

Case Report: Acupuncture Treatment for Frozen Shoulder Resulting from Traumatic Injury

Suzanne Tapper* MTCM(Hons), DipTCM, DipAcu
In private practice, Christchurch, New Zealand

Trine Stub MA(Acu), MA(Public Health), MNHL(Homeopath)
NAFKAM (Nasjonalt Research Centre in Alternative and Complementary Medicine)
Department of Community Medicine, University of Tromsø, Norway

ABSTRACT

In our literature review we find the evidence in both conventional and complementary therapies does not reliably inform us of the effectiveness of treatments for frozen shoulder (FS). Physiotherapy, non-steroidal anti-inflammatory drugs, glucocorticosteroid injections, capsular stretching, exercises and surgery demonstrated limited evidence of efficacy. Similarly, studies varied greatly regarding the effectiveness of acupuncture treatment for shoulder injury. In the following case study we discuss acupuncture treatment of a FS resulting from traumatic injury. However in this case, traditional acupuncture intervention markedly improved the patient's symptoms. After eight treatments the pain level was significantly reduced and stabilised. Furthermore, full range of motion was regained. MRI findings two months post-injury and two months post-acupuncture treatment also provide evidence of anatomical improvement during the course of treatment. We suggest future acupuncture research trials would be more clinically relevant, and likely show more clinically significant results, if subjects were treated according to their presenting TCM diagnosis and neuro-anatomical presentations.

KEYWORDS injury, shoulder (including shoulder impingement/tendonitis and frozen/painful shoulder), rotator cuff, acupuncture.

Background

Chronic shoulder pain is a common medical and social problem. While some Western medical treatments appear to be efficacious, there is limited evidence to support most of them. Studies examining acupuncture treatment of shoulder problems also have variable outcomes. Nevertheless, some studies suggest that a combination of distal and local points may be helpful.

According to one survey, 13% of the Norwegian working population have experienced significant work-related neck and shoulder pain during the past two weeks.¹ Furthermore, in Australia shoulder disorders are third only to back and neck complaints, as musculoskeletal reasons for primary care consultation.²

Frozen shoulder (FS) is a common disorder affecting the glenohumeral joint. It involves a non-specific chronic inflammatory reaction of the sub-synovial tissue that causes the associated capsular and synovial thickening.³ FS is often associated with supraspinatus tendon inflammation resulting from constriction between the greater tuberosity of the humerus and the inferior surface of the acromion process.⁴ Various stages of tendon degeneration may then occur, through to ultimate calcification, with pain and restricted movement occurring at any stage. Of significance, FS is uncommon in patients younger than 40 years.^{5,6} A predisposing factor to FS appears to be supraspinatus tendon degeneration, caused by the numerous daily physical stresses placed on the arm and shoulder over many years.⁷

* Correspondent author; e-mail: suzytapper@xtra.co.nz

FS onset is usually gradual and idiopathic. However, it may be acute and associated with a previous history of minor injury to the shoulder joint.^{3,4} The clinical picture of FS is characterised by pain and restricted active and passive Range Of Motion (ROM). Pain, which can be severe, may cause pronounced sleep disturbance. ROM-restriction is usually marked with external rotation, but less prominent with abduction and internal rotation.^{5,7} FS is usually self-limiting but the duration and severity may vary greatly. Most patients recover within two years of onset, although for some, symptoms may last longer.⁸

Objectives

In this paper, we review the evidence available for acupuncture treatment of frozen shoulder resulting from traumatic injury (TI). We then explore the use of acupuncture in a case study and discuss possible reasons for the variable study outcomes that we found in the literature.

