Som November 2007 report. Evidence for transverse friction massage. Debbie Cox

Massage can be described in general terms as a therapeutic manipulation in order to correct pathophysiology of soft tissues. It may be used as primary therapeutic intervention or as an adjunct to other therapeutic techniques, its uses include;

- mobilization of interstial fluid
- reduction or modification of oedema
- increase of local blood flow
- decrease of muscle soreness and stiffness
- moderation of pain
- facilitation of relaxation
- prevention or elimination of adhesions (Wieting 2004).

Various different types of massage exist that can have mechanical, neurological, psychological, and reflexive effects. These can be used to reduce pain and adhesion formation, promote sedation, mobilize fluids, increase muscular relaxation, and facilitate vasodilatation (Wieting 2004).

Mechanical pressure on soft tissues displaces fluid which then moves in the direction of least resistance. Movement of the practitioners hand creates a pressure gradient resulting in small amounts of fluid leaving the soft tissues and entering the venous or lymphatic systems, improving lymphatic flow (Wieting 2004).

In addition to mechanical effects, massage releases histamine causing superficial vasodilation which assists in the washing out of metabolic waste products. A decrease in lactate occurs in massaged muscles which is associated with reduced muscle spasm and increased force of contraction and endurance. Massage may also decrease blood viscosity and hematocrit. There is an increase in circulating fibrinolytic compounds along with substances such as myoglobin, creatine kinase, dehydrogenase, and glutamic oxaloacetic transaminase which probably represent local muscle cell leakage from the applied pressure. There is also release of endorphins and enkaphalin production (Wieting 2004).

Impulses from stimulation of superficial skeletal muscle, cutaneous and spindle receptors reach the spinal cord and may produce segmental moderation and even somatovisceral reflex changes (Wieting 2004).

Animal data has also suggested that mechanical stimuli such as massage may have an effect on adipocytes independent of systemic energy consumption potentially reducing the body's fat stores, and having an influence on obesity (Wieting 2004).

The technique of deep transverse friction massage was popularised by Cyriax. He advised its use for pain and inflammation relief in sub acute and chronic inflammatory musculoskeletal conditions as part of a physiotherapy program. The technique attempts to reduce abnormal fibrous adhesions and improve scar tissue mobility by encouraging normal alignment of soft tissue fibres (Brosseau et al 2002, Wieting 2004)

Normal healing may also be enhanced by breaking cross bridges, preventing abnormal scarring. The mechanical action of the technique causes hyperaemia and increased blood flow to the area (Brosseau et al 2002). In addition shearing stresses are created at tissue interfaces below the skin. eg, dermis-fascia, fascia-muscle, muscle-bone interfaces, the deep pressure prevents shearing of superficial tissues and the shear force is directed at the deeper tissue surface interface (Wieting 2004). This helps release underlying adhesions and promotes improved circulation to the area (Lorenzo 2004).

Sevier and Wilson (1999) describe vigorous cross friction massage for 5-10 minutes over the common extensor tendon perpendicular to underlying soft tissue structures in the treatment of tennis elbow. Point friction is also described performed directly over the lateral eipcondyle and over the radial tunnel where it can be used in an attempt to reduce venous congestion at the extensor carpi radialis origin. This is a purely descriptive article of commonly used treatments for tennis elbow. No analysis of any evidence regarding the efficacy of any of these treatments is given.

Carrying out deep transverse friction massage can place considerable strain on the treating clinicians hands according to Sevier and Wilson (1999) who go on to describe the concept of augmented soft tissue mobilization. This is a technique based on the concept of transverse friction massage. Solid handheld devices are utilised with angled edges that augment a clinician's ability to perform soft tissue massage. These instruments are moved in longitudinal strokes over involved musculotendinous structures and multidirectional strokes around bony prominences. Changes in soft tissue texture and underlying fibrosis can be detected when applying this technique which may relate to the presence of soft tissue abnormalities in structures other than the primary site (Sevier and Wilson 1999).

Disabella (2004) describes the use of friction massage in conjunction with ultrasound and/or electrical stimulation in the treatment of elbow and forearm overuse injuries. The USA Agency for healthcare research and quality guidelines for work related musculoskeletal upper extremity disorders suggest corticosteroid injection has improved outcomes compared with manipulation and deep friction massage but this is based on limited evidence produced from 1 RCT.

