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What's in a name: Myofascial Release or Myofascial Induction?

Recent reviews of current research into the use of Myofascial Release (MFR) (Leahy and Mock, 1992; Manheim, 2008) - also described in many studies as Myofascial Induction Therapy (MIT) (Pilat, 2014; Pilat, 2017; Fernández-Pérez et al., 2008) – strongly suggest that this gentle soft tissue manipulation approach is clinically effective – whether self-applied, or provided as part of a therapeutic interventions.

Since the two approaches (see below) are virtually identical, the question arises as to which name is more appropriate?

As Pilat (2014) has explained, in relation to his preferred term, *Myofascial Induction, this* has implications beyond a local tissue response (i.e. 'release'):

> *"The term 'induction' relates to the correction of movement facilitation, and not a passive stretching of the fascial system. This is primarily an educational process, in the search for restored optimal homeostatic levels, recovering range of motion, appropriate tension, strength, and coordination. The final aim of the therapeutic process is not establishment of stable hierarchies, but facilitation of optimal and continuous adaptation to environmental demands, with maximum efficiency."*

Pilat (2014) explains the subtle difference between induction, and release, as follows:

> *"Clinicians familiar with myofascial release (MFR) note the many similarities between it and MIT. With different nuances, they are based on the same concept of clinical reasoning and complement each other. MIT is characterized as manual tissue remodeling, always avoiding arbitrary stimulus application (altered force intensity and direction), focusing on the intrinsic natural tissue response."*

1. Systematic reviews of MFR

In a systematic review of 19 randomized, controlled trials, involving MFR (out of 133 studies evaluated), Ajimsha et al. (2015) found that *"MFR is emerging as a strategy with a solid evidence base and tremendous potential."* MFR was defined in this systematic review as: *"a form of manual therapy that involves the application of a low load, long duration stretch to the myofascial complex, intended to restore optimal length, decrease pain, and improve function."*

The most common reason for studies not being included in their review, was because "*the study had a small sample size and/or no long-term follow-up to treatment."*

2. Systematic and narrative reviews of self-applied MFR (SMFR)

Also in 2015, Beardsley & Skarabot, conducted a systematic review of self-applied MFR (SMFR), and identified 22 studies using the physiotherapy evidence database [PEDro] scoring system. They noted that – *"the average quality of the studies, included in this review, is moderate "*

Beardsley & Skarabot also observed that: *"Myofascial release (MFR) has been described as an umbrella term for a wide variety of manual therapy techniques in which pressure is applied to muscle and fascia. By extension, self-myofascial release (SMFR) is a type of MFR that is performed by the individual themselves rather than by a clinician, often using a tool. The most common tools used for SMFR are the foam roller and the roller massager."*

Based on their review their overall conclusion was that~:

> *"SMFR appears to have a range of potentially valuable effects for both athletes and the general population, including increasing flexibility and enhancing recovery. Specifically, SMFR seems to lead to increased joint ROM acutely and does not impede athletic performance acutely. SMFR therefore seems suitable for use by athletes or the general population prior to exercise, training sessions or competition. SMFR seems to alleviate DOMS [delayed onset muscle soreness] acutely, and may therefore be suitable for use by athletes or the general population for enhancing recovery from exercise, training sessions or competition. There is also limited evidence that SMFR may lead to improved arterial function, improved vascular endothelial function, and increased para- sympathetic nervous system activity acutely, which may also be useful in recovery. Finally, there is some evidence that long-term SMFR may lead to improved flexibility, although not all chronic studies confirm these results"*

3. Little evidence of value of SMFR for myofascial pain

Interestingly Kalichman and David (2017), who conducted a narrative review of SMFR, noted that although researchers had: "*observed a significant increase in the joint range of motion after using the SMFR technique and no decrease in muscle force or changes in performance after treatment*" with SMFR - and that the methods had been widely employed by health-care professionals, in treating myofascial pain, they had *"found no clinical trials which evaluated the influence of SMFR on myofascial pain*"

Despite that conclusion, several studies have shown that MFR and SMFR might be effective in treatment (or self-treatment) of

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myofascial pain, for example Lee et al. (2017) reported that neck and/or back myofascial pain *'significantly improved'* following SMFR".