Literature review

SEARCH STRATEGY

The research question for the review was 'Does acupuncture treatment of FS successfully reduce pain and increase range of motion?'. Table 1 shows the keywords identified using the PICO format:

Injury	
Shoulder	Including shoulder impingement/tendonitis and frozen/painful shoulder
Rotator cuff	
Acupuncture	

The search strategy, using Boolean operators, was:

- Injury
- Shoulder OR rotator cuff OR frozen shoulder
- #1 AND #2
- Acupuncture OR acupuncture therapy
- #3 AND #4

MeSH-terms and truncation symbols were utilised where available. Abstracts and keywords were searched. Search results were limited to Systematic Reviews and Randomised Controlled Trials (RCT) because they rate the highest on the National Health and Medical Research Council evidence

ranking scale for interventions.⁹ The following databases were searched for relevant studies: PubMed, Science Direct, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, Blackwell Synergy, Medline, CINAHL, ACP Journal Club and DARE.

ANALYSIS OF AVAILABLE EVIDENCE

Numerous options are available for treatment of shoulder injuries. Commonly used treatments include physiotherapy, non-steroidal anti-inflammatory drugs, glucocorticosteroid injections, capsular stretching, exercises and surgery.^{2,3} While some physiotherapy interventions such as exercises, mobilisation and laser treatment may be regarded as efficacious¹⁰⁻¹², there is limited evidence to support most treatments.¹²⁻¹⁵ Similarly, study results vary greatly regarding the effectiveness of acupuncture for shoulder injury (SI). A Cochrane review of acupuncture treatment for shoulder pain analyses nine trials.^{2,16} However, no conclusions are drawn regarding acupuncture efficacy. Consequently, the evidence found does not reliably inform us of the effectiveness of acupuncture treatment for SI.

Poor study designs, including avoidable biases and confounders, weakens their findings.¹⁷ Acupuncture appears to be more effective than ultrasound treatment¹⁸; however, a non-intervention control group was not used. Significant differences between the control and study group size weakens one RCT comparing exercises alone to shoulder exercises combined with leg point acupuncture.¹⁹ Extra shoulder movements during the study group acupuncture sessions introduce further bias. Other acupuncture studies have allowed analgesic medications.^{15,20} Reduced pain due to analgesics may improve ROM in both the control and study groups, distorting the true acupuncture effect. In contrast, another study monitors the study subjects' use of analgesics for symptomatic relief. It finds that acupuncture in conjunction with physiotherapy, shows greater improvement in shoulder function and decreases the use of analgesic medication, in comparison to the group receiving physiotherapy alone.²¹ As with many acupuncture trials, adherence to use of prescribed acupuncture points is likely to reduce both statistical and clinical significance. According to traditional acupuncture, a study has clinical relevance only when point selection duplicates the individualised treatment provided in usual clinical practice. Without this, the true significance of the acupuncture effect is not apparent. Lack of RCT point specificity is a common scientific community criticism of SI-acupuncture trials.¹⁵ Nevertheless, clinically, point selection varies according to patient presentation. Therefore the relevance of point specific studies to clinical practice needs to be considered carefully.

Additionally, contradictory findings create confusion. Ceccherelli et al²² suggest that deep acupuncture needling has a greater and longer lasting analgesic effect than superficial needling. This is thought to be because muscular afferent fibres

more efficiently transmit acupuncture signals than those in the skin. However He et al²³ use electro-stimulation pads placed on the skin. They claim that at three year follow up their 'acupuncture' group has better results than the control group. In another study they demonstrate that needling muscle tissue has no significant difference between the control and study groups after three months.²⁴

The number of treatments given may also influence study results. Long term reduction in pain, improved sleep and increased quality of life are associated with 8–12 acupuncture treatments.^{22,25,26} Insufficient treatment numbers may therefore contribute to poor long-term acupuncture results in other studies.^{15,27,28}

UNDERSTANDING TRADITIONAL CHINESE MEDICINE (TCM)

Understanding TCM diagnosis is fundamental to understanding TCM treatment. In TCM, TI causes Qi and Blood stagnation in the affected *jing-luo* and tissues.^{29,30} This may cause pain. TCM and WM view musculoskeletal tissues differently (see Table 2). TCM also considers whether underlying physiological imbalance impairs healing. In WM biochemical changes associated with chronic pain are known to decrease pain threshold activation, prolonging recovery

time.³⁰ In TCM these physiological changes may involve Organs (*zangfu*) or Qi, Blood, Essence/Jing or Body Fluids.^{30,31}

