# The Combined Shoulder Technique: A Novel Approach in the Treatment of Scapular Dysfunction—A Case Report

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#### **CASE REPORT**

## Abstract

Athletes who throw overhead experience injuries to their throwing shoulders secondary to the mechanics of throwing.<sup>1</sup> The process of throwing is a coordinated, complex set of movements known as the kinetic chain.<sup>1,2</sup> Disruption anywhere about this chain can result in injury to the throwing shoulder.<sup>1-3</sup> The scapula's interaction with the thoracic cage allows for normal motion, and injury or imbalance of the scapular stabilizers can result in SICK scapular syndrome and this, in turn, can result in an injury to the glenohumeral joint itself.

Osteopathic manipulative treatment (OMT) can be utilized to restore the kinetic chain to its full function and to decrease SICK scapular syndrome, thereby preventing injury and treating it if it occurs. The present case will demonstrate this and introduce a novel technique to treat the entire shoulder joint.

### Introduction

The shoulder is a unique joint, designed for mobility not stability. The true shoulder joint is the glenohumeral joint but all 3 joints of the pectoral girdle—the glenohumeral, acromioclavicular, and the sternoclavicular—will be considered as the shoulder for the purpose of this paper.<sup>4</sup> The scapulothoracic joint, a pseudojoint, is considered part of the shoulder as it contributes to its motion. This joint system is integral to the motion of the arm and, therefore, restrictions of this system contribute to dysfunctions of the arm, pectoral girdle, neck, and thoracic cage. This system is part of an overall system known as the kinetic chain. The kinetic chain is a complex, full-body activity of overhead throwing.<sup>1,3</sup> If working properly, it can provide accuracy and velocity to a thrown object, in this case a baseball. The chain itself refers to a sequence of force transferring motions that occur while throwing.<sup>1,3</sup>

Throwing is a continuous, fluid group of movements that begin with the lower extremities and core. In baseball, the chain begins with the plant foot, which is contralateral to the throwing arm. The kinetic chain provides support and builds kinetic energy that is ultimately transferred through the throwing arm to the release of the object from the fingers.<sup>2,3</sup> Dysfunction anywhere along the chain can cause disruption of the entire chain with resultant injury to the shoulder or arm. This case depicts a novel approach to treatFrom the Arcana Center for Integrative Medicine in Wynnewood, Pennsylvania.

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ing the kinetic chain and the shoulder with osteopathic manipulative treatment.

## **Case Report**

A 17-year-old male, left-handed pitcher, presented to the clinic with a chief complaint of 2 weeks of decreasing pitch velocity accompanied by increasing, aching, non-radiating, up to 6/10 left shoulder pain. He denied any other symptoms in the shoulder or arm except for a lack of "cut" on his slider. The slider spins away from the batter, and his was becoming flat going through the hitting zone. He noted the pain increased while throwing "breaking pitches" and decreased when his arm was taped across his body, in adduction, and iced. He also reported mild, right-sided, nonradiating, achy, low back pain that began after slipping on a wet mound throwing a pitch in practice. He stated that his right leg, his plant foot, slid forward and turned outward during the pitch and that his back pain began shortly thereafter. The shoulder pain

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began approximately 1 week later. He noted some overall relief with 600 mg of ibuprofen. He denied any previous trauma to the shoulder but did note having "elbow difficulties" the previous season. His review of systems was negative except as noted above.

## History

The patient's medical and surgical histories were negative. He was born full-term via non-induced, spontaneous vaginal delivery without instrumentation to a primigravid mother. He denied any history of trauma. He denied having any allergies. He occasionally took up to 600 mg of ibuprofen for pain. He was a high school student and avid baseball player, specifically a pitcher.

### Examination

A physical exam depicted a physically fit 6 foot, 7 inch, 195-pound adolescent boy in no acute distress. His blood pressure was 128/78 mm Hg with a heart rate of 60 beats per minute and a respiratory rate of 18 breaths per minute. His neck was supple with a full range of motion. The Spurling test was negative bilaterally, Lhermitte sign was not present, and the cervical compression test (axial) was negative. His cardiac exam revealed a regular rate and rhythm without murmurs, rubs, or thrills. The respiratory exam was clear to auscultation bilaterally without rhonchi, rales, or wheezes. The musculoskeletal exam revealed an inferior and prominent left scapula with tenderness about the left coracoid process in addition to full active and passive range of motion of the right shoulder, elbow and wrist but decreased left shoulder abduction (actively and passively) and flexion (actively and passively) due to pain. There was full active and passive range of motion of the left elbow and wrist. The full can, empty can, Hawkins, Neer, lift off, and O'Brien tests were negative bilaterally.5

The patient's gait displayed out-toeing of right foot with mild external rotation of the right lower extremity and decreased extension of the right lower extremity and left upper extremity. Observation of throwing motion unveiled back and left shoulder pain. The back pain was reported with right leg lift and right leg drive. The shoulder pain was reported with arm cocking and mostly with maximum internal rotation during arm deceleration.<sup>6,7</sup>

The neurologic exam revealed 2/4 and equal bilateral reflexes at C5, C6, C7, L4, and S1. The patient's strength was 5/5 bilaterally at shoulder flexors, extensors, internal rotators, external rotators, adductors, and abductors except left shoulder abduction was 4+/5 due to pain. Strength was 5/5 at elbow flexors, extensors, pronators, supinators, wrist flexors, extensors and lumbricals, hip flexors, adductors, abductors, hamstrings, quadriceps, foot dorsiflexors, and plantar flexors bilaterally as well.

