A set of three clinical tests can detect the presence or absence of rotator cuff tears

**Synopsis**


**Question:** What is the diagnostic accuracy of the physical examination in predicting arthroscopy findings in patients with suspected rotator cuff tear? **Design:** Cross-sectional study comparing the results of the clinical examination with presence of partial or complete rotator cuff tear on arthroscopy. **Setting:** Australian orthopaedic surgeon's practice. **Patients:** Patients (400) with shoulder injuries that warranted arthroscopic examination. **Description of tests and diagnostic standard:** Each subject was examined with 23 commonly-used shoulder tests and then underwent arthroscopy. Subjects were examined for wasting, tenderness, active and passive range of motion, shoulder strength and the presence of three signs: the drop arm sign, O'Brien's sign and impingement sign. **Main outcome measures:** Prevalence of rotator cuff tear per 10 year age group and positive and negative likelihood ratios (+LR and –LR respectively). **Main results:** Prevalence of rotator cuff tear increased with age from less than 5% for subjects aged in their twenties to more than 80% for subjects in their seventies. Most clinical shoulder tests, when used in isolation, could not distinguish between patients with and without rotator cuff tears (individual results were not provided). The three exceptions were the presence of supraspinatus weakness, weakness in external rotation and the impingement sign. If all three features were present the +LR and –LR were: 48.0 and 0.76; if at least two were present: 7.6 and 0.42; at least one present: 1.9 and 0.01. **Conclusion:** Tears of the rotator cuff are common in patients with shoulder injuries referred for arthroscopy and prevalence increases markedly with age. Individual physical examination tests are inaccurate in diagnosing rotator cuff tears. The presence of supraspinatus weakness, weakness in external rotation and the impingement sign are associated with greatly increased likelihood of rotator cuff tear and the absence of all three is associated with greatly reduced likelihood of rotator cuff tear.

(+)Likelihood ratios calculated by CM from original data in paper. (By inspection of figure.

Individual tests from the history and physical examination are inaccurate in diagnosing rotator cuff tears

**Synopsis**


**Question:** What is the diagnostic accuracy of the history and physical examination in predicting arthrography results in older patients with suspected rotator cuff tear? **Design:** Comparison of the results of the clinical examination with presence of partial or complete rotator cuff tear on arthrogram. **Setting:** United States orthopaedic practice limited to shoulder conditions. **Patients:** Consecutive patients (448) referred for arthrography because of suspected rotator cuff tear. **Description of tests and diagnostic standard:** A single orthopaedic surgeon completed a standardised examination for each patient. Each patient then underwent double contrast arthrography. **Main outcome measures:** Positive and negative likelihood ratios (+ LR and – LR respectively) were calculated for each individual physical finding and historical feature and the examiner's clinical diagnosis. In a subset of the patients, logistic regression was used to derive the combination of factors that best identified rotator cuff tear and this data was used to develop a clinical scoring system (weakness on external rotation = 2 points; age ≥ 65 = 2 points; night pain = 1 point) for predicting the presence of rotator cuff tear. The scoring system was validated in the derivation set and the validation set. **Main results:** The +LR and –LR for the individual features and the examiner's diagnosis were: history of trauma (+LR = 1.3 and –LR = 0.88), night pain (1.1 and 0.62), supraspinatus muscle atrophy (2.1 and 0.61), infraspinatus muscle atrophy (2.1 and 0.61), elevation < 170 degrees (1.4 and 0.89), external rotation < 70 degrees (1.2 and 0.97), impingement (1.1 and 0.31), weakness with elevation (1.8 and 0.55), weakness with external rotation (1.8 and 0.42), arc of pain (1.1 and 0.25), shoulder strength (1.9 and 0.18). A clinical score of ≥ 4 had an +LR of 10.9 and –LR of 0.69 in the derivation set; and an +LR of 4.9 and –LR of 0.69 in the validation set. A clinical score of ≥ 2 had an +LR of 2.0 and –LR of 0.23 in the derivation set; and a +LR of 1.6 and –LR of 0.35 in the validation set. **Conclusion:** Individual tests from the history and physical examination are unhelpful in diagnosing rotator cuff tears. The presence of weakness on external rotation and night pain in patients over 65 is indicative of rotator cuff tears, and the absence of all three features is suggestive of no tear.

(+)Likelihood ratios calculated by CM from original data in paper.
Commentary

Identifying patients with rotator cuff tears is important, because treatment outcome is influenced by the status of the rotator cuff. For example, the prognosis for patients treated conservatively is usually poor for patients with complete tears (Goldberg et al 2001).

