

Managing Rotator Cuff Injury: Can Acupuncture Add Increments to the Current Protocol? Inference from a Case Study

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The shoulder is one of the most versatile but also most unstable and vulnerable joints of the body. It is vulnerable to a variety of injuries, of which rotator cuff injuries predominate. These require specific tissue-targeted therapy to heal the point injuries.

Conventional physiotherapy has been found to be limited in its efficacy as it offers superficial physical measures that cannot reach the traumatized tissue. Acupuncture, by virtue of its mode of application, can reach deeper in the traumatized tissue and offer substantial pain relief along with rapid healing of the trauma through ways that are yet to be fully understood. Acupuncture therapy for the management of rotator cuff injury seems to be the most productive way to reduce the intervention time and improve the net outcome, as observed in the case studied.

Key words: acupuncture, rotator cuff, macrotrauma, tendon sheath

Introduction

Disorders of the rotator cuff complex are among the most common problems affecting shoulder movements. These disorders may vary from bursitis and tendonitis from overuse to frank massive rupture of the tendinous cuff. The condition usually presents as a painful arc of abduction, abnormal scapulohumeral rhythm during abduction, tenderness in the subacromial bursa, and weakness in the infra- and supraspinatus muscle-tendon units.¹

Injury to the rotator cuff is the most

frequent reason associated with rotator cuff dysfunction. These injuries may be the result of microtrauma from repetitive movements, as seen in participants of various sports when the overhead movement of shoulder is overused,² or the result of acute traumatic injuries or macrotrauma to the shoulder. Acute macrotraumatic rotator cuff injury, though uncommon, may result in a partial- or full-thickness tear to the cuff from a direct injury to the shoulder.³ These tears may also be associated with an instability of the glenohumeral joint among older adults, in which an addi-

tional rupture of the subscapularis may be the attributing factor.⁴

The clinical presentation of a rotator cuff injury largely depends upon the particular mechanisms of injury involved. In the case of microtrauma, the mechanisms involved are primary impingement, secondary impingement, tensile failure, and internal glenoid impingement. In case of macrotrauma, the mechanisms are usually more obvious and involve direct trauma to the tendon sheath and muscle or trauma due to overstretching of the tendon sheath in an unprotected sudden movement of shoulder. The clinical presentation in macrotrauma is thus largely dependent upon the type of injury, the impact of the collision, and the movement involved when the injury occurs.

Symptoms include pain, weakness, and limitation of active motion. Pain may be located at the anterior, superior, and lateral aspects of the shoulder. The symptoms of weakness and limitation to active motion can be the result of pain or a direct tear to the rotator cuff.

Rotator cuff injuries are debilitating as they limit the most versatile joint of the body from motion, thus affecting the patient's dexterity. It is a frustrating injury for people who engage in active sports, and for others as well as it limits many routine activities such as dressing oneself and reaching for or lifting things in the plane higher than the shoulder.

Current treatment of rotator cuff injury is a combination of steroid injections to the inflamed tissue, appropriate rehabilitative programs, and surgical decompression of the impingements or repair of the tear. Nonoperative management of rotator cuff injury is the mainstay of management plans and is composed of phasic approaches to reduce the inflammation and gradually increase the range of motion. These are followed by exercises initially only in the painless range, often in the plane below the shoulder. The final phase of therapy includes isotonic exercises to strengthen the rotator cuff and scapular stabilizers.

Conservative management of rotator cuff injury usually results in good outcomes in cases involving microtrauma,

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except that the time taken for the inflammation to be reduced and muscles to be retrained is substantially longer than in surgically correctable cases. An important limitation in the use of corticosteroid injections is that it introduces the risk that a tendon may tear or rupture if the drug is injected into it. Physical therapy carries the limitation of heat's effect being largely a superficial phenomena⁵; also, physical therapy often is not able to address the fine tears in the cuff that may cause substantial limitation in some specific movements observed only occasionally during routine activities.