In a systematic review of the use of deep transverse friction massage in the treatment of tendonitis Brosseau et al (2002) found only found 2 randomised controlled trials of sufficient quality. One of which looked at patients receiving treatment for iliotibial band friction syndrome and the other at tennis elbow. The outcomes of both studies suggest that transverse friction massage combined with other physiotherapy modalities does not significantly reduce tendonitis symptoms when compared to a control. However these studies were of small sample size making it difficult to draw conclusions regarding the benefits or not of treatment of iliotibial band friction syndrome or tennis elbow with transverse friction massage.

The tennis elbow study looked at 9 sessions of transverse friction massage given over 5 weeks in combination with other physiotherapy modalities and in isolation. The comparison groups were as follows;

- deep transverse friction massage with therapeutic ultrasound and placebo ointment compared with therapeutic ultrasound and placebo ointment
- deep transverse friction massage compared with phonophorisis
- phonophorisis alone

No difference was found in pain relief, grip strength and functional status between the groups. This study used double blinding and a sound randomisation procedure but did not report withdrawals and dropouts (Brosseau et al 2002).

Another study of lateral epicondylitis was carried out by Smidt et al (2002). 185 patients with lateral epicondylitis of at least 6 weeks were randomised using computer generated block randomisation to 6 weeks of treatment with steroid injection, physiotherapy or wait and see policy. The physiotherapy arm of the study consisted of 9 sessions of pulsed ultrasound, deep friction massage and an exercise program over 6 weeks.

Outcome measures were general improvement, severity of main complaint, elbow disability, grip strength and pressure pain threshold. Prior to the main study a reproducibility study on 50 patients was carried out that demonstrated good intertester reliability for the research physiotherapists carrying out the outcome measures.

Intention to treat analysis was used and at 6 weeks injection was significantly better than all other options on all outcome measures. There was a high recurrence rate in the injection group. The physiotherapy package (which included frictions) gave better long term outcomes than injection but was no better than wait and see policy. Interestingly the wait and see policy had better long term outcomes than injection.

A further cost effectiveness analysis of the approaches used in this article was carried out by Korthals-de Bos et al (2004). Physiotherapy that included transverse friction massage appeared to be cost effective in comparison to injection. It was less clear when a wait and see strategy was compared to either physiotherapy or injection and no strong conclusion could be reached on the optimal strategy for the treatment of lateral epicondylitis.

In a review article summarising the evidence for the effectiveness of interventions for the management of tennis elbow Nimgade et. al (2005) used the Cochrane Collaboration guidelines to assess the quality of the evidence reviewed. The Cochrane guidelines have 11 score items for internal validity, 6 for external validity and 2 for statistical criteria. Thirty studies were reviewed and the quality scores awarded to each study varied between 2 and 9 (out of 11). Eighteen studies scored between 6 and 11 points indicating good quality.

It appeared that relative rest will eventually improve function but the use of early active interventions including steroid injection and physiotherapy modalities may speed up recovery. The physiotherapy interventions reviewed included exercise and ultrasound alone and in combination with friction massage.

These authors concluded that, patients who need a rapid return to work or usual activities, may benefit from one or two steroid injections for pain relief in the first few

weeks or months and physiotherapy (which may include friction massage) at any stage.

Smidt et al (2003) carried out a review to evaluate physiotherapy interventions for lateral epicondylitis. This was a well conducted review that found only one RCT with acceptable validity showing exercises were significantly better than ultrasound plus friction massage. The authors therefore concluded there was insufficient evidence for the effectiveness for most interventions and there was weak evidence that ultrasound may have a beneficial effect.

For the treatment of sub acute bicipital tendonitis Gonzalez (2004) recommended physical therapy involving soft tissue therapy with transverse gliding of the tendon and cross-friction massage.

In the trial reviewed by Brosseeau et al (2002) involving patients with iliotibial band friction syndrome deep transverse friction massage was used in combination with rest, ice, stretching exercises and ultrasound and this was compared to a control group receiving rest, ice, stretching exercises and ultrasound only. No statistically significant difference was demonstrated in pain relief after 4 sessions of friction massage combined with the other modalities. There was however a clinically important difference in pain when running.

