

Annotated Bibliography

Myers JB, Ju Y-Y, Hwang J-H, McMahon PJ, Rodosky MW, Lephart SM. Reflexive Muscle Activation Alterations in Shoulders With Anterior Glenohumeral Instability. *Am J Sports Med.* 2004;32:1013-1021.

This article reported the results of a study conducted to measure the activation of muscles that affect shoulder stability in patients with recurrent anterior shoulder instability. Muscles of the shoulder, particularly the pectoralis major and biceps brachii, act as stabilizers of the glenohumeral joint. Muscles of the rotator cuff act to properly center the humeral head during glenohumeral movement, and thus also are important in shoulder stabilization. This study measured alteration of the activation of these muscles during external rotation in what the article calls apprehension position, which is described as 90° abduction, 90° elbow extension.

The study included eleven subjects with recurrent anterior shoulder instability and a control group of eleven subjects without shoulder instability. None of the subjects were overhead throwers. The subjects were put into apprehension position with a Biodex isokinetic machine which was the source of perturbation of the shoulder. The subjects were blinded with blindfolds, earphones and vibrations from the chair. Muscle activation was measured by electromyography. Electromyographic probes were inserted into the supraspinatus, infraspinatus and subscapularis. Surface electrodes were placed over the pectoralis major, biceps brachii, anterior deltoid and latissimus dorsi.

The study found that activation of pectoralis major and biceps brachii are suppressed in patients with anterior shoulder instability, as well as the coactivation of supraspinatus-subscapularis. The peak activation of supraspinatus, subscapularis and infraspinatus was increased in the subjects with instability. The article concluded that the shoulder of patients with anterior instability has increased vulnerability partially due to the suppressed response of the pectoralis major and biceps brachii. Thus, clinicians should target these muscles during rehabilitation of patients with anterior shoulder instability.

Since this study was a retrospective study, it would be rated as Level 2 according to the AAOS Levels of Evidence for Primary Research Question. The authors do acknowledge that this is a retrospective study, thus more research is required to investigate if these muscle activation alterations are present in patients before they experience instability.

Critical Appraisal Checklist

Primary guide

1. The results are valid, as each subject in the instability group had recurrent anterior shoulder instability, thus they had at least 3 instability encounters
2. Follow up was complete, all subjects finished the study.

Secondary guide

1. Outcome was unbiased, as the subjects were blinded during the study.
2. There was no adjustment for different factors, only altered muscle activation was measured.

What are the Results

1. Alteration of muscle activation in patients with recurrent instability is very likely.
2. The likeliness of the effects are not particularly precise, a confidence interval was not listed.

Will the Results Help me in Caring for my Patients

1. The subjects were somewhat similar to my patients, they were a few years older on average. Also, most of the subjects that more occurrence of instability.
2. The results will help me to select certain exercises to focus on strengthening and activation of pec major and biceps brachii in rehabilitation.
3. The results are useful, as I know what muscles to target during rehabilitation.