Chiropractic management of a 30-year-old patient with Parsonage-Turner syndrome

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Abstract

Objectives: The purpose of this case report is to describe the chiropractic management of a patient presenting with right arm paralysis and a diagnosis of Parsonage-Turner syndrome.

Clinical Features: After receiving nerve entrapment release surgery, a 30-year-old man presented with a right arm contracture, atrophy, and weakness with general paralysis of the forearm and index finger of 6 weeks' duration.

Intervention and Outcome: The patient was provided chiropractic care that included high-velocity/low-amplitude spinal manipulation based upon applied kinesiology manual muscle testing, soft tissue trigger point therapy, exercises, and stretches. The patient demonstrated improvement in range of motion after the first treatment session. By the eighth treatment, he was able to fully straighten his arm. Three years later, the patient reported that he was able to do mountain climbing and that his arm was fully functional and pain-free.

Conclusion: For this patient, chiropractic care seemed to be successful in relieving his right arm paralysis and restoring normal arm movement.

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Introduction

Parsonage-Turner syndrome (PTS) is an entity that is also known as *acute brachial neuritis*, *neuralgic amyotrophy*, *brachial neuropathy*, or *neuritis of the shoulder girdle*. This plethora of descriptive terminology does not lead to a readily available diagnosis, with it being easily confused with other upper extremity abnormalities, including anomalies of the rotator cuff,

acute calcific tendinitis, adhesive capsulitis, cervical spondylosis, peripheral nerve compression, tumor, acute poliomyelitis, and amyotrophic lateral sclerosis.¹

Internationally, PTS has been described in many countries, although the specific incidence has been reported. The incidence in the United States has been estimated at approximately 1.64 in 100 000 per year with an unknown etiology.² It appears to affect males more than females, with a peak in incidence in patients in their third and seventh decades.^{3,4}

This condition was first documented by Spillane⁵ in 1943 and by Parsonage and Turner⁶ in 1948. Parsonage and Turner described 136 cases of this

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condition and stated these features as strongly diagnostic of PTS:

- discrepancy for muscles wasting and denervation between muscles innervated by the same nerve.
- patchwork distribution of denervation of muscles that are innervated by several nerves or nerve trunk arising from the brachial plexus.
- dissociation between sparing of the sensory nerve action potential and denervation of muscles depending on the same mixed nerves.

Treatments have traditionally been based upon symptomatic relief. Suggested biomedical treatment protocols for PTS include analgesics, often narcotics (which may be required for several weeks); physical therapy for 3 to 8 weeks to help maintain strength and mobility; and encouragement that the condition will slowly improve. The profound weakness in the shoulder muscles may require the use of a sling. Corticosteroids, although frequently used, are of unproven benefit. Along with these treatments, suggested rehabilitation programs include physical therapy focused on the maintenance of full range of motion in the shoulder and other affected joints, occupational therapy in the form of functional conditioning of the upper extremity, and surgical intervention including nerve grafting or tendon transfers for the few patients who do not achieve good recovery by 2 years. Surgery usually is aimed at improving shoulder abduction.⁷ The objective of this article is to describe one patient's response to chiropractic care for a patient with PTS or acute brachial neuritis.

Case report

A 30-year-old right-handed-dominant athletically built man presented to a chiropractic office with paralysis of the right arm with a diagnosis of PTS. Excluding this condition, he was in excellent health. He neither smoked nor drank alcohol. He worked in a sporting goods store and was an avid mountain climber. There were no related cases of family members having had similar symptoms.

The patient had been healthy until 6 weeks earlier when he awoke with a slight discomfort in his right arm. He thought initially this was due to sleeping on the arm. After going to work, however, the patient reported that the discomfort had progressed to severe pain.

The following day, the patient sought treatment from his primary care physician, who rendered an

initial diagnosis of tendonitis and prescribed celecoxib and acetaminophen/hydrocodone, which decreased the pain.

Within a week, the patient began to progressively lose mobility to the point that his elbow became paralyzed in extreme flexion; and he was unable to straighten the forearm. He returned to his primary care physician, who referred him to an orthopedist. Upon examination, the orthopedist discovered that the patient had only 5° of mobility in the elbow. Results of radiographs were negative.

