

Based on its Anatomic Configuration, the Posterior Bundle of the Acromioclavicular Ligament Plays a Role in Joint Stabilization

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Summary:

Based on the oblique passing through the acromioclavicular joint, the posterior bundle of the acromioclavicular ligament might play a vital role as the stabilizer which prevents posterior dislocation of the clavicle.

Abstract:

BACKGROUND

In anatomy textbooks, the acromioclavicular ligament has been depicted as running nearly vertical to the acromioclavicular joint surface. Meanwhile, some biomechanical studies have demonstrated that the acromioclavicular ligament is the primary stabilizer which prevents posterior translation of the clavicle, but not anterior translation. We hypothesize that the acromioclavicular ligament may have a yet unknown structure that mainly affects constraints against the posterior translation of the clavicle. The objective of the present study was to investigate the morphology of the acromioclavicular ligament related to its functional role.

METHODS

We observed 20 shoulder girdles from 11 cadavers (6 males and 5 females; average age 84.1 years) which were donated to the department of anatomy. They were fixed in 8% formalin, and then preserved in 30% alcohol. Two specimens were excluded because of prior dissection. The shoulder girdles were extracted en bloc, and the muscles were detached from the shoulder girdle. We macroscopically examined the morphology of the acromioclavicular ligament after removal of the connective tissues overlying the acromioclavicular ligament and joint capsule. In addition, we classified the acromioclavicular ligament according to dimensions of the joint capsule of the acromioclavicular joint in sagittal sections.

RESULTS

The acromioclavicular ligament was divided into posterior and anterior bundles which were completely independent of each other. The well-developed posterior bundle ran obliquely from the anterior part of the acromion to the posterior part of the lateral clavicle. At the clavicular side, the attachment of the posterior bundle spread from the superior to inferior surface of the lateral clavicle. In comparison, the anterior bundle was thin and narrow; it could be categorized into three types according to its configuration. The posterior and anterior bundles could be easily separated from each other and from the capsule of the acromioclavicular joint.

DISCUSSION

As for clinical implications, the anatomical findings in the present study could be a clue to facilitate improved design of the surgical technique for the dislocation of the acromioclavicular joint. To date, there are many candidates for the treatment of acromioclavicular joint disruption, such as the acromioclavicular fixation, coracoclavicular fixation, and the coracoclavicular ligament reconstruction. Though the common aim of the treatment has been focused on reconstruction of the coracoclavicular ligament, and not the acromioclavicular ligament, the coracoclavicular

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ligament might only contribute to the supero-inferior stabilization. In other words, there may be residual instability in the antero-posterior direction with only coracoclavicular reconstruction. Based on the anatomic findings of the current study, particularly those of the posterior bundle, the anatomic reconstruction of the acromioclavicular ligament could facilitate the improved outcome in the treatment for acromioclavicular joint disruption.

CONCLUSION

The acromioclavicular ligament was divided into well-developed posterior and poorly developed anterior bundles. The posterior bundle ran posteriorly toward the lateral clavicle from the acromion. Taking into account the course of the posterior bundle, the acromioclavicular ligament may be the primary stabilizer which prevents posterior translation of the clavicle.