This study was not a double blinded but this is difficult to do where rehabilitation interventions are concerned and can result in trials of such modalities having consistently low methodological scores. However withdrawals and dropouts were reported which is good practice but there were problems with the randomisation procedure (Brosseau et al 2002).

In a summary of aetiology, pathology and treatment of temporomandibular joint syndrome Berman (2004) suggest friction massage may help inactivate trigger points due to temporary ischemia and resultant hyperaemia produced by a firm cutaneous pressure. In addition small fibrous adhesions in the muscle formed as a result of surgery, injury, or prolonged restricted motion may be disrupted.

Many studies have used subjective and non validated scales for pain measurement and the use of combined treatments causes difficulties when trying to evaluate treatment efficacy (Brosseau et al 2002). This can make comparison of outcomes between different trials particularly difficult.

In studies where a lack of effect is demonstrated confounding variables can contribute to this. These include characteristics of therapeutic application (experience of therapist, rate, rhythm and depth of technique application), population (age, sex, occupation, sports), disease (acute/chronic) and methodology (blinding, randomisation, validated outcome measures, sample sizes, comparison groups, ‘massage only’ group to assess specific effects) (Brosseau et al 2002).

Comments & Conclusions

Despite a lack of good quality evidence to recommend either its inclusion or exclusion transverse friction massage is a widely taught and used physiotherapy treatment in the management of muscle, ligament, tendon injury and pain.

The majority of the literature found reviews the usage of transverse friction massage in the treatment of tennis elbow. No literature was found reviewing its application in the management of muscle pain or injury. There is paucity of good quality randomised controlled trails testing the efficacy of transverse friction massage either in isolation or as part of management package. Many papers are descriptive in nature of transverse friction massage being used in conjunction with other modalities. The literature regarding mechanical, physiological, neurological effects and possible mechanisms of action is speculative which could be due to such trials being difficult to conduct.

There is a need for good quality trials demonstrating the clinical effects of transverse friction massage in isolation and as part of a management package in conjunction with other modalities. Small scale or pilot MSc projects could provide valuable starting points that would require further development in order to build an evidence base. Investigations of the clinical effects would be complemented by studies of the histological, physiological, mechanical and neurological effects of transverse friction massage which would require access to and collaboration with physiologists.

References

Berman. Temporomandibular joint syndrome. eMedicine.com. 2004 TRIPDatabase

Brosseau , Casimiro , Milne , Robinson, Shea , Tugwell , Wells. Deep transverse friction massage for treating tendonitis. Cochrane Database of Systematic Reviews 2002, Issue 4 CD003528

Chapell , Bruening , Mitchell , Reston , Treadwell. Diagnosis and treatment of worker-related musculoskeletal disorders of the upper extremity. Rockville MD USA: Agency for healthcare research and quality. Evidence report/technology assessment; 62

Disabella. Elbow and forearm overuse injuries (sports medicine). eMedicine. com 2004 TRIPDatabase

Korthals-de Bos, Smidt , van Tulder, Rutten-van Molken M, Ader, van der Windt, Assendelft , Boulter. Cost effectiveness of interventions for lateral epicondylitis: results from a randomised controlled trial in primary care. Pharmacoeconomics 2004 22 (3) p 185-195

Lorenzo. Lateral epicondylitis (rehabilitation). eMedicine.com. 2004 TRIPDatabase

Nimgade , Sullivan , Goldman. Physiotherapy, steroid injections, or rest for lateral epicondylosis: what the evidence suggests. Pain practice 2005 5 (3) p203-215

Sevier and Wilson. Treating lateral epicondylitis. Sports medicine 1999 28 (5) p 375-80.

Smidt , Assendelft , Arola , Malmivaara , Green , Buchbinder , van der Windt , Bouter Effectiveness of physiotherapy for lateral epicondylitis: a systematic review. Annals of medicine 2003 35 (1) p 51-62

Wieting. Massage, traction and manipulation. eMedicine.com. 2004. TRIP Database