The man's condition did not improve, and the patient was referred to an orthopedic surgeon. Electromyography studies revealed abnormalities consistent with a peripheral neuropathy. A working diagnosis of PTS or pronator teres syndrome was rendered. The surgeon recommended a surgical procedure to release the nerve entrapment by the pronator teres muscle. The patient sought other opinions from 2 orthopedic surgeons and a neurologist. Because of his intense pain and disability, the patient decided to undergo the procedure performed by the original orthopedic surgeon, with the understanding of the risks and benefits. Improvement was not obtained following the surgery, and the condition worsened. The patient's arm went from being relatively immobilized at 45° flexion, able only to make small rocking movements, to being fully paralyzed at 90° elbow flexion, unable to move the arm in any direction.

Initially, the patient presented with his right forearm, wrist, and hand in full flexion and was unable to extend most noticeably his right forearm. He complained of burning, stabbing, numbness, and pins and needles sensations, most notably along the C6, C7 dermatomes. At the time of this examination, the severity of his pain had diminished from a 9 to a 2 (on a numeric pain scale of 10 being maximum pain) while he was taking the drug Neurontin (Pfizer, New York City, NY).

Inspection revealed a pronounced zigzag-shaped scar approximately 4 in over the medial aspect of the antecubital region from the surgical attempt to release nerve entrapment by the pronator teres muscle. The forearm was in an antalgic position against his body in an approximately 90° angle.

Physical examination showed atrophy of the right arm and thenar eminence. Results of the orthopedic tests Adson and Wright maneuvers were positive for sensory findings on the right. There was loss of grip strength that could not be measured on a handgrip dynamometer because he was unable to grip the measuring tool. Palpation revealed nodules and referred pain patterns in the right scalenes, pectoralis minor, and biceps muscles. Manual muscle testing was

performed; and based on the analysis of physical impairment assessment standard from the *Guides to the Evaluation of Permanent Impairment, 5th Edition*⁸ of the American Medical Association where muscle power is graded between 0 (complete paralysis) to 5 (normal) points, the following was displayed: 0/5 strength of the second finger (median nerve-C7, C8, T1), 3/5 strength of opponens pollicis (median nerve-C6,7), 4/5 strength of the serratus anterior (long thoracic nerve-C5, C6, C7), and 4/5 strength of the wrist extensors (radial nerve-C5, C6, C7, C8, T1) only while the neck was in flexion or when a mild caudal pressure was applied to the vertex of the head. Empirical observations in applied kinesiology have shown this to occur when an anterior cervical subluxation, most commonly at C5, is present.⁹ Also noted was a 4/5 weakness of the pectoralis minor only after a pronounced stretching of the muscle. This is a diagnostic procedure unique to applied kinesiology where inhibition of a muscle following stretching indicates a fascial shortening or “trigger point” and requires treatment geared toward releasing or lengthening that specific muscle fascia.¹⁰

He reported that only the anticonvulsant gabapentin proved effective in diminishing pain. Although the mechanism by which gabapentin exerts its anticonvulsant action is unknown,¹¹ the patient did not seem to experience any of the more common adverse effects; and so he remained on it.

Clinical diagnosis

Diagnosis was multifaceted beginning with the diagnosis given by the first orthopedic surgeon and confirmed by 2 additional orthopedic surgeons and a neurologist, acute brachial neuritis or PTS. In addition, there was restricted motion (chiropractic subluxation) of approximately the fifth cervical vertebra in a posterior to anterior direction. It was theorized that this possibly caused “an inflammatory reaction and may give rise to foraminal narrowing and compression of the adjacent nerve root” and thus may have resulted in the patient’s symptoms.^{12,13}

Further complicating this patient’s condition where what Travell and Simons¹⁴ have called *myofascial adhesions* or *trigger points*. The trigger points were located in his right scalenes; pectoralis minor; and, consequently, biceps muscles. Travell and Simons¹⁵ hypothesized that shortening of the scalene and pectoralis fascia can lead to peripheral entrapment of the brachial plexus. The presumption was that this, in turn, led to the shortening of the biceps due to nerve

entrapment and subsequent antalgic condition with which this patient presented.

These findings led to the following diagnostic impressions:

1. Acute brachial neuritis (PTS) resulting from:
  - a. Anterior scalene syndrome whereby the hypertonic or hypertrophied scalene muscles compress the brachial plexus between the anterior and medial scalenes and the first rib.
  - b. Pectoralis minor syndrome whereby entrapment of the brachial plexus can occur between the fibers and tendon of the pectoralis minor muscle, the head of the humerus, and the coracoid process of the scapula.
2. Cervical root irritation resulting from a restriction of motion (chiropractic subluxation) of the fifth cervical segment possibly afflicting the musculo-cutaneous nerve innervation to the biceps.
3. Acute contracture of the right biceps muscle possibly as a consequence of the above.

