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Spectrum of Morphological and Histological Characteristics of Spinoglenoid Ligament with Its Topographical Anatomy.

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ABSTRACT

The spinoglenoid ligament, also known as inferior transverse scapular ligament overly the suprascapular nerve in the spinoglenoid notch. Previous documented reports suggest that this may be a contributing factor to the dysfunction of distal branch of the suprascapular nerve. Thus the objective of this study was to determine the morphology, histological characteristics and topographical anatomy of the spinoglenoid ligament. The spinoglenoid ligaments of thirty cadaver shoulders were dissected to evaluate their anatomical dimensions, histological characteristics, and relationship to the suprascapular nerve, the posterior part of the capsule, and the glenoid rim. The spinoglenoid ligament was categorized as type-1 (thin fibrous band) and type-2 (distinct ligament) based on their appearance. The gross examination of the spinoglenoid ligament extended from the lateral aspect of the scapular spine to the posterior part of the glenoid and the superficial fibers blended with the posterior aspect of the shoulder capsule. Of the thirty dissected ligaments, seven belonged to type I and the remaining twenty three were type II. Histological examination revealed collagen fibres within the ligament. This study revealed the superficial and deeper attachments of the spinoglenoid ligament to the glenoid with some variation in the size of the ligament. The findings suggest a possible relationship between this ligament and entrapment neuropathy of the distal suprascapular nerve. Also, the ligament may limit the infraspinatus tendon mobilization during repair of rotator cuff tear, placing the distal part of the suprascapular nerve at risk.

Keywords: spinoglenoid, topographical anatomy, ligament, scapula.

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INTRODUCTION

There is a considerable debate on the existence and importance of spinoglenoid ligament in the literature. Some investigators have thought that the structure is indistinct or that its clinical relevance has not yet been defined. Hence, the present study was conducted to define the prevalence, anatomy, morphology and histological characteristics of the spinoglenoid ligament in cadaveric shoulders.

Spinoglenoid ligament forms the roof for spinoglenoid notch. The ligament extends from inferior border of the lateral part of the spine of the scapula to the superior margin of the glenoid. As a result, the suprascapular nerve, artery and vein courses through the fibrosseous foramen formed by the spine of the scapula and the spinoglenoid ligament.

At the spinoglenoid notch, cross-body adduction and internal rotation of the glenohumeral joint has shown to tighten the spinoglenoid ligament, resulting in the stretching of the suprascapular nerve which moves laterally underneath the ligament [1]. Overhead athletes and manual labourers are at an increased risk for entrapment of the distal branch of the suprascapular nerve by the spinoglenoid ligament [2]. Also, the spinoglenoid ligament may limit the infraspinatus tendon mobilization during repair of rotator cuff tear, placing the distal part of the suprascapular nerve at risk [3].

MATERIALS AND METHODS

The present prospective study included thirty dissected fresh-frozen cadaver shoulders.

The trapezius and deltoid muscles were carefully reflected from the scapular spine and the acromion process. The exposed supraspinatus and infraspinatous muscles were elevated from their respective fossae and the structures of the spinoglenoid notch were evaluated and dissected. Later, the suprascapular nerve was identified and the spinoglenoid ligament was completely exposed for proper examination. Based on appearance the ligament was categorized as type-1 (thin fibrous band) and type-2 (distinct ligament).

Sliding calipers was used to measure the dimensions of the spinoglenoid ligament. The superior and inferior borders of the ligament along with insertions on the glenoid and scapular spine were measured (Figure 1).

Figure 1: Measurements include ligament to nerve, ligament to bone, scapular spine insertion, glenoid insertion, superior border and inferior border.

A segment of the ligament with their attachments were fixed in 10% buffered formalin. The specimens were processed and later embedded in paraffin. The ligament sections were taken in an axial direction and were stained with hematoxylin and eosin as well as Masson trichrome stain. The histological examination was performed under light microscopy.

