USE OF CONSERVATIVE AND SPORT-SPECIFIC MANAGEMENT STRATEGIES FOR A BASEBALL PITCHER WITH PERSISTENT ELBOW PAIN

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ABSTRACT

Objective: To present a case of medial epicondylitis in an adolescent baseball pitcher that appeared to improve when addressing the upper extremity kinetic chain with a variety of conservative management strategies.

Clinical Features: An 18-year-old right hand dominant high school baseball pitcher had recurring sharp pain in his right elbow. Previous trials of medication and physical therapy were only partially successful in resolving the problem. The patient's pain was rated as an 8 on a numerical pain scale during throwing activities. A variety of tender points were noted in the right upper extremity. The patient had discontinued playing competitive baseball due to the pain.

Intervention and Outcome: The patient was treated 14 times over 15 weeks. Treatment included cervical, thoracic and upper extremity manipulation, soft tissue mobilization and progressive sport-specific training for the upper extremity. After the first treatment he was able to throw the ball and was able to continue throwing during the treatment program. The patient returned to league play after the treatment program.

Conclusion: A course of conservative care addressing multiple elements of the upper extremity kinetic chain seemed beneficial for this athlete. (*J Chiropr Med* 2006;5:97-100)

Key Indexing Terms: Chiropractic; Rehabilitation; Forearm Injuries; Athletic Injuries; Medial Epicondylitis

INTRODUCTION

Athletes feel the need to excel, to compete, and to challenge their own previous performances.¹ Given

their drive, an injury can be detrimental to an athlete on many levels. Although pain may be located in one joint, it is important to ask the patient about other joints and tissues and to study the neurology and mechanics of the injury. It is important to understand the baseline and level of conditioning, and muscle strength of an athlete prior to beginning care.² As Cain et al³ state, "The most important information will be obtained through a thorough and detailed history and physical examination."

Athletes adapt to chronic pain by developing new movement patterns in an attempt to reduce noxious stimuli. This new "central programming" has been called an engram.⁴ Liebensen suggests that treatment of chronic conditions will likely fail if only peripheral targets (eg, muscles and joints) are addressed.⁴ Thus, a treatment protocol that includes chiropractic adjustments of the spine and extremities and integrates sport specific rehabilitation may involve the "deprogramming" of a new movement patterns. This case demonstrates the use of a deprogramming approach for a high school baseball pitcher with medial epicondylitis.

CASE REPORT

A right-handed 18-year-old male high school senior presented to our office, at the request of his baseball coach, with sharp medial right elbow pain that increased significantly when he threw. The pain began the previous spring while he was playing baseball. After one pitch he felt a numbness and burning pain in the medial aspect of the right forearm that extended down into the fingers of the right hand. The pain eased within several minutes, but it persisted in the medial aspect of his right elbow. In addition to baseball, the patient lifted weights for the upper and lower extremities and trunk 3-4 times each week. Due to the continuation of the pain and its effect on his ability to participate in sports, the patient consulted with a physical therapist approximately 1 month after the initial onset. The physical therapist set him up on a rehabilitation

program that included an upper body exerciser (bicycle with using the arms), medicine ball toss with a trampoline, and band exercises for the upper extremity. This program resulted in a decrease of his elbow complaint after 3 months. Eight months after the last physical therapy visit, his elbow pain was exacerbated after one pitch of baseball.

At the time of his chiropractic examination he had been taking 2 800mg tablets of aspirin a day without relief. He was evaluated by a general practitioner 1 day prior to coming into our office and he was instructed to see a physical therapist and continue with over the counter medication. His right elbow pain was rated as a 0 on a numerical pain scale, with 10 being severe and 0 being no pain. Pitching or throwing a baseball increased the pain severity to an 8.

Cervical ranges of motion, as measured with an inclinometer, were decreased (right rotation = 76° ; left rotation = 77°). Normal rotation range of motion for the cervical spine is $\geq 80^\circ$.⁵ No pain or limitations in flexion, extension, right lateral flexion or left lateral flexion were noted. No cervical orthopedic tests were positive. Shoulder ranges of motion were measured with a goniometer. He had decreased right external rotation (80°), whereby normal range is $104^\circ \pm 8.5^\circ$.⁵ Normal ranges were found with flexion, extension, and internal rotation. Right internal and external rotation tests produced an increase in the patient's right elbow pain. Positive shoulder orthopedic tests included the 80 degree test, Apprehension, and Apley's Scratch on the right side only.

