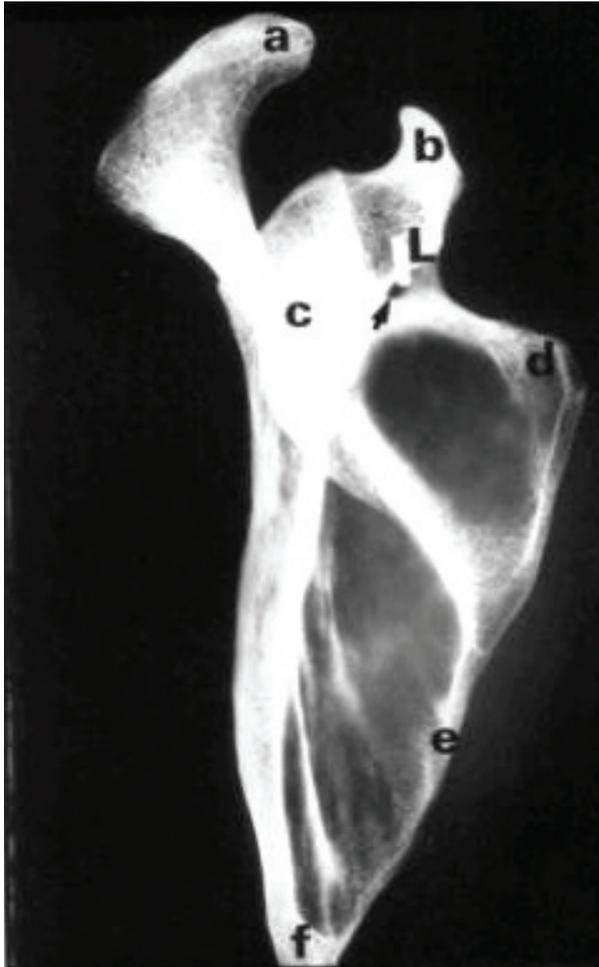


Figure 2: Skiagram of scapula (Oblique view) showing:

- a:** Acromion process
- b:** Coracoid process
- c:** Glenoid cavity
- d:** Lateral angle
- e:** Lateral border
- f:** Inferior angle

Suprascapular foramen is being shown with small arrow (↑) and the ossification of the ligament (L) is shown with lead pin placed vertically while obtaining the skiagram

seen in this case, may be clinically and academically relevant. As anatomists, we think that a study of STSL in a larger sample would definitely be worthwhile.

Interestingly, entrapment of the suprascapular nerve at the suprascapular notch was first described by Kopell and Thompson. According to these authors, the movement of abduction or horizontal adduction of the shoulder resulted in compression of the nerve against the STSL.¹² Research studies have also defined it as a 'sling effect' because there is kinking of the su-

prascapular nerve against the STSL.¹³

Involvement of the suprascapular nerve by an ossified STSL may result in pain. The history of such a patient will have to be carefully noted and a thorough physical examination undertaken. Usually in these cases of entrapment, the patient complains of pain, which may be present over the postero-lateral aspect of the shoulder. The pain may radiate down the arm and there is weakness with abduction and external rotation of shoulder.¹⁴ Thus weakness with abduction and external rotation is an important clinical feature to diagnose such an entrapment. However, this pain may also resemble a rotator cuff tear. Anatomically, the rotator cuff includes the muscles subscapularis, supraspinatus, infraspinatus and the teres minor. Out of these four muscles, only the supraspinatus and infraspinatus muscles are innervated by suprascapular nerve. Thus entrapment of the suprascapular nerve would result in loss of action of both the supraspinatus and infraspinatus muscles. External rotation by both infraspinatus and teres minor muscles and just the loss of action of the infraspinatus may be difficult to identify. Under such conditions, the patient is asked to adduct the arm across the chest, which tenses the nerve on the STSL and there is a resultant increase in pain.¹⁵

The nerve conduction velocity and electromyographic studies may help in proper diagnosis.¹⁶ Investigations like CT, MRI scans and arthrography may help at arriving at a correct diagnosis. Interestingly, even atrophy of muscles has been found in MRI scans, therefore MRI scans may be beneficial for correct diagnosis.¹⁷

Non-operative treatment has been advised for majority of the cases.¹⁶ A rehabilitation programme with gradual strengthening of the involved muscles is always advised. In extreme cases, surgical decompression of the nerve is advised. The approach is anterior, superior or posterior. The idea is to identify the suprascapular nerve by retracting the suprascapular vessels laterally and then the STSL may be resected to decompress the impinged nerve.¹⁴

In the present case, the complete ossification of the STSL can be easily made out in the radiological study (marked with an arrow in Figure 2). We also kept a lead pin in vertical position for the better visualization of the suprascapular foramen, which was complete because of the ossification of the STSL. In the presence of a normal suprascapular foramen with a normal STSL, there would be no distinct bar of bone casting

any shadow in the X-ray plate, but one was noticed in the present case (marked with arrow in Figure 2). The presence of such an ossified ligament may not be detected unless compression symptoms exist.

The presence of an ossified STSL may also pose a challenge during decompression of the suprascapular notch if the condition is not fully appreciated.² The ossification of the STSL may also alter the attachment of the omohyoid muscle, which has its attachment close to it. The lateral border of the scapula had a projection and it may have distorted the attachment of the omohyoid muscle, thereby altering its actions.

CONCLUSION

The anatomical and radiological knowledge of the ossification of the STSL may be helpful for clinicians, radiologists and surgeons dealing with suprascapular nerve entrapment conditions. Overall, it is an interesting osteological study, which opens the door for further research on the ossification of STSL.

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