The statistical analysis used in the study was mean value for all anatomic measurements.

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RESULTS

Dissection revealed presence of spinoglenoid ligament in all 30 specimens. The size and thickness varied, but all specimens had distinct insertions on the scapular spine and the posterior aspect of the glenoid. Out of the thirty specimens, seven were Type 1 [Figure 2] and twenty three were Type 2 [Figure 3].

Figure 2: Type 1 spinoglenoid ligament.

Figure 3: Type II spinoglenoid ligament.

Spinoglenoid ligament extended from inferior border of the lateral part of the spine of the scapula to the superior margin of the glenoid. Therefore, the neurovascular bundle was enclosed by a fibro-osseous foramen formed by the spine of the scapula and spinoglenoid ligament. In all cadavers, suprascapular nerve, artery and vein coursed in an order from medial to lateral and from superior to inferior at the spinoglenoid notch. The mean values of different dimensions of spinoglenoid ligament measured [Table.1].

Table 1: Measurements of spinoglenoid ligament with their mean value.

Measurements of the spinoglenoid ligament	Mean values
Ligament to nerve	0.76 cms
Ligament to bone	0.94 cms
Scapular spine insertion	1.43 cms
Glenoid insertion	1.51 cms
Superior border	1.78 cms
Inferior border	1.74 cms

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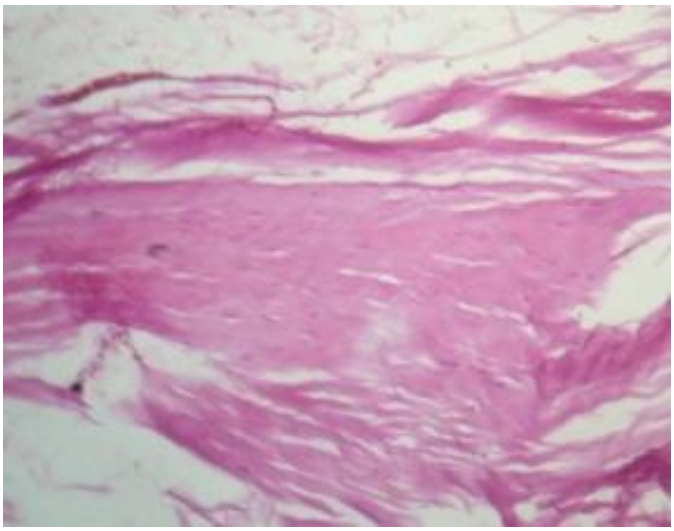
Histological Analysis

Histologically, the ligament was composed of parallel bundles of collagen fibers with similar orientation [Fig. 4A]. The collagen bundles were confirmed by Masson Trichrome stain [Fig.4B].



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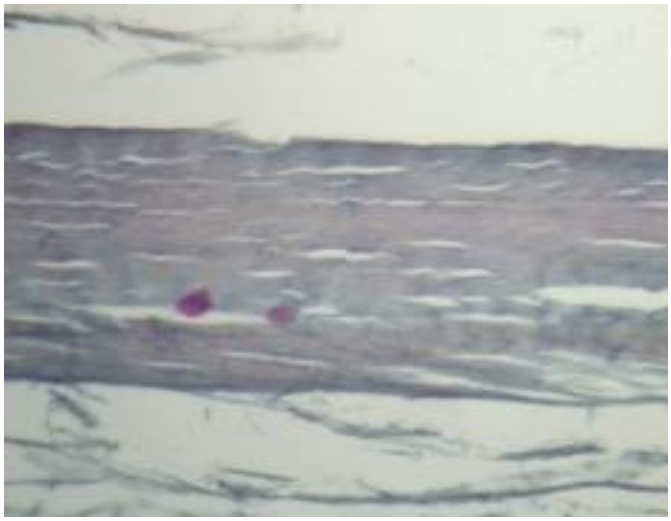

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Figure 4A and 4B: Hematoxylin and Eosin stains as well as Masson trichrome stain of spinoglenoid ligament showing the presence of collagen fibrils.