4. Mechanisms – based on basic science evidence

Cautionary note: It is important that cautious clinical translation of these studies is needed, in order to definitively identify cause and effect of manual treatments (Standley and Meltzer, 2008). It is also worth noting that studies of the mechanotransduction effects of different dosages of modeled load, applied to (for example) fibroblasts, ignores other cells, such as stem cells, that are almost certain to also be mechanically affected during *in-vivo treatment* (Cao et al., 2015).

In addition, we cannot know how applied load/force would be absorbed or transmitted to deeper tissues, in-vivo – compared with modeled methods where laboratory conditions apply, and where precise measureable load to cells is possible (Zein-Hamoud and Standley, 2015).

Studies involving modeled osteopathic methods – such as MFR – have been applied to cells *in-vitro* – and offer possible explanations of clinical outcomes, particularly in respect of the dosage elements, such as degree, duration and direction of load (Hicks et al., 2012).

4.1. Degree of load?

MFR variables include the degree of applied load (always light, always painless); the duration of sustained load (usually minutes, rather than seconds) and – as explained below - the directions of load application.

The methodology of MFR varies from a simple application of sustained, very light compression, or stretch, as well as (rarely) the use of additional features such as friction, or active movement during the treatment.

One way of describing essential aspect of MFR, involves a *'meeting and matching'* of tissue tensions, or restriction barriers, rather than making any deliberate effort to overcome these (Chaitow, 1983).

As explained above by Pilat, MIT (and MFR) treatment, aims to avoid any application of arbitrary stimulus, with force intensity usually maintained at a constantly light level, and with variations in the directions of applied load being largely determined by tissue responses over time.

A number of elements are standard in MFR/MIT usage, particularly that the methods should not be sensed as painful e.g.'no more than 3 out of 10' (Chen et al., 2016), with the termination of load application being determined by perceived changes in tissue behaviour.

4.2. MFR and tendons: light load better than moderate

Several basic science studies have concluded that when MFR is applied to damaged tendons – the degree of load should be extremely light, and sustained.

- Zein-Hamoud and Standley (2015) concluded that: MFR affects (tendon) wound closure and wound shape changes - with very low magnitude MFR (>1min at 3% load) having no effect, and high magnitude <5min at 12% load slowing wound healing. Optimal load was found to be approximately 6%, for ~5 minutes. MFR-*in vitro* is seen to elevate fibroblast and collagen density, suggesting MFR starts and speeds cellular migration, cellular proliferation and collagen expression/secretion.
- Wang and Guo (2012) reported that 4% cyclic uniaxial stretching of tendon fibroblast-like tenocytes, decreases COX-2 and MMP-1 gene expression and prostaglandin production, inducing differentiation of tendon stem cells into tenocytes only - whereas 8% of stretching load increased expression of these genes as well as pro-inflammatory prostaglandin production, so encouraging non-tenocyte differentiation – and therefore tendinopathy.
- These *in* vitro studies suggest that the use of the descriptor 'induction', is more appropriate, rather 'release', in relation to the resulting mechanism

4.3. Duration of load?

Modeled MFR - that applies an acyclic, long-duration, stretch to fibroblasts that have been repetitively strained (for up to 8 hours), for 60 seconds, has been shown to markedly assist in injury repair by the cells – for example, reversing inflammatory tendencies. (Hicks et al., 2012).

4.4. Direction of load?

In studies of load applied to cells *in vitro*, it has been noted that strain direction, frequency and duration, impact important fibroblast physiological functions known to mediate pain and inflammation. Zein-Hamoud and Standley (2015) observed that "*Fibroblasts, … respond to different types of strain by secreting anti-inflammatory chemicals and growth factors, thus improving wound healing and muscle repair processes.*" They also reported that "*heterobiaxial load as used in MFR, but not equibiaxial strain, affects fibroblast morphology ….[probably due to] … actin, which mediates strain-induced cellular Ca++ release.*"

It is worth noting, that even when linear forces are applied to myofascial tissues, during MFR/MIT there is an automatic involvement of heterobiaxial strain on sarcomeres, ensured by load transfer.