The osteopathic structural exam revealed tight right plantar fascia with a dropped median cuneiform; tight right gastrocnemius and soleus; tight right hamstrings; an outflare of the right innominate; a right-on-right sacral torsion with L3-5 neutral, side-bent right, rotated left; a tight linea alba; a very tight left latissimus; tight paraspinal muscles from the sacrum through the thorax; T12 flexed, rotated and side-bent right; tight left rhomboid and trapezius musculature with decreased scapular thoracic joint glide bilaterally, left greater than right; tender points in the left supraspinatus, left infraspinatus and about the left coracoid process with mild internal rotation of the left humerus; left proximal ulna adduction; an elevated left first rib with inhalation; left ribs 3-5, C7 flexed, rotated and side-bent right; C2 flexed, rotated, and side-bent right; and a mild left side bending rotation of the sphenobasilar synchondrosis.

## Treatment

After verbal consent was obtained from the patient and his mother, osteopathic manipulative treatment was applied to the somatic dysfunctions detailed above. Treatment commenced with release of his linea alba, utilizing ligamentous articular strain (LAS).<sup>8</sup> LAS was then applied to the plantar fascia and cuneiform of his plant (right) foot. LAS and myofascial release (MFR) were applied to the tight muscles in his right leg. LAS was again utilized to treat the innominate dysfunction. Osteopathic cranial manipulative medicine (OCMM) was used to treat his sacrum and his L5. T12 and the paraspinal muscles were treated with MFR. The ribs were treated with LAS and respiratory assist muscle energy. The neck was treated with LAS, and the head was treated with OCMM. The elbow was articulated with a modified high-velocity, low-amplitude technique (HVLA).

After the tender points were treated with counterstrain (CS), the scapula and glenohumeral joints were treated with the combined shoulder technique, a technique that consists of myofascial release to the scapula followed by the simultaneous use of LAS and muscle energy to the muscles surrounding the joints and to the glenohumeral joint itself. The patient was instructed not to pitch that day and to begin throwing the following day if pain free. He was instructed to follow up in 2 weeks.

The patient returned to the clinic for his 2 week follow-up pain-free and, more importantly to him, throwing harder than he had prior to treatment.<sup>9</sup> He reported being pain-free approximately 2 days after his treatment and also noted pain-free "long toss" warm-up sessions. He began throwing harder 4 days post-OMT without discomfort and was up to his full velocity and back to throwing breaking pitches 3 days after that (1 week post-OMT). He noted that his back symptoms began to recur after lifting his backpack on the

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morning of his follow-up appointment, and he was worried that his pain and pitching impairments would return.

Physical examination that day revealed a new posterior right innominate that was treated with muscle energy technique. The remainder of his somatic dysfunctions, found previously, were greatly improved or resolved after his second treatment. Of note, posttreatment, his left (pitching) shoulder had increased range of motion compared to his right as described by Wilk et al and Bailey et al.<sup>10,11</sup>

### **Combined Shoulder Technique**

Seventeen muscles attach directly to the scapula, and multiple others influence its motion.<sup>4</sup> The combined shoulder technique addresses the majority of these muscles. If needed, the technique is utilized after other treatments are performed. It is not a technique to be performed alone. It is rooted in the first tenet of osteopathy,<sup>14</sup> and it is employed as such. A complete orthopedic assessment must be performed prior to applying this technique to rule out rotator cuff, labral or bony pathology. This technique is executed after treatment of the ribs, particularly the first rib on the affected side, the clavicles, pelvis, and sacrum. In most athletes, treating the lower extremities also would take place prior to engaging the combined technique. This is secondary to throwing being a wholebody motion and not simply a motion of the shoulder and upper extremity.<sup>1</sup>

## *Figure 1.* Lateral recumbent view of hand position during combined shoulder technique.



The combined shoulder technique is divided into 2 distinct parts and can be used as such. The "scapular wheel" will be described first and the muscle energy/LAS (MELAS) technique for the glenohumeral joint and rotator cuff, second.