Murrell and Walton found that the prevalence of full or partial thickness tears increases linearly from approximately 3% in subjects aged 20 to 29 years to approximately 80% in patients aged 70 to 79 years of age. These data suggest that therapists should consider cuff tears as being unlikely in subjects 30 years of age and under, while cuff tears are likely to be the most common cause of shoulder pain in patients 60 years of age and older. Both studies found that a combination of positive tests increases the likelihood of a cuff tear over that seen for a single positive test.

When considering the evidence from the two studies abstracted here, and two similar studies (Itoi et al 1999; Calis et al 2000), the following can be concluded. Weakness in abduction or external rotation, visible atrophy of the rotator cuff musculature, and pain that awakens the patient at night, in combination, strongly suggest the presence of a cuff tear. For patients older than 60 years of age, only two of the tests need to be positive to indicate the presence of a tear. An absence of a painful arc and a negative impingement test effectively rules out a cuff tear.

One issue these studies did not examine is whether diagnostic utility varies depending on whether the tear is full thickness or partial thickness. Because physical therapy interventions are not likely to appreciably influence the disability of patients with full thickness tears it would be important for future research to examine whether diagnostic utility for the tests varies for partial versus full thickness tears.

Dan Riddle
Virginia Commonwealth University, USA

References


Synopsis


Question: Acupuncture, massage or self-care: which is most effective in improving pain and disability in patients with chronic low back pain? Design: Randomised controlled trial. Setting: United States health maintenance organisation. Patients: Patients with low back pain (LBP) who had visited a primary care physician were invited to participate. Exclusions included sciatica, acupuncture or massage treatment of LBP in last year and prior LBP treatment by specialist or complementary medicine provider. Two hundred and sixty-two subjects were randomized, 252 received treatment and 249 completed the 12 month follow-up. Interventions: Licensed and experienced acupuncturists and masseurs treated patients for up to 10 visits over 10 weeks. The massage techniques allowed were: Swedish, deep-tissue, neuromuscular, trigger and pressure point techniques. The acupuncture techniques allowed were: needling techniques, electrical and manual stimulation of the needles, indirect moxibustion, infrared heat, cupping and exercise recommendations. The self-care group received an information book and two videos containing information on back pain and its treatment, self-management (techniques for controlling and preventing pain and improving quality of life, suggestions for coping with emotional and interpersonal problems that may accompany chronic illness) and exercise. Main outcome measures: The primary outcomes were bothersomeness of symptoms measured on a 0-10 scale and disability measured using a modified Roland Disability scale (range 0-23) measured at four, 10 and 52 weeks. Secondary measures included satisfaction with care, health-related quality of life measured using the SF-12, recurrence of back pain and health care use. Main results: After adjustment for baseline scores and prognostic covariates, the massage group had less bothersome symptoms at 10 weeks than the self-care group (3.4 vs 4.7 p = 0.01) and less disability than the self-care (5.9 vs 8.9 p < 0.001) and acupuncture (5.9 vs 8.3 p = 0.01) groups. At one year, massage was not better than self-care however the massage group had less bothersome symptoms than the acupuncture group (3.1 vs 4.7 p = 0.002) and less disability (6.3 vs 8.2 p = 0.05). At one year, there were no between-group differences in health-related quality of life, satisfaction with care, the proportion of subjects with a recurrence or continuation of back pain in past six months. Conclusion: Massage provides better results than acupuncture in both the short and long term. While massage is more effective than self-care in the short term, this benefit is not evident at one year follow-up.

Commentary

This is an extremely timely study in view of the popularity of complementary and alternative therapies among CLBP sufferers and therapists alike. There is a lack of strong evidence for the efficacy of these interventions and current clinical trials are largely of poor methodological quality.

In this study, appropriately trained and experienced practitioners of massage and acupuncture delivered the specific treatment protocols, thus providing evidence of the true benefits of these interventions for patients with chronic LBP. Although patients in the therapeutic massage group had better symptomatic relief in the short term (supporting its use), by one year follow-up, all groups reported ongoing pain and functional disability and there was no difference between groups for the majority of outcomes. Consequently, this paper does not provide any new solutions to the problem of LBP chronicity and recurrence (almost 80%). It is now generally believed that LBP can only be successfully tackled by a biopsychosocial approach, which encompasses the influence of cognitive, affective and behavioural influences on pain and disability. Rehabilitation programs that focus on cognitive behavioural therapy strategies (with or without an exercise component) have been found to produce significant long-term positive effects in LBP patients compared with routine management (Klaber-Moffett et al 1999, Moore et al 2000). However, in this study, only the self-care group received such an approach in the form of education materials related to pain control and coping techniques. It would have been interesting to include the self-care protocol in the massage and acupuncture groups as well.