Both WM and TCM evaluation of FS should thoroughly ascertain the involved structures. After TI prolonged Qi/Blood stagnation may disrupt local microcirculation, preventing adequate nourishment of the surrounding tissues.²⁹ Similarly, in WM chronic pain is associated with activation of the sympathetic nervous system, which causes vasoconstriction.³⁰ When prolonged, this inhibits healing of injured tissues. SI may involve trauma to other anatomical areas. For example the spine, ribs, their surrounding muscles, vasculature and nerves may be traumatised as a result of SI and contribute to the pain presentation.^{32,33} The thoracic spinal cord provides sympathetic innervations to the upper limb.³⁰ Consequently, microcirculation is further impaired if there is also vertebral dysfunction.

Furthermore, in TCM weakening of affected areas may allow external pathogens such as Wind, Heat, Cold or Damp to invade.³⁴ Pathogenic invasion may complicate or reduce the effectiveness of many treatments. Differentiation of pain quality and character is an important part of diagnosing which pathogens are involved (see Table 3).

TABLE 2 WM/TCM tissue correlations³⁰

TCM tissue	WM correlation	Involved Organs	Tissue nourished by
Joints (formed by sinews and bones)	Joints and all their associated structures/tissues	Liver, Spleen, Kidney	Liver-Blood, Fluid-Ye, Jing
Sinews	Fascia, tendons, ligaments, subcutaneous tissue, some parts of muscle, joint capsules, cartilage, some blood vessels	Liver	Liver-Blood
Muscle/Flesh	Muscle	Spleen/Stomach, Liver, Kidney	Spleen Qi, Liver-Blood
Bones	Muscle	Kidney, Spleen	Jing, Fluid-Ye, Nutritive Qi

TABLE 3 TCM pain/pathogen differentiation^{29,30,35}

Pathogenic factors	Pain presentation
Qi stagnation	Generalised/distending/pulsing; often affected by emotions/stress; better with pressure, e.g. massage
Blood stagnation	Sharp/fixed/local: often worse at night; worse with pressure
Wind	Moving/changeable; often sudden onset
Cold	Contracting/spastic/constant/severe; worse with cold; relieved by warmth
Heat	Hot/swollen; aggravated by heat; relieved by cold
Damp	Swelling/numbness/heaviness; affected by weather changes

Consequently, TCM treatment of any SI should vary according to diagnosis. Treatment may include acupuncture, moxibustion, Chinese herbal medicines/liniments, exercises and dietary therapy.^{29,35}

Appropriate treatment of any injury is important. Chronic pain is associated with maladaptive responses that create secondary pain and musculoskeletal complications.³⁰ There is little scientific evidence supporting any treatment for SI. Therefore, rigorous research to more clearly define appropriate treatments for SI is essential. TCM theory provides another approach to viewing traumatic injury. This case history explores the use of TCM and neuroanatomical acupuncture for the treatment of an unresolved SI that has caused secondary FS.

Case Report

This patient is a 52-year-old female teacher diagnosed with left side FS as result of traumatic injury. A summary of the details of her presentation is shown in Table 4.

MRI findings two months post-injury show: bone marrow oedema in the major tubercle which is possibly due to an old tear-off fracture; substantial scar tissue in the subcoracoid bursa; joint capsule and coracoacromial ligament thickening. The patient's pulse was deep and fine; her tongue small, short, pale and swollen.

TCM DIAGNOSIS

TI is responsible for the initial Qi-and-Blood-stasis in the *jing-luo* of the shoulder, neck and upper thoracic area. Trauma to the thoracic/cervical spine, ribs and surrounding muscles as a result of the initial injury is likely to be contributing to the patient's presentation due to their anatomical proximity and the neurological associations discussed previously. Cold invasion is indicated by the cold sensation in the shoulder joint, intense nature of the pain and the 'freezing' of the ROM.³⁵ Furthermore, underlying Kidney yang deficiency, as indicated by the tongue and pulse^{31,37}, has probably prevented resolution of this condition.

