

## Transverse Friction Massage

*Transverse friction massage (also known as cross-friction and cross-fiber massage) is a technique that promotes optimal collagen healing by increasing circulation and decreasing collagen cross-linking, thus decreasing the formation of adhesions and scar tissue.*

### Some Indications

Cyriax indicates that lesions in these areas might be intractable except to transverse friction massage.<sup>1</sup>

#### Upper extremity

- supraspinatus (musculotendinous junction)
- biceps (long head and lower musculotendinous junction)
- subclavius belly
- brachialis belly
- supinator belly
- ligaments around carpal lunata
- adductors of the thumb
- interosseus muscle

#### Torso and lower extremity

- oblique muscles of the abdomen
- psoas (lower musculotendinous junction)
- quadriceps at patella
- coronary ligaments of the knee
- biceps femoris (lower musculotendinous junction)
- anterior and posterior tibia, peroneus (musculotendinous junction)
- posterior tibiotalar ligament
- anterior fascia of ankle joint
- interosseous belly at foot

### Treatable Lesions in Other Areas

- thumb extensors
- Achilles' tendon
- shin splints
- common flexor/extensor tendon (elbow)
- ankle ligaments
- external shoulder rotators
- hamstrings
- triceps brachii tendon
- knee collateral ligaments
- infrapatellar tendon
- hamstring muscles and tendons
- piriformis tendon of insertion
- posterior sacroiliac ligaments
- posterior iliolumbar ligaments
- ITB (above lateral epicondyle & bursa)
- scar tissue in general

### Technique

**Site Selection:** In the case of muscles and tendons, select the area to be treated by *using resisted muscle testing*. Apply the procedure to the area of maximum tenderness elicited by the isometric contraction.

In some specific cases, it is better to identify the site of treatment based on location of tenderness *when the tendon is stretched* (e.g., hamstring stretch or Mills stretch in lateral epicondylitis).

Finally, there are cases where cross friction should be applied at the *site of maximum*

*palpatory tenderness and crepitus* (e.g., thumb extensor tendons).

When identifying the area of ligament to address, painful joint play should be used rather than isometric contraction. Selecting areas by static palpation can also be used but this method is not as strongly recommended. Apply treatment to the area of lesion, not necessarily the area of subjective pain report.<sup>2</sup>

**Pre-treatment:** The procedure may be preceded with 5 minutes of ultrasound or phonophoresis, 2.0 watts/cm<sup>2</sup>).

**Set-up:** The muscle should be in a relaxed position. A tendon or ligament can be in a slightly stretched position.

**Application:**

- Use a reinforced thumb or index contact to apply the friction massage transversely across the fibers.
- A T-bar with rubber tip can be used on deeper tissue, or more cautiously on more superficial tissue.
- A rate of about 2-3 cycles per second is used. The pressure should be deep enough to move the tissue back and forth firmly under the clinician's contact, yet light enough to be tolerable to the patient.
- Avoid superficial skin friction. No lotion should be used.
- Continue the massage in a firm and rhythmic fashion for 5 to (rarely) 20 minutes.
- After a few minutes the patient should get an analgesic effect, at which time you may increase your pressure to affect deeper tissue.
- After another few minutes, there should be a further analgesic effect, allowing you to apply still more pressure. This will go on step-wise throughout the procedure.
- Always remain within the patient's tolerance.

- In general, the pressure will be light in the acute case and deeper in subacute and chronic phases.

**Post-treatment procedures:** Apply cryotherapy until patient numbs (about 2-5 minutes; up to 15 minutes for larger muscles like the hamstrings).

Other options are 6-8 minutes of continuous (0.5 watts/cm<sup>2</sup>), or pulsed ultrasound (1.5 watts/cm<sup>2</sup>), or combined ice plus electrotherapy for 10-20 minutes.

If both ice and ultrasound are used, ice should always be used last.

Finish with gentle stretching techniques to the tissue that was treated as well as AROM in a pain-free range.

**Treatment length:** During the first treatment, check after 5-6 minutes to see if there is any change (isometric contraction for muscles/tendons; joint play for ligaments).<sup>3</sup>

Length of treatment can be gradually increased by about 3 minutes per session. Patient will usually feel some immediate improvement. Many clinicians treat for about 5 minutes.

Most references recommend longer treatment: Souza suggests that 6-10 minutes may be sufficient; however, Hammer indicates that a minimum of 10 minutes is more usual and that as long as 20 minutes may be needed in chronic cases.<sup>4,2</sup> Kessler and Cyriax suggest working toward 12 to 15 minute sessions.<sup>3,1</sup>

**NOTE:** A chronic bursitis may also benefit from this procedure; however, there may be some irritation over the first three visits and local anesthesia may be difficult to achieve or maintain.

**Frequency:** Two to three times per week for 3 weeks during Phases 1, 2, & 3 of rehabilitation as indicated. Avoid treating two days in a row. If there is no improvement within three treatments, it is unlikely this therapy will help. Most cases will resolve after 6-10 sessions over a 2-3

week period.<sup>3</sup> Some cases may require up to two months of treatment.

**Endpoint of care:** In cases where pain was produced by resisted muscle testing, treatment should continue until the muscle/tendon can be tested 10 times without pain.<sup>2</sup> In cases of joint capsules/ligaments, continue this treatment until there is no pain with joint play or orthopedic stress testing of the treated joint.

### **Rationale**

Transverse friction massage is thought to promote optimal collagen healing by increasing circulation and decreasing collagen cross-linking, which will decrease adhesions and non-mobile scar formation. The theory is that scar tissue may form in an irregular fashion and may become a nociceptive focus and/or limit flexibility of tissues.

### **Side Effects**

Slight soreness or inflammation may occur. Limiting treatment time in the early stages of injury, and icing the area afterward may help to alleviate this effect and shorten treatment time.

Development of blisters or abrasions may be the result of improper technique or nails that are too long.

### **Precautions**

This technique must be performed transversely to the tissue fibers or it will

increase inflammation and cause tissue damage. If the patient's condition is worsened by the procedure or if the desired anesthesia does not develop in 3-5 minutes, discontinue the procedure.

Consider waiting two weeks over areas that have received steroid injections (although no literature was found to directly prohibit this, other recommendations based on animal studies suggest refraining from any strenuous loading of the tendon with vigorous activity).<sup>5</sup>

Caution should also be exercised with patients on aspirin or other anti-coagulant therapies.

### **Contraindications**

Do not use over acute inflamed tissue (such as an acutely inflamed bursae) due to trauma, infection, or inflammatory arthritis,<sup>1</sup> or over hematomas, calcifications, or peripheral nerves.

Mennel suggests myofascial trigger points may be a contraindication for cross-friction massage.<sup>6</sup> Kessler also cautions about cases of impaired vascular response (patients on high-dose or long-term steroids, patients with known peripheral vascular disease.)<sup>3</sup>

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