In view of the findings of this study, and given the mounting evidence for cognitive behavioural therapy, the challenge now facing therapists is how to integrate biopsychosocial principles into clinical practice in order to have a meaningful impact on LBP and its associated sequelae.

Deirdre Hurley
University of Ulster, Northern Ireland

References


Spinal manipulation and exercise for chronic neck pain: Are they more effective when delivered alone or in combination?

Synopsis


**Question:** If combined, are progressive neck exercises and spinal manipulation therapy (SMT) a more effective intervention than when they are delivered alone, for patients with chronic neck pain? **Design:** Randomised, parallel group, single-blind clinical trial. **Setting:** Minneapolis/St Paul, Minnesota (clinical setting not reported). **Patients:** One hundred and ninety-one subjects aged 20-65 years, with mechanical neck pain of greater than 12 weeks duration, who were recruited through newspaper advertisements. Mechanical neck pain was defined as having no specific, identifiable etiology, reproduced by neck movement and/or provocation tests. Exclusion criteria were referred neck pain, severe osteopenia, neurological deficits, vascular disease of upper limb or neck, previous cervical surgery, current/pending litigation, inability to work because of neck pain, having received recent SMT, or concurrent treatment for neck pain. **Main outcome measures:** Primary outcome measures were by questionnaires administered twice at baseline, during and on completion of intervention (five and 11 weeks), and at follow-up three, six and 12 months later, measuring pain, Neck Disability Index, SF36, scales for frequency of medication use, improvement and satisfaction. Secondary outcome measures were taken twice at baseline and on completion of intervention (cervical muscle strength, endurance, range of movement). **Intervention:** Subjects were randomly allocated into three groups. All groups received 20 treatment sessions and undertook the same home exercise program. Group 1: Short lever, low amplitude, high velocity cervical manipulation (spinal manipulative therapy), followed by 45 minutes of supervised progressive rehabilitation exercises for neck and upper body. Group 2: Dynamic high technological progressive exercise program using MedX device focusing on cervical strength and rotation. Group 3: Spinal manipulative therapy (as in Group 1), followed by 45 minutes of sham microcurrent therapy. **Results:** Groups were similar at baseline in all outcome measures. After intervention, and at 12 months follow-up, all groups demonstrated, and maintained, significant improvement from baseline. At completion of intervention, significant differences between groups were in satisfaction, flexion endurance and flexion/rotation range of movement, with Group 1 intervention scoring highest. At 12 months follow-up, greatest satisfaction with Group 1 intervention persisted, and a significant improvement in pain for Groups 1 and 2 (those containing exercise) was found. **Conclusion:** A home exercise program has long term benefits for chronic neck pain. Interventions that include a progressive exercise program, with or without spinal manipulative therapy, show greater long term benefits than SMT alone.

Commentary

The point prevalence of neck pain is estimated to be 14%. In its chronic form neck pain shares many similarities with chronic low back pain: difficulty of diagnosis, resistance to commonly used therapeutic interventions and a financial burden on society. It is imperative that effective treatments for both conditions are identified, and widely implemented in clinical practice. The aim of the study by Bronfort et al (2000) was to investigate the relative efficacy of different treatment protocols for chronic neck pain. All three treatment groups showed short term and long term improvement over a range of patient-rated outcome measures. Since the subjects had experienced symptoms for an average of five years, the improvement was deemed to be a treatment effect rather than due to natural history.

The authors report a “clinically important” difference between the two groups whose treatment included exercise in some form, compared with the group receiving spinal manipulative therapy alone. Of note was that the improvement accumulated over time. Over the 11 treatment weeks between-group differences were not significant but, by 12 months follow-up, the differences had reached significance. The effect size was nominally “medium” (0.5) and may prompt therapists who solely employ spinal manipulation therapy to re-appraise their clinical practice.

What sort of exercise might benefit chronic neck pain patients is unclear when cost and accessibility are considered. In this study, the superior exercise groups used apparatus, either a weighted helmet or an isokinetic machine. However all groups, including the SMT group, were taught home strengthening exercises using rubber tubing for resistance, and all groups made 'substantial' improvement. This study raises the enticing proposition that a readily available and cost effective intervention for chronic neck pain exists. The effect of simple home exercise on chronic neck pain needs to be tested against a control group.

Simon Wilson
La Trobe University, Melbourne