Elbow ranges of motion were found to be within normal limits, as measured with a goniometer. Extension of the right elbow produced medial elbow pain in that elbow. Positive orthopedic tests for the right elbow included extension stress, flexion stress, and Cozen's test. Moderate tenderness was noted in the following muscles: right supraspinatus, right pectoralis major (clavicular and sternal branches), right pronator teres, right subscapularis. Deep tendon reflexes were +2 bilaterally for the biceps, triceps, and brachioradialis muscles. Muscle strength testing was 5/5 (a standard neurological grading scale of 5/5 was used) on the right side for the middle deltoid, wrist extensors, fingers flexors, finger extensors, and interossei. The right biceps, triceps, wrist flexors, supraspinatus, infraspinatus, and pectoralis group tested weak at 4/5 and caused an

increase in the medial elbow pain. The same muscles were tested on the left arm and were 5/5. Sensation to light touch was decreased on the right forearm (dermatomes C6 and T1) when compared to the left.

Plain film radiographs of the right elbow obtained the day before at the medical doctor's office were normal. Cervical radiographs (A-P open mouth, A-P lower cervical, neutral lateral) were taken to help rule out any underlying pathology and assess for potential cervical subluxation. Bone density appeared adequate and disc spacing was within normal limits. No soft tissue abnormalities were noted in the cervical views. A severe hypolordosis was noted (cervical curve measured 10° using C1 and the inferior endplate of C7 as reference points). Cervical subluxation complex of C5 flexed and C6 right laterally flexed and left rotated was observed and a congenital anomaly of a posterior ponticle was noted.

The working diagnosis included right ulnar collateral ligament sprain and elbow muscular dysfunction, with associated cervical subluxation complex, and right altered upper extremity mechanics. His prognosis was favorable, given his motivation and compliance with his treatment and home rehabilitation protocols. Complicating factors for the case included the one year duration, multiple occurrences, and the patient's uncertainty with his future of pitching.

The patient was treated 14 times over a 15 week period. The treatment plan began at a frequency of 3 times a week for 3 weeks and included chiropractic adjustments (cervical and upper extremity), myofascial release, and home rehabilitation exercises for flexibility and range of motion of the shoulder and elbow joints.

During the first week, he began a progressive shoulder throwing program, a sport specific, home rehabilitation program with emphasis on the proper mechanics of pitching. Usually, the program covers a period of 2–3 months. However, for less severe shoulder injuries, the throwing program can be accelerated.⁶ His elbow complaint and high compliance allowed this intense throwing program to be condensed into 10 weeks. At the end of the first week, he was placed on a shoulder core stabilization protocol, a resistance exercise that focused on form. These exercises included the following movements:

external rotation modified short arc, internal rotation modified short arc, side lying lateral raise, and tricep kick back.⁶ He was instructed to perform 20 repetitions per exercise 1 time per day using 5 pounds. As he became comfortable with the exercises, he was instructed to perform the exercises at 30 repetitions, 3 times a day using 5 pounds. Sharing with his coach regarding the first day of treatment, the patient said the muscle work was very sore but afterwards he was able to throw the ball with limited discomfort. He was motivated to get the problem corrected. The patient was pleased with his progress and relieved that he was able to continue playing baseball.

As his condition continued to improve, his treatment plan continued at 3 times a week for the following 2 weeks. During this time, the focus was turned to soft tissue re-education with each visit consisting of 5 minutes of myofascial release to key muscles (right subscapularis and right pronator teres, 5 passes for each muscle done actively), rehabilitation (the progressive shoulder throwing program and Rocket Arm™) and home exercises (shoulder core stabilization). The Rocket Arm™ is an isotonic weight training device designed specifically to strengthen the baseball player's throwing arm (True Sport, Inc, Columbia, MD). He was instructed on the use of the Rocket Arm™ to develop the proper mechanics in pitching during his rehabilitation.

After 3 weeks of care, the patient reported he was able to throw 75% with no pain during or after throwing. On occasion his elbow would flare up when throwing, yet only last for 1 second, as reported by the patient. The patient also stated that it felt as though he had decreased tightness in the musculature of his right forearm. After 15 weeks of care, he was able to play summer league and college baseball.

DISCUSSION

The elbow is anatomically analogous to the knee, but it is injured less often. Souza⁷ suggests that this is due to the non-weight bearing function of the elbow. However, the elbow is functionally challenged with repetitive activities. Souza⁷ states, "These overuse mechanisms account for the majority of complaints. With athletes, valgus stress predominates, in particular in throwing sports and in activities requiring the use of an arm extension."