History and presentation	Affected activities of daily living	ROM assessment
Onset: skiing fall impact injury to anterior shoulder one year earlier	Unable to walk with normal arm swing – arm uncomfortable unless in a sling	Pain and stiffness with passive and active movement. Normal muscle strength until ROM reaches pain level.
Gradual onset of pain and stiffness	Unable to do any of her usual aerobic training	Flexion 90°
Cold sensation in the shoulder joint	Unable to ride a bicycle	Extension 10°
Intense pain in the rhomboid muscle area at the level of T1 to T5		Abduction 20°
Previous treatment: 1 x cortisone injection and physiotherapy		Internal rotation 5°
Palpation elicits tenderness over the anterior glenohumeral joint, upper trapezius, rhomboids and supraspinatus		External rotation 5°

Western medicine	TCM
Secondary FS due to trauma ³⁶	TI causing Qi/Blood stagnation in the <i>jing-luo</i> of the shoulder, neck and thoracic spine, ribs and muscles
	Invasion of Cold
	Kidney Yang deficiency

Points used	Method	Action
BL 18 <i>Ganshu</i>	Reduction	Reduces rigidity/pain of neck and spine ³⁸
Rhomboid trigger points ³³	Low frequency electro-acupuncture	Increase local circulation, strengthen regional tendons/ligaments, and stimulate muscle ³⁰

TREATMENT PLAN AND TREATMENT DETAILS

Using an integrative approach, applying knowledge of both TCM as well as neuroanatomy, the aim of treatment was to reduce pain and increase ROM. Due to scheduling difficulties, acupuncture treatment was planned for only once a week for 10 weeks, with the intention to re-evaluate progress at that time.

The TCM treatment principle used was: circulate Qi/Blood in the *jing-luo* of the shoulder, neck and thoracic area; disperse pathogenic Cold in *jing-luo* of shoulder; and tonify Kidney Yang.

ACUPUNCTURE

Deep needling of the points shown in Table 6 was favoured, as it appears to have a greater and longer lasting analgesic effect than superficial needling.²² Cloud & Dragon sterile acupuncture needles were used. The size was 0.30x0.25mm and 0.30x0.40mm. The depth and angle of needling were performed according to the standard described.³⁸ Qi was obtained at the start and end of the treatment. For the electro-acupuncture an IC-1107+ ITO CO., LTD machine was used with low frequency at 2.5–5.5 Hz.

Each treatment session started with needling of ST 38 *Tiaokou*. Qi was obtained with deep needling. The needle was lifted and thrust while the patient moved her arm. Thereafter, LU7 *Lieque* was needled on the right side and KI6 *Zhaohai* on the left. Followed by SP 4 *Gongsun* on the right side and PC 6 *Neiguan* on the left. These four needles were removed in reverse order. Points on the left arm and the rest of the body were then needled. The needles were removed after 20 minutes. The rhomboid trigger points were then needled and electro-acupuncture applied for 10 minutes. Each time the patient came to treatment the same procedure was followed. The patient found the treatment painful, especially when

ST 38 *Tiaokou* was needled and she had to move her arm in painful directions. Therefore we had to perform this in short intervals of half a minute each time.

This patient experienced considerable improvement with acupuncture treatment. A significant increase in ROM and reduction in pain was noticeable after each treatment. The upper trapezius tenderness decreased after the first treatment. After sessions two and three the intense thoracic area pain decreased. The generalised pain decreased over the following weeks. In week seven, pain and stiffness intensified after one week of heavy cross-country skiing, but then settled significantly after treatment. After eight treatments the pain level was significantly reduced and stabilised, and full ROM was regained. Pain improvement was measured using a visual analogue scale. Pain and ROM change over the course of treatment is visualised in the graph below (see Figure 1).