For example:

- "… *connections between sarcomeres and surrounding collagenous fibers are present along their full periphery … [with] … multiple reaction forces exerted onto sarcomeres within a myo-fiber. If these sideways connections supply a notable part of the reaction forces, we have force transmission onto the endomysium ——" myofascial force transmission*" (Huijing, 2012)
- "*The stress transmitted laterally at 100º [of flexion] is twice that at 50º*– [this information] *may be useful in establishing specificity of resistance training for persons with medical conditions such as knee and femur injuries?*" (Chaudhry et al., 2017)
- Findley et al. (2015) have shown that: "*Radial stress is 50% of longitudinal stress in the soleus, medial gastrocnemius, and elbow flexor and extensor muscles.*"

The resulting force transfer therefore ensures that cells, such as fibroblasts, would be loaded heterobiaxially.

5. Neurophysiological responses?

In addition to mechanoreceptor effects (as described in the basic science notes above), proprioceptors, nociceptors and interoceptors are likely to be stimulated during application of MFR/MIT – however neurophysiological features are not discussed in this editorial. For information on those influences see Pilat 2014, Tesarz et al., 2011 and Castro-Sánchez et al., 2011.

6. Selected MFR/MIT studies

Enhancement of fascial gliding motion is frequently a key objective in use of MFR. *"Fascia and connective tissue are treated with fingers, open hands, [softly] clenched fists …. with pressure directed to release adhesions between what should be freely sliding structures."* (Findley and Schleip 2007).

A recent study has validated that particular objective (sliding/gliding fascial layers). Chen et al. (2016) demonstrated that light, sustained compression of the lateral raphe region, close to the Lumbar Interfascial Triangle LIFT (Willard et al., 2012) - just inferior to the 12th rib, produced demonstrable (via ultrasonography) improvement in the behaviour the sliding functions of transversus abdominis, during contraction, following 1 minute of light (painless) myofascial release, in patients with chronic low back pain. They concluded that their result:" *indicated immediate effect of sustained manual pressure on musculofascial junction of* transversus (*TrA*) *- and that this* supported *the concept that* the possible imbalanced tension of the myofascial corset of transversus abdominus in patients with LBP."

Positive outcomes have been reported when MFR has been applied in a variety of clinically challenging conditions, including:

- **Neck pain**: *"This study provides evidence that MFR could be better than a multimodal PT program for short-term improvement of pain and PPTS [pain thresholds] in patients with neck pain".* (Rodríguez-Huguet, 2017)
- **Neck and shoulder pain in breast cancer survivors (BCS).** *"A single Myofascial Induction maneuver produces a greater decrease in pain intensity and improved neck-shoulder ROM, but does not affect mood in BCS, to a greater degree than placebo electrotherapy for BCS experiencing pain".* (Castro-Martín et al., 2017)
- **C-section scar related pain:** *"after 8 weekly Myofascial Induction treatments "In all 10 cases studied, changes were observed after applying MIT on the structure of the scar fold, both at deep (shown by ultrasound) and at superficial (shown by scar fold measurement) levels"* (Comesaña et al., 2017).
- **Back pain (amongst nurses)** *"This study provides evidence that MFR when used as an adjunct to SBE is more effective than a control intervention for CLBP in nursing professionals."* (Ajimsha et al., 2014a,b)
- **Hip dysfunction:** (MFR compared with hot packs): "*Only MFR resulted in changes in both deep fascial motion and muscle stiffness measured by elastography*" (Ichikawa et al., 2015)
- **Lateral epicondylitis:** *"Patients in the MFR and control groups reported a 78.7% and 6.8% reduction, respectively, in their pain and functional disability in week 4 compared with that in week 1, which persisted as 63.1% in the follow-up at week 12 in the MFR group"* (Ajimsha et al., 2012)
- **Temperomandibular dysfunction,** involving deep longitudinal fascial induction of masseter muscles (Heredia-Rizo. et al., 2013)
- **Improved pain levels in cases of plantar heel pain (PHP**). *"The principal finding of the current study is that the MFR intervention tested in this trial was significantly more effective than sham ultrasound therapy over the pain, functional disability and pressure pain threshold of PHP"* (Ajimsha et al., 2014a,b)

MFR (MIT) appears to have increasing degrees of evidence, as safe and effective manual therapy approaches, in management of musculoskeletal pain and dysfunction.

CONCLUSION: Returning to the question in the title of this editorial as to whether the method should be called Myofascial Release or Myofascial Induction? – the latter would seem to be more appropriate.

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