Chiropractic management

The patient’s treatment protocol included chiropractic manipulation, deep tissue therapy, and exercise rehabilitation. Chiropractic manipulative therapy (CMT) was selected to restore normal anterior to posterior motion to the fifth cervical segment. The technique used involved bringing the joint to limits of its physiological range of motion in rotation then applying a controlled impulse to the spinous process in a lateral to medial direction to induce normal anterior to posterior motion of the articular facets. This CMT was performed bilaterally. Deep tissue therapy as advocated by Walther¹⁶ was performed in conjunction with the ice and stretch technique of Travell and Simons¹⁷ to release fascial adhesions and restore normal resiliency to the right scalenes, pectoralis minor, and biceps muscles. Rehabilitative therapy included rubber ball to strengthen the finger flexors and rubber band exercises (Fig 1) to strengthen the finger extensors as well as the use of Chinese exercise balls, which are stainless steel balls that are rolled in a circular pattern in the palm by the patient to stimulate the muscles and improve dexterity and circulation (Fig 2).

After the initial treatment, the patient noted the first improvement in his condition since it began 6 weeks earlier. After 6 treatments, elbow extension measured 90% of expected normal. Hand grip dynamometer strength was measured 3 times on each side with values of 36, 40, and 32 lb on the right and 52, 50, and 50 lb on

Fig 1. Rubber band therapy used to strengthen muscles in the hand. (Color version of figure is available online.)

the left. Results of the Adson and Wright maneuvers were negative. After 8 sessions, elbow extension was 100% of expected normal. After 12 visits, hand grip dynamometer readings were 50, 54, and 46 lb on the right and 54, 50, and 50 lb on the left with only a 10% loss of full movement of the distal digit on the second finger. All muscles now registered 5/5 strength on manual muscle testing with the notable exception of the finger flexor muscle of the distal interphalangeal joint of the first finger that measured 4/5 strength. Three years later, the patient was called on the phone and asked how he was doing. The patient reported that he was able to do mountain climbing and that his arm was fully functional and pain-free.

Discussion

The possible mechanisms for the results obtained in this case are varied. Because it appears that the patient responded favorably to conservative manual therapy such as CMT and deep tissue treatment, this tentatively corroborates with the proposed mechanism of hypomobility of the fifth cervical vertebra and peripheral

entrapment between the anterior and middle scalene muscles and the first rib. It is also consistent with an entrapment between a hypertonic pectoralis minor muscle, coracoid process of the scapula, and head of the humerus.

The proposed mechanism of the fifth cervical vertebra in this case could possibly be the result of the patient's hobby of mountain climbing. In theory, this activity could have also caused shortening of the scalene and pectoralis minor muscle due to the tension sustained to these muscles while climbing steep terrain. The resulting peripheral entrapments of the brachial plexus may have led to the acute symptom experienced by this patient. The contracture of the patient's biceps muscle may have been the reason for his hyperflexion condition and inability to extend the elbow and the severe motor loss in the more distal joints.

This patient's condition appeared to be multifaceted and the result of several areas of dysfunction, leading to the difficulty in arriving at a single diagnosis and therefore single treatment. This case illustrates the importance of appreciating the unique and multiple

Fig 2. Chinese exercise ball therapy used to improve dexterity of the hand. (Color version of figure is available online.)

factors that can contribute to a patient's condition, such that the therapy should be directed to treating the person that has the condition rather than vice versa.

This case is notable because the exact cause of PTS remains unknown and, previously, there has been no mention of chiropractic as a treatment option for people with this condition. This represents a case where chiropractic techniques, ascertained through manual muscle testing and applied kinesiology procedures, appear to have been successful in resolving PTS.

Limitations

Single case studies do not provide conclusive evidence for treatment effectiveness. Manual muscle testing findings were not corroborated by another practitioner and may have been interpreted differently. Some cases of PTS can resolve themselves with recovery of strength and sensation beginning spontaneously as early as 1 month after symptoms onset, with about 75% of complete recovery within 2 years.¹⁸ Therefore, the patient in this case may have improved without treatment or because of other causes. Future studies of chiropractic treatment of patients with PTS should include additional and more rigorous outcome measures.

Conclusion

This case demonstrated that a patient with PTS who did not respond to standard medical or pharmaceutical intervention derived benefit from conservative care, namely, chiropractic management using applied kinesiological modalities.

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