Rehabilitation then continued to focus on shoulder strengthening exercises⁴⁰ and return to normal ADL. The patient was told to perform two stretching exercises daily on her own. One of them was to crawl her painful arm up a wall using her fingers. She was to start at hip height and crawl up as far she managed. The other exercise was to fold a dishtowel and use it as an extension between her arms across her back. She was to hold her painful arm above her head, bend the elbow and let the lower part of the arm fall down towards her back. The other arm was to get hold of the other end of the dishtowel and move it back and forth.

Comparison of the original MRI-findings to those taken two months post-treatment (Figure 2) showed significant improvement in the appearance of the joint capsule and the coraco-acromial ligament. An orthopaedic specialist examined the images and confirmed that these were clinically significant structural changes associated with resolution of frozen shoulder.

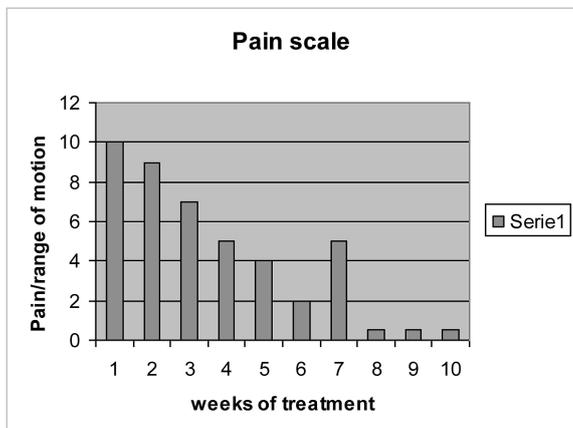


FIGURE 1 Visual representation of change in pain and ROM over the course of treatment

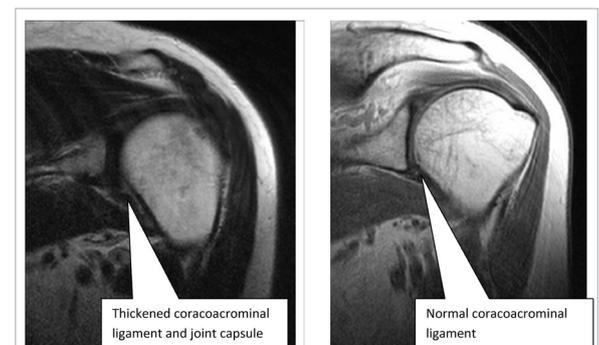


FIGURE 2 MRI pictures demonstrating difference between before and after acupuncture. Coronal (pd+t2)

Conclusion

This case study discussed treatment of a chronic SI⁴¹ leading to a diagnosis of FS. One challenge in study evaluation is the great variations in diagnosis of SI.⁴² In this case, neuro-anatomical consideration and TCM evaluation enabled a more in depth analysis and treatment than indicated by WM diagnosis. This may be particularly significant for problems arising from chronic SI. However, the acupuncture studies evaluated for this paper, suggest that TCM practitioners do not consider wider neuro-anatomical involvement. It is possible that integrating neuro-anatomical concepts with TCM theory may improve future study outcomes.

Future studies also need to explore needle depth and treatment number. In this case history the pain levels decreased significantly in incremental steps over the first eight treatments and then stabilised with exercise rehabilitation. This aligns with the studies suggesting that 8–12 treatments are required for long-term pain relief. Deep needling was favoured for this patient's treatment. However, further studies are required to clarify the significance of needle depth. As discussed in the evidence analysis, future studies also need to adequately identify sources of bias and include a control group.

Of particular significance, the MRI results associated with this case history provide objective findings that justify a call for further investigation of acupuncture treatment for frozen shoulder, based on both TCM and neuro-anatomical analysis.

Clinical Commentary

Diagnostic imaging may not always be relevant for shoulder injuries. If an abnormality is found on digital images, the question arises whether it is relevant or not. In other words, does the imaged finding account for the clinical findings? Regardless of diagnostic imaging, a competent acupuncture practitioner considers what neuro-anatomical areas may have been compromised as a result of TI. Treatment is formulated based on this information as well as their TCM diagnosis. In order to more accurately reflect the effectiveness of acupuncture treatment of SI, and indeed in order to be clinically relevant, trials need to evaluate the effectiveness of treatment based on these individual presentations.