Acupuncture is considered an effective therapeutic modality for musculoskeletal and neuromuscular disorders. The role of acupuncture in the reduction of pain and inflammation has been clinically observed in muscle and joint pathologies.⁶ For rotator cuff injury, acupuncture is thought to be of particular benefit as it can reach the site of actual inflammation and, because of the filamentous nature of needles, does not causing any additional trauma to the tissue. Acupuncture has been observed to reduce the total recovery time and improve net outcomes in cases of rotator cuff injury when added to a conventional conservative management protocol.

Case Study

A male with no history of previous illness had an accident while riding a bicycle (without wearing a helmet) 4 months previously. He had been attacked by a stray dog, collided with a pole, and fallen on his right shoulder. He had lost consciousness for a while after the collision and had been taken to hospital and investigated for any intracranial hemorrhage. After an investigation and clinical examination, his head injury had been found to be minimal and, after a short stay in the hospital, he had been released. During his stay in the hospital, he had realized that his right arm was painful with any attempt to move. This had been considered a posttraumatic phenomenon. An x-ray of the right shoulder joint had revealed no fracture in the part con-

cerned. He had been discharged with a prescription for some anti-inflammatories and analgesics to be continued for a week.

The pain continued when the patient was home and, despite the analgesics, limited the routine movement of his shoulder. Three weeks after the initial injury, the pain being unrelieved by the analgesics, he sought the opinion of a physiotherapist. He was advised to undergo physical therapy including ultrasound, diathermy (the treatment of organs or tissues by passing high-frequency electric currents through them in order to generate heat, thus increasing circulation), and transcutaneous electrical nerve stimulation to the right shoulder joint on a regular basis. This treatment was continued for about 6 weeks, with a small reduction in the pain intensity and slightly improved range of motion. However, the pain continued to be significant enough to limit the routine activities and his range of motion. He then sought help through acupuncture.

On examination, a wasting of the scapular stabilizers was seen on posterior aspect of right scapula. The right shoulder was found to be partially shrugged. Winging of the right scapula was present, and a painful arc of abduction was seen in the same joint. The left shoulder joint was devoid of any abnormality. A noticeable diffuse hardness and edema was found on the posterior right upper arm and on the superior aspect of right shoulder, which was mildly tender on palpation. The range of motion in passive and active processes were examined and observed as 90° active abduction,

130° passive abduction, 90° active flexion, and 180° passive flexion in right shoulder.

Treatment

Acupuncture treatment was given using stainless steel needles of 0.3 mm width and 40 mm length under strict aseptic conditions and proper sterilization. The point prescription was based partially on the identification of trigger points (myofascial pain points) and partially on traditional Chinese medicine (TCM) philosophy. The points selected were Jian Zhen (SI 9), Nao Shu (SI 10), Tian Zong (SI 11), Ju Gu (LI 16), Jian Liao (SJ 15), Jian Jing (GB 21), as well as a number of ashi points where tenderness was observed during palpation. The needles were inserted to a variable depth between 2 and 10 mm and retained *in situ* for 20 minutes before being removed. This basic treatment was continued with changes to needle locations from one appointment to another as per the changes in pathology following treatment. Follow-up examinations to check appearance of the joint and its range of motion (with the help of goniometer) were held every 2 weeks. The results are illustrated in Table 1.

The pain associated with movement was reduced to a minimum after 30 days and had almost disappeared following 45 days of therapy. The most remarkable observation involved the stabilization of the scapula; due to the weakened stabilizers, there had been a tendency for the scapula to pull superolaterally in any approach of abduction or flexion of the joint above the shoulder plane. Other observations recorded were an absence

Table 1: Range of Motion (in Degrees) in Right Shoulder

	Before Acupuncture	After Acupuncture		
		At 15 Days	At 30 Days	At 45 Days
Active abduction	90	110	160	180
Passive abduction	130	150	180	180
Active flexion	90	110	130	160
Passive flexion	180	180	180	180

of shrugging, reduced edema, improved muscle bulk, and improved muscle strength in the concerning joint after 45 days of therapy. As indicated in Table 1, the movements of the shoulder joint reached almost normal positions after 45 days of therapy, at which time the therapy was stopped. The patient was directed to do some range-of-motion exercises and was called for a follow-up 1 month later. This follow-up revealed a further improved range of motion and stability in the concerned shoulder joint.