When treating a patient with elbow pain, the physical anatomy of the elbow region is an important starting point. The elbow joint has 3 major articulations, including the humero-radial, humero-ulnar and proximal radioulnar surfaces.⁸ The elbow joint performs 2 movement patterns, including extension/flexion and pronation/supination of the forearm. The joint complex is stabilized by ligamentous and capsular tension that is determined by joint position and bony congruity, and static/dynamic muscle/tendon support.⁷ On the medial aspect of the elbow, the ulnar collateral ligament is composed of 3 bundles, including the anterior, posterior and transverse oblique bundles. The anterior bundle is the primary restraint to valgus force of the elbow.³ Radial collateral, and annular ligaments also help to stabilize the elbow joint.

The importance of assessing the cervical spine when treating an extremity is due to the origin of the nerve supply for the upper extremity. Chiropractic adjustments to the cervical and thoracic spinal areas were performed to, as Buchberger⁶ states, "... provide adequate motion in the base of the upper extremity kinetic chain." Several peripheral nerves exit the cervical spine and travel through the elbow on the way to the hand and the fingertips. The C5, C6, and C7 nerve roots form the musculocutaneous nerve. This nerve supplies motor innervation to the coracobrachialis muscle, biceps muscle, and greater part of the brachialis muscle and sensation to the skin over the forearm. The radial nerve, which originates from the C6, C7, and C8 levels, supplies the extensor muscles of the arm and forearm that extend the wrist and fingers and supplies sensation of the overlying skin of these muscles. At the elbow, the median nerve, which is derived from the C5 through C8 levels, supplies motor innervation to the flexor-pronator forearm muscles. Finally, the ulnar nerve, which arises from the C5 through C8 levels, is both a motor and sensory nerve.⁹

The treatment program included chiropractic adjustments, which was done to restore joint mobility and protect function of the kinetic chain. Myofascial release was used to reduce intermuscular and intramuscular fibrous adhesion in key muscles. Home rehabilitation exercises were used to increase flexibility and range of motion at the shoulder and elbow joints. Addressing the full kinetic chain¹⁰ appeared to be important in decreasing this patient's decreased elbow pain and return to athletic performance.

Although it is not possible to draw specific clinical conclusions from a single case report, this patient was treated medically in the past and did not respond from treatment that was focused to the elbow without addressing the kinetic chain and source of peripheral nerves.

CONCLUSIONS

A high school baseball pitcher with medial epicondylitis reported a reduction in pain and improvement in performance, after a protocol of cervical, thoracic and upper extremity manual adjusting and myofascial release to specific musculature combined with a therapeutic exercise program that addressed many parts of the upper extremity kinetic chain.

REFERENCES

1. Salter R. Textbook of disorders and injuries of the musculoskeletal system. Media, PA: Williams & Wilkins; 1999. p. 647–51.
2. Gerbino PG. Elbow disorders in throwing athletes. *Orthop Clin North Am* 2003;34:417–26.
3. Cain EL, Dugas JR, Wolf RS, Andrews JR. Elbow injuries in throwing athletes: a current concepts review. *Am J Sports Med* 2003;31: 621–35.
4. Liebensohn C. Rehabilitation of the spine: a practitioner's manual. Baltimore: Williams & Wilkins; 1996. p. 26.
5. Cipriano J. Photographic manual of regional orthopaedic and neurological tests. Baltimore: William & Wilkins; 1997. p 22–25; 81–86; 123–125.
6. Buchberger D. Scapular-dysfunctional impingement syndrome as a cause of grade 2 rotator cuff tear: a case study. *Chiropr Sports Med* 1993;7:38–45.
7. Souza T. Differential diagnosis and management for the chiropractor: protocols and algorithms. Sudbury, MA: Jones and Bartlett; 2005. p. 232–9.
8. Kocher MS, Waters P, Micheli L. Upper extremity injuries in the paediatric athlete. *Sports Med* 2000;30:117–35.
9. Andrews J and Whiteside J. Common elbow problems in the athlete. *J Orthop Sports Phys Ther* 1993;17:289–95.
10. Ellenbecker T, Davies G. Closed kinetic chain exercise: a comprehensive guide to multiple-joint exercises. Champaign, IL: Human Kinetics; 2001.