References

1. Statistikkbanken. Survey of living 2000. Statistisk Sentralbyrå (Statistics Norway); 2001 [cited 20 Apr. 2006]; Available from: SSB.no.
2. Green S, Buchbinder R, Hetrick S. Acupuncture for shoulder pain. The Cochrane Library; 2006 [cited 31 Mar. 2006]; Available from: <<http://www.thecochranelibrary.com>>.
3. Sun KO, Chan KC, Lo SL, Fong DYT. Acupuncture for frozen shoulder. HKMJ 2001 Desember 2001;7(4):381–91.
4. Ombregt L, Bisschop PR, TerVeer HJ. A System Of Orthopaedic Medicine. 2 edition ed. London: Churchill Livingstone; 2003.
5. Cyriax J. Textbook of Orthopaedic Medicine, Diagnosis of Soft Tissue Lesions. 6th ed: Baillière Tindall; 1975.
6. Hervik J. Behandling av skuldersmerter (Treatment of shoulder pain). De Qi 2004(1):24–5.
7. Cailliet R. Neck and Arm Pain. 2 ed. Philadelphia: F.A. Davis Company; 1989.
8. Waldburger M, Meier JL, Gobelet C. The frozen shoulder: Diagnosis and treatment. Prospective study of 50 cases of adhesive capsulitis. Clin Rheumatol 1992;11:364–8.
9. NHMRC. NHMRC additional levels of evidence and grades for recommendations for developers of guidelines: Pilot program 2005–2006. In: Council NHaMR, editor: Australian Government; 2005.
10. Hanada EY. Efficacy of rehabilitative therapy in regional musculoskeletal conditions. Best Practice & Research Clinical Rheumatology 2003;17(1):151–66.
11. Sauers EL. Effectiveness of rehabilitation for patients with subacromial impingement syndrome. J of Athletic Training 2005;40(3):221–3.
12. Green S, Buchbinder R, Hetrick S. Physiotherapy intervention for shoulder pain. The Cochrane Database of Syst Rev 2006 [cited 17 Apr. 2006].
13. Grant HJ, Arthur A, Pichora DR. Evaluation of interventions for rotator cuff pathology: a systematic review. J of Hand Therapy 2004;17(2):274–99.
14. Trojian T, Stevenson JH, Agrawal N. What can we expect from nonoperative treatment options for shoulder pain? J of Family Practice 2005;54(3):216–23.
15. Vas J, Perea-Milla E, Mendez C, Galante AH, Madrazo F, Medina I, et al. Acupuncture and rehabilitation of the painful shoulder: study protocol of an ongoing multicentre randomised controlled clinical trial. BMC Complementary and Alternative Medicine 2005 14 October;5(19).
16. Acupuncture for shoulder pain [database on the Internet]. The Cochrane Library. 2005 [cited Mar. 2006]. Available from: <<http://search.epnet.com/login.aspx?direct=true&db=rzh&an=2009009702>>.
17. Peat J. Health Science Research: A Handbook of Quantitative Methods. Crows Nest: Allen & Unwin; 2001.
18. Johansson KM, Adolfsson LE, Foldevi MOM. Effects of acupuncture versus ultrasound in patients with impingement syndrome: randomised clinical trial. Physical Therapy 2005;85(6):490–501.
19. Sun KO, Chan KC, Lo SL, Fong DYT. Acupuncture for frozen shoulder. Hong Kong Med J 2001;7(4).