## The Scapular Wheel

The scapular wheel is an indirect myofascial technique applied to the posterior and anterior fascia and musculature of the shoulder. The patient is generally supine, although the technique can be applied to a seated or lateral recumbent patient. The physician is seated next to the patient. The physician's cephalad hand contacts the acromion while the caudad hand contacts the angle of the scapula. *(See Figures 1 and 2.)* 

The cephalad hand gently applies pressure through the acromion to "steer" the scapula into its direction of ease. The caudad hand gently guides the scapular angle into the direction of ease as well. This position is held until a balance point is obtained and is maintained until a release is felt. The scapula will then display increased motion and the scapulothoracic joint should glide more freely as well. This portion of the technique provides the needed relaxation of the scapulothoracic joint, its fascia and in general, some of the major muscle movers of the shoulder, specifically the latissimus dorsi, trapezius, pectoralis minor, biceps brachii (both heads), coracobrachialis, omohyoid, serratus anterior, and rhomboid major and minor. Pectoralis major can also be affected with this portion of the

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**Figure 2.** Supine hand positioning during combined shoulder technique.





Figure 3. The initial positioning before MELAS.

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technique. The deltoid, triceps, and rotator cuff muscles may show signs of improvement after this portion of the technique as well, but not always.

### Muscle Energy Ligamentous Articular Strain

The MELAS portion of the technique is utilized to treat and balance the rotator cuff musculature with the larger major movers of the shoulder while providing restabilization and balance of the glenohumeral joint. The technique is 2-fold, but it occurs simultaneously after the initial setup. The initial setup consists of the patient lying supine with the physician being seated next to the patient. The patient's arm is brought into 90° of abduction with elbow flexed, thereby giving the physician a "handhold" to balance the glenohumeral joint. The elbow is placed into the abdomen of the physician. The patient's arm is then moved into the feather-edge of the barrier of external rotation with the patient's hand on the posterior deltoid of the physician. This is the initial setup and should be fine-tuned so that the glenohumeral joint is in balance before applying the isometric muscle energy portion of the technique (see Figure 3). Once the balance point is achieved, the patient will internally rotate (throw) the affected arm against the physician's deltoid (see Figure 4). The physician resists this action for 3-5 seconds. There is then a pause of 2 seconds followed by repositioning of the arm to the next barrier's feather edge and the process is repeated 3-5 times.14

The glenohumeral joint is to remain at its balance point throughout the muscle energy sequence. This is accomplished by maintaining pressure with the physician's abdomen on the patient's elbow. The area should then be rechecked for improvement in range of motion and pain.



Figure 4. Final positioning after MELAS.

This set of techniques addresses the entire shoulder and allows for reintegration of the injured parts with the whole (LAS) while resetting the dysfunctional muscles (ME) and directly influences the superior portion and termination of the throwing portion of the kinetic chain.<sup>1,3,5,7</sup> It allows for treatment of underlying somatic dysfunctions prior to labral or rotator cuff pathology occurrence.<sup>12,15,16</sup>

### Discussion

The patient injured himself while slipping off a pitching mound, causing somatic dysfunctions in his right foot and sacrum. This foot injury with resultant sacral dysfunction created, via the latissimus dorsi attachments to the thoracolumbar fascia and humerus, left scapular malposition with resultant scapular dyskinesis, leading to an initial loss of throwing velocity followed by pain.<sup>12</sup> The findings of scapular malposition and dyskinetic movement compelled the diagnosis of SICK scapular syndrome.

SICK scapular syndrome is defined as scapular malposition, inferior medial border prominence, coracoid pain and malposition, and dyskinetic motion of the scapula.<sup>12</sup> It is common among throwing athletes with injury and is amenable to OMT.

After removing the shock from the system<sup>13</sup> by releasing the linea alba, treatment commenced at the initiation point of the injury, the right foot. Treatment of the foot began a gradual unwinding of the kinetic chain, with resultant resolution of the shoulder pain and increase in velocity. In this case, the foot injury was the key lesion.<sup>8</sup> The scapular dysfunctions were most likely due to the disruption of the beginning of the kinetic chain for which combined shoulder

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technique addressed much of the shoulder dysfunctions at one time.

## Conclusion

The pitcher in this case presented with shoulder pain secondary to a slip off the mound and disruption of the kinetic chain. The shoulder pain resulted from SICK scapular syndrome secondary to an injury inferiorly along the kinetic chain. The patient was treated osteopathically to resolve his somatic dysfunctions, and a novel technique was created in order to treat SICK scapular syndrome in coordination with the osteopathic tenets. The first tenet of osteopathy states, "The body is a unit of mind, body and spirit," and the second tenet states, "Structure and function are interrelated."<sup>14</sup>

This case demonstrates how osteopathic principles, especially these tenets, must be utilized in order to treat dysfunctions related to pitchers and other overhead-throwing athletes. The use of OMT can potentially prevent injuries and prolong careers.<sup>4,10,15-18</sup> Future studies are required to confirm that OMT can prevent and treat injuries in overhead throwing athletes.

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