DISCUSSION

The spinoglenoid ligament is a fibrous connective tissue band which runs from the lateral border of the scapular spine to the margin of the glenoid process. This ligament has been reported with variable prevalence and morphology in cadaveric shoulders. At the spinoglenoid notch, cross body adduction and internal rotation of the glenohumeral joint has also been shown to tighten the spinoglenoid ligament, resulting in the stretching of the suprascapular nerve which moves laterally underneath the ligament [1].

The spinoglenoid ligament has a variable presence. It can be a thin fibrous band or a thick, well defined ligament. Recently a spinoglenoid septum has been described. This is formed by the thickening of the fascia cover of the supraspinatous and infraspinatous muscles [4].

According to Kevin et al, spinoglenoid ligament is seen in all cadavers and histology shows collagen fibrils in the ligament. Measured dimensions of the spinoglenoid ligament in their study are ligament to nerve 4.63mms, ligament to bone 6.61mms, scapular spine insertion 14.36mms, glenoid insertion 13.76mms, superior border 15.84mms and inferior border 14.21mms [5]. This is in accordance to our study wherein all the dissected cadavers contained spinoglenoid ligament and histological evaluation of few ligaments showed collagen fibrils. However, the measurements in our study were comparatively slightly higher.

Also Kevin et al observed that spinoglenoid ligament was affected by the position of the glenohumeral joint. Internal rotation of the shoulder combined with abduction and adduction showed increased pressure on the distal branch of suprascapular nerve. Athletes with overhead activities are repetitively reproducing this motion, which may result in an increased risk for entrapment of the distal branch of the suprascapular nerve by the spinoglenoid ligament [2].

The presence of spinoglenoid ligament is of potential clinical importance for two reasons. First the ligament may limit the advancement of the infraspinatous tendon during repair of a massive tear of the rotator cuff, placing the distal part of the suprascapular nerve at risk. Second, the spinoglenoid ligament roofing the spinoglenoid notch forms a potential site for entrapment of the suprascapular nerve, particularly with the added stress of traction that can occur with overhead athletic activites [3]. Suprascapular nerve entrapment (SNE) is becoming more commonly recognized as a cause of the painful shoulder especially in the athletes with overhead activities such as volley-ball players. Surgical release of the spinoglenoid ligament in these patients is indicated [6].

CONCLUSION

We conclude that the presence of sphenoglenoid ligament is an anatomical entity by morphology and histology. The measurements of spinoglenoid ligament may help the surgeon during surgical release of the spinoglenoid ligament in the treatment of suprascapular nerve entrapment. Also, we believe measurments of the ligament in our study could help in assessing the risk factors for suprascapular nerve entrapment (SNE) syndrome at the spinoglenoid notch region in manual labourers and also those involved in violent overhead sports activities such as volleyball players.

REFERENCES

[1] Bernard CS Lee, Muthukaruppan Yegappan, Palaniappan Thiagarajan. Ann Acad Med Singapore 2007;36;1032-1035.
[2] Kevin D Plancher, Timothy A Luke, Robert K Peterson and Stephen V Yacoubian. The J Arthroscopic Rel Surg 2007;23[9]:991-998.
[3] Mustafa Aktekin, Deniz Demiryurek, Alp Bayramoglu, Eray Tuccar. Journal of Pan Arab Union of Neurological Sciences 2003;8[4]:222-224.
[4] Boris Poberaj, Ladislav Kovacic. Acta Orthop Belg 2005:71:269-272.
[5] Kevin D Plancher, Robert K Peterson, Jack C Johnston and Timothy A Luke. The J Bone Joint Surg 2005;87[A]:361-364.
[6] Dramis, Ashvin Pimpalnerkar. Acta Orthop Belg 2005:71:269 -272.