20. Guerra de Hoyos JA, Andres Martin MC, Bassas y Baena de Leon E, Vigara Lopez M, Molina Lopez T, Verdugo Morilla FA, et al. Randomised trial of long term effect of acupuncture for shoulder pain. *Pain* 2004 Dec;112(3):289–98.
21. Vas J, Ortega C, Olmo V, Perez-Fernandez F, Hernandez L, Medina I, et al. Single-point acupuncture and physiotherapy for the treatment of painful shoulder: a multicentre randomized controlled trial. *Rheumatology* 2008 June;47(6):887–93.
22. Ceccherelli F, Bordin M, Gagliardi G, Caravello M. Comparison between superficial and deep acupuncture in the treatment of the shoulder's myofascial pain: a randomised and controlled study. *Acupuncture & Electro-Therapeutics Research* 2001;26(4):229–38.
23. He D, Veiersted KB, Høstmark AT, Medbø JI. Effect of acupuncture treatment on chronic neck and shoulder pain in sedentary female workers: a 6-month and 3-year follow-up study. *Pain* 2004(109):299–307.
24. Kleinhenz J, Streitberger K, Windeler J, Güßbacher A, Mavridis G, Martin E. Randomised clinical trial comparing the effects of acupuncture and a newly designed placebo needle in rotator cuff tendinitis. *Pain* 1999(83):235–41.
25. He D, Høstmark AT, Veiersted KB, Medbø JI. Effect of intensive acupuncture on pain-related social and psychological variables for women with chronic neck and shoulder pain – an RCT with six month and three year follow up. *Acupuncture in medicine: J of the British Med Acu Soc* 2005 June;23(2):52–61.
26. Carlsson CPO. Acupuncture mechanisms for clinical long-term effects, a hypothesis. *International Congress Series* 2002(1238):31–47.
27. Nabeta T, Kawakita K. Relief of chronic neck and shoulder pain by manual acupuncture to tender points—a sham-controlled randomised trial. *Comp therapies in med* 2002(10):217–22.
28. Romoli M, Van Der Windt D, Giovanzana P, Masserano G, Vignali F, Quirico E, et al. International research project to devise a protocol to test the effectiveness of acupuncture on painful shoulder. *J of Alt & Comp Med* 2000;6(3):281.
29. Legge D. *Close to the bone*. Woy Woy: Sydney College Publications; 1990.
30. Marcus A. *Foundations for integrative musculoskeletal medicine*. Berkeley: North Atlantic Books; 2004.
31. Maciocia G. *The foundations of Chinese medicine, a comprehensive text for acupuncturists and herbalists*. Edinburgh: Churchill Livingstone; 1989.
32. Toth C, McNeil S, Feasby T. Peripheral nervous system injuries in sport and recreation: a systematic review. [Review]. *Sports Medicine* 2005;35(8):717–38.
33. Travell JG, Simons DG, Simons LS. *Myofascial pain and dysfunction*. 2nd ed. Baltimore & Philadelphia: Lippincott Williams & Wilkins; 1999.
34. Maciocia G. *The practice of chinese medicine*. Edinburgh: Churchill Livingstone; 1994.
35. Vangermeersch L, Sun P. *Bi-syndromes or rheumatic disorders treated by traditional Chinese medicine*. Brussels: Satas s.; 1994.
36. Buchberg D. *The shoulder made simple Evaluation and management of the shoulder in clinical practice*. Lecture notes, Norwegian Chiropractic Association 2006.
37. Hammer LI. *Chinese pulse diagnosis*. Seattle: Eastland Press; 2001.
38. Deadman P, Al-Khafaji M. *A manual of acupuncture*. London: J of Chinese Med Publication; 1998.
39. McDonald J. *Acupuncture point dynamics* (Revised 1998 ed. Vol. 1). Gold Coast: Private printing; 1986.
40. Goldberg BA, Scarlat MM, Harryman DT. *Management of stiff shoulder*. Springer Tokyo; 1999 [cited 17 Apr. 2006]; Available from: <[http://www.springerlink.com/\(p5h5ygmbo0dcizj45faijdzam\)/app/hom](http://www.springerlink.com/(p5h5ygmbo0dcizj45faijdzam)/app/hom)>.
41. AHFMR. *Trigger point injections for non-malignant chronic pain*: Alberta Heritage Foundation for Medical Research 2002.
42. Ejnisman B, Andreoli CV, Soares BGO, Fallopa F, Peccin MS, Abdalla RJ, et al. *Interventions for tears of the rotator cuff in adults* (Review) *The Cochrane Database of Systematic Reviews* 2006(1).