PRINCIPLES OF MUSCLE ENERGY TECHNIQUES TO ENHANCE REHABILITATIVE OUTCOMES

Manual therapy has been utilised for the treatment of injuries for hundreds of years since the times of Ancient Greece (1). Various professions include manual therapy techniques within their scope of practice. Some of these professions are massage therapists, osteopaths, athletic trainers, physical therapists, athletic therapists, acupuncturists and many others. The manual therapy techniques can be applied with the purpose to affect soft tissue such as tendon and muscle, bone, neural tissue or all of these.

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MUSCLE ENERGY TECHNIQUES

Although manipulation with the mobilisation grades defined by Maitland are most commonly used to affect joint mobility, another non-invasive and effective treatment option is muscle energy technique (MET). METs have been used for many years and the general principles have not had much change in application over the years. Though there is limited and in reality, almost no research support, MET continues to be an active, non-invasive, direct treatment technique in which the patient provides the force. It is virtually impossible to harm a patient using MET and the benefits reported by numerous practitioners and patients continues to provide support for its use.

MET is defined as a 'manual therapy procedure which involves he voluntary contraction of patient muscle in a precisely controlled direction, at varying levels of intensity, against a distinctly executed counterforce applied by the operator' (2). Typically the muscle is directed to contract isometrically to move a joint or affect movement at that articulation. Any articulation in the body that can be moved by voluntary muscular contraction can be affected by a muscle energy technique procedure. An isometric muscular contraction is the more commonly used form of MET with the duration and force of the muscular contraction varying and dependent upon the desired outcome.

Outcomes include reduction of localised oedema or relief of passive congestion via the pump action of muscles upon the lymphatic and venous systems. Other outcomes include lengthen-

ing of a spastic or contracted muscle. However, METs are typically used to mobilise a dysfunction or restricted joint. Muscle hypertonicity seondary to a dysfunctional segment of the spine can restrict osteokinematic function at that vertebral segment. There must be accurate localisation of the restricted barrier and control of the muscular forces to restore joint mobility. These outcomes are applicable to acute and chronic patients and a particular advantage with MET is that these techniques are adaptable to be used in both the chronic and acute stages.

UNDERLYING PHYSIOLOGICAL PRINCIPLES OF MET

It is important to acknowledge the underlying-muscular physiological principles used in MET however, it is beyond the scope of this article to fully describe this topic and the reader is directed to consult a neuroscience text for full detail. There is recent information to suggest that neural components contribute to joint dysfunction (3), much of the theory behind the use of MET to affect joint mobility is based upon what is known about muscular function. Shortened and hypertonic muscles are often primary restrictors of joint movement (2). After an isometric contraction, due to the interaction of Golgi tendon receptors, the gamma afferents from spindle receptors with the spinal cord and the efferents to the intrafusal fibers within the muscle, the muscle can be taken to a new resting length (3).

Isotonic contractions are also used with METs. This form of METs utilises the principle of reciprocal inhibition to promote smooth motion by relaxing the antagonist that may be inhibiting mobility. The joint of a patient is directed to the point of restriction with active contraction by the patient. Rhythmic reversals with use of the antagonist followed by the agonist promotes decreased resistance to the desired motion. This use of isotonic contractions contributes to muscular strength in the agonist muscle as well as reduced hypertonicity in the shortened antagonist muscle.

It is impossible to perform a MET to affect movement at an articulation without also affecting the surrounding fascia, ground substance of connective tissue, interstitial fluid. Fascial length and soft tissue tension are also reported to be altered by METs. These changes are produced in relative safety because the patient is providing the force, however, it is important to note that the clinician must direct the dosage to decrease soreness and overdose for the patient.

CRITICAL COMPONENTS FOR EFFECTIVE MET APPLICATION

There are three critical components for performance of a successful MET. These are:

1. Localisation of the joint
2. Control of the force
3. Balance of the practitioner and athlete/patient

1. Localisation

Localisation entails identifying the restricted joint and the plane of restriction to be addressed. Once these are identified, the clinician must find the restrictive barrier. In the osteopathic model this is sometimes referred to as the 'feather-edge of the barrier'. This term refers to the point at which the joint just begins to be restricted in the desired plane. This point can be particularly difficult to isolate when dealing with areas such as the vertebral column where motion restrictions can occur along three different axes. It is recommended that force be applied along one plane at a time in order to maintain adequate localisation.

2. Control of force

Control of the force by the clinician is needed with both verbal and tactile cues given to the patient. Continued control of the muscle force by the patient and the yielding (isotonic) or unyielding (isometric) counterforce by the clinician results in a more comfortable and effective MET.

3. Balance of the practitioner

Finally, both the therapist and the patient must be balanced during the performance of the MET to facilitate good control and localisation. Loss of balance or precarious positioning will not allow the patient to relax nor the therapist to maintain good counterforce when performing the intervention.

CONCLUSION

There are many reported therapeutic effects that occur with the MET procedure such as increased joint motion, stretch of shortened fascia, removal of passive congestion, and normalisation of muscle length. An added bonus is that these procedures are physiologically and anatomically safe and can be performed in acute stages of pain when patients may have high levels of muscle guarding and pain. These techniques should be a skill added to every clinician's repertoire.

THE AUTHOR

Cathy Ortega is a dual qualified physical therapist and athletic trainer with 14 years national and international experience. Cathy is co-founder of the International Women's Tennis Foundation and the World Federation of Athletic Training and Therapy and she currently represents the WTA Tour, University of Texas Health Science Center and the National Athletic Trainers' Association, worldwide, organising educational conferences and lecturing on state of the art topics such as core stabilisation, manual therapy, bandaging and bracing for sport and standards of practice for the physically active. Cathy is one of eight international speakers at the 2007 sportEX conference in association with the Sports Massage Association and the British Association of Sports Rehabilitators and Trainers.

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