Discussion

Soft tissue injuries are often overlooked in patients with head injuries as the soft tissue injuries are not a cause of concern for the treating specialist. In cases where repeated stress initiates a search for the cause of pain in a sore joint, a lack of x-ray evidence of a break is of relief to the doctor but does nothing to help the patient.

The shoulder is one of the most vulnerable joints in this regard as evidence of injury is often difficult to detect in a trauma unit. Soft tissue injuries of the shoulder constitute a large part of the complaints involving the shoulder joint, and rotator cuff injury remains the commonest pathology in these cases. Regardless of the etiology, the pathology in these cases is the same, with a little variation in their severity. Tendons and their sheaths are poorly vascularized tissues that rely heavily upon synovial fluid diffusion to provide nutrition. During tendon injury, as with damage to any other tissue, there is a requirement for cell infiltration from the blood system to provide the necessary reparative factors for tissue healing. Neovascularization of the tendon and its sheath has been an important process of their healing.⁷ It has been noted that a number of tendons have a region of reduced vascularity; the biceps and supraspinatus tendons are among them and are commonly associated with degeneration and subsequent rupture with any compromise to their net vascular supply.⁸ Resultant hypoxia has often been considered the basic cause for this degeneration.⁹ Considering the disease

Key Points

Rotator cuff injury is a potential underlying cause of shoulder pain among individuals who have had falls.

Rotator cuff injury may be underdiagnosed in many cases because of lack of ready visibility in conventional radiography.

Surgical correction may be the best treatment option in limited cases.

Conservative therapy in diagnosed cases leads to good recovery but requires a long time for full recovery.

The addition of acupuncture to conservative therapy may add substantially to the net recovery by reducing the total recovery time and by improving the grade of recovery.

process of rotary cuff injury, any intervention that can improve the vascularity of the morbid tendons and their sheaths would be of benefit.

Acupuncture therapy provides localized stimulation through the insertion of filamentous needles deep into the body; in principle, it is an approach by which the targeted tissue can be stimulated without much trauma caused to the neighbouring tissues. Several processes have been proposed to explain acupuncture's effects, especially on pain. It is believed that acupuncture causes the release of certain neurochemicals that can modulate pain perception.¹⁰ Acupuncture has also been documented to influence immune reactions, blood flow, and body temperature.¹¹ Its effectiveness has been evaluated and validated in a number of randomized and individual case trials.^{6,12,13}

The TCM philosophy states that trauma can disrupt energy channels, causing an excess of energy proximal to the trauma and a deficit distal to it. The accumulation of energy results in edema and hardening, whereas the deficit causes degeneration and atrophy. The treatment involves restoring the energy flow so that it is evenly distributed.

Regardless of which philosophy is considered, the results observed in this case were impressive and are sufficient to call for further evaluation of this alternative treatment approach. This may bring acupuncture into mainstream therapy for patients in whom physiotherapy alone is producing limited success.

Conclusion

Rotator cuff injury is either independent or reflects a comorbid state of pathology that affects the routine functioning of the affected shoulder. It is common among individuals who participate in sports involving the overhead movement of the shoulder—resulting in microtrauma due to overuse. Macrotrauma to the rotator cuff has often been a neglected phenomenon in injuries from accidents as more concern is given to the head and spinal injuries and soft tissue injuries are not addressed with the care they deserve. Often, it is only on the repeated request of a patient that radiological examinations are performed and analgesics provided. Unfortunately, a neglect of tendon and sheath injuries can lead to major muscular deficiencies in the form of degeneration and atrophy, which may become difficult to treat if not handled early in the disease course due to the specific nature of their pathology.

Once diagnosed, rotator cuff injuries are often handled with conservative management, of which physiotherapy is the mainstay. It is a common observation that physiotherapy alone has limitations and, apart from partial pain reduction and small improvements in range of motion, cannot offer more to alleviate the pathology. In tendon and sheath injuries in which the vasculature is deficient, a target-oriented approach is needed that can directly address tissue-specific needs. Acupuncture, by virtue of its mode of application, seems to be the most efficient

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and least invasive way to handle these injuries, and it may have an edge over conventional physiotherapy alone, as was observed in this case study.

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