The Absence of the Pectoralis Major Muscle Affecting Pitching Biomechanics

Travis Kirk
Faculty Advisor: Jason C. Craddock, EdD, ATC, LAT, CSCS
Florida Gulf Coast University, Department of Rehabilitation Sciences, Athletic Training Program

Abstract

Background: This level 4 clinical case report involves a 24-year-old (76 inches and 214 lbs) male Minor League right handed pitcher. His medical history includes grade I right rotator cuff muscle strains, and sternoclavicular ligament sprain. The athlete is a level 4 clinical case report in the athletic training room and comes into the athletic training room reporting soreness and tightness in his R rotator cuff muscles, along with some burning/scapular muscle tightness. A biomechanical analysis reveals an abnormality of the athlete’s chest wall on the right side. Also, his right shoulder sits higher than the left side, at rest. Following observations, it is noted the athlete has an absence of the right pectoralis major muscle.

Method: Findings: The following palpations, the athletic trainer determines the athlete’s pectoralis minor and subclavian muscle are present, only the pectoralis major is missing. Further palpation of the shoulder and back reveals myofascial trigger points in the rhomboids, levator scapulae, infraspinatus, descending trapezius, subscapularis, and teres minor. Full active range of motion and strength bilaterally with shoulder flexion, abduction, internal rotation, and external rotation. Empty can test (+), clunk test (+), Hawkins-Kennedy’s test (+). Following the evaluation, the athlete noted he was born without his pectoral major muscle on his right side.

Discussion and Summary

Rehabilitation and Results

A biomechanical analysis was performed to determine what muscles were contributing to the lack of pectoral major muscles during the pitching motion. A plan was established to strengthen the compensating muscles and reduce his trigger points. The pectoralis major is most active during the arm cocking phase and the arm acceleration phase creating a muscle trigger and tension point phenomenon. Due to the absence pectoral major muscles, the subscapularis, infraspinatus and latissimus dorsi must produce more force to perform the same action. Treatment began with deep tissue massage of the compensating muscles followed by therapeutic cupping if necessary, to release tension in the muscles. Also, the athlete will perform stretching, along with a pin and stretch, or active release technique, can be used to stretch the fibers. To strengthen the compensating muscles, a progressive stretching and strengthening program was created.

Case Report

Patient: The athlete is a 24-year-old (76 inches and 214 lbs.) male Minor League right handed pitcher. His medical history includes grade I right rotator cuff muscle strains, and sternoclavicular ligament sprain. The following information will explain the mechanism of injury, clinical findings, and the rehabilitation plan. The athlete's first outing return to play to provide additional information to this athlete’s unique injury.

Mechanism of Injury: There is no known mechanism of injury for the right shoulder. The athlete was born without his pectoral major muscle. Overuse injury due to repetitive throwing is the main suspect for causing the injury of an elevated fist and sternoclavicular joint trigger points. The pectoralis major is most active during the arm cocking phase and the arm acceleration phase of the throwing motion. During the arm cocking phase, the pectoralis major, anterior deltoid, and subscapularis contract concentrically to horizontally adduct the shoulder. It also provides stability during motion and pitch. The rotator cuff is a group of muscles consisting of the supraspinatus, infraspinatus, subscapularis, and teres minor. Range of motion within the shoulder is limited due to release tension in the muscle fibers. Static stretching, along with a pinch and stretch, or active release technique, can be used to stretch the fibers. To strengthen the compensating muscles, the athlete will perform a weekly shoulder program. The focus is to strengthen the rotator cuff muscles and supporting scapular muscles. A progressive resistance exercise program was initiated for the RTC. To fix the SICK scapulae a focus on getting the lower trapezius muscle to be more active during scapular motion was the key. Having the athlete perform the SICK scapulae and latissimus dorsi during the pitching motion and explains how the significance of Poland Syndrome can effect the pitching biomechanics.

Discussion

The Absence of the Pectoralis Major Muscle Affecting Pitching Biomechanics

Travis Kirk

Anatomy

Understanding the anatomy of the shoulder is essential in understanding the biomechanics of pitching and how Poland Syndrome effects the shoulder joint. The rotator cuff is a group of muscles consisting of the supraspinatus muscle, the infraspinatus muscle, teres minor muscle, and the teres major muscle. The rotator cuff’s main responsibility is to keep the humeral head securely in the glenohumeral joint allowing proper motion and allows for proper movement of the shoulder. The other muscles that assist in providing motion of the shoulder are the pectoralis major, the three aspects of the deltoid, coracobrachialis, triceps brachii (long head), biceps brachii, and teres major. These muscles are attached to the bones that make up the shoulder joint which are the humerus, scapula, and clavicle. The muscles and bones create the glenohumeral joint that is surrounded by ligaments and a labrum to provide extra support and create the joint

References