

INTRODUCION TO SPORTS THERAPY

Practical – Muscle Energy Techniques

Learning Outcomes

- By the end of this session students should be able to:
- Describe and apply the principles of muscle energy techniques
- Recognise and Treat using METs

Muscle Energy Techniques (METs)

- History
 - Mitchell, Chaitow, Osteopathy
 - Linked to:
 - PNF
 - Load & Stretch
 - 10s pre-stretch/6 s isometric/ 30s post stretch
 - 100% maximal force in isometric contraction
 - Too aggressive?

Muscle Energy Techniques (METs)

- MET is a form of manipulative diagnosis and treatment in which the patient's muscles are actively used on request, from a precisely controlled position, in a specific direction, and against a distinctly executed practitioner counterforce fascia is involved in almost all MET techniques (Chaitow, 2009).

Muscle Energy Techniques (METs)

- Guidelines for application
 - Demonstrate and explain (IC)
 - Breathing(breath hold is common: advise to breath, let go, relax)
 - Time:- 10s isometric contraction
 - Resist:- apply 25% of max amount of isometric strength

Muscle Energy Techniques (METs)

- Point of bind
- Indicates the end of volitional comfortable range
- Ask Pt for tightness in muscle belly (not pain)
- Look for compensatory movements
- Indications
 - Hypomobility/ increase ROM
 - Mobilise
 - Remedial
- Contraindications
 - Hypermobility
 - Inflammation (All MT)
 - Surgery, esp joint replacement surgery

Muscle Energy Techniques (METs)

- Mechanism of effect
 - GTO's & Stretch Receptors (muscle spindles)
- Post isometric relaxation
- Autogenic inhibition

Muscle Energy Techniques (METs)

- Protocol
 - Find point of bind
 - Isometric contraction
 - 10 sec
 - 25% max
 - At end of 10sec breath out
- Recheck of point of bind & repeat
 - Can repeat as 1x10s (3 sec pause) 2x20s (3 s pause) 3x10s
 - Repeat until plateau

Common Sites for METs

- Hamstrings (HE, KF)
- Rectus femoris & Quads
- Iliopsoas
- TFL
- Glutes/ Deep Hip
- Pronators
- Gastroc
- Soleus
- Adductors
- GH
 - Flex
 - Ext
 - Add
 - Abd
 - MR
 - LR
 - Horizontal Abd Add
- Shoulder girdle
 - Elevation
 - Depression
 - Protraction
 - Retraction

METs

Indications

- Hypomobility/ increase ROM
 - Mobilise
 - Remedial

Contraindications

- Hypermobility
- Inflammation (All MT's)
- Surgery, esp joint replacement surgery

Mechanism

- Autogenic inhibition
- Post isometric relaxation

Protocol

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Clinical Reasoning

- How much force?
 - Research has not yet adequately addressed the question of the optimal contraction force to be used in MET isometric contractions
 - Most PNF/MET researchers have used protocols with either moderate or maximal contraction intensities
 - Because of the different treatment and ROM measurement methods employed it is impossible to make comparisons between these studies
 - In using MET Lewit (1999) recommends less than 30% maximal contraction
 - Lewit, K. (1999). Manipulation in Rehabilitation of the Locomotor System. Butterworths, London

Clinical Reasoning

- Whose Force?
 - It MUST be the patient's force, not yours
 - The therapist's force is always the counterforce.
 - A common mistake is to ask the patient to 'resist my effort'.
 - This ignores the factor of intentionality that ensures that core muscles are re-educated and rehabilitated.
 - What works best is to tell the patient the exact direction of the action, the amount of force, and when to stop!
- Interview with Fred Mitchell Jr. In: Franke H ED. (2009) The History of MET In: Muscle Energy Technique History-Model-Research. Verband der Osteopathen Deutschland, Wiesbaden

Clinical Reasoning

- How long a contraction?
 - Many experts advocate 3-7 second resisted MET contractions (Greenman 1996)
- Others use:
 - 5-sec (Ballantyne et al 2003),
 - 5 to 20-sec (Mehta&Hatton2002),
 - 6 to 12-sec (Schmittetal1999),
 - And 20-sec (Ferberetal2002) contraction durations
- The value of longer isometric contractions is uncertain, because of conflicting results

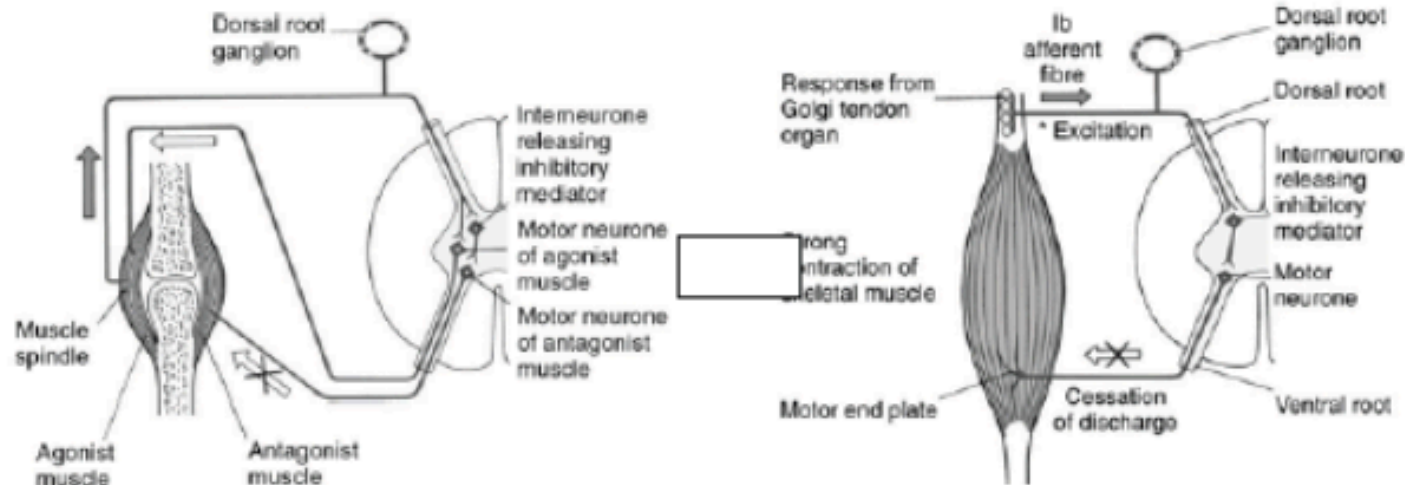
Clinical Reasoning

- How many repetitions?
 - Osternig et al found that 64-84% of the ROM gain was achieved in the first phase
 - One 5-second contraction, followed by 5-second relaxation and stretch
- Magnusson et al., achieved a large hamstring ROM gain (33°) following only one 6-second isometric contraction
- It is suggested that there is probably little clinical benefit in employing more than 2 repetitions

Mechanism of Effect

Are these really the Mechanisms of MET ?

Muscle relaxation (PIR) may occur following contraction, by activation of the golgi tendon organs and their inhibitory influence on the motor neuron pool - or due to reciprocal inhibition (RI) produced by contraction of a muscle antagonist.



Although it is accepted that these reflex pathways exist, their role in enhancing stretch potential has not been established.

Mechanism of Effect

Connective tissue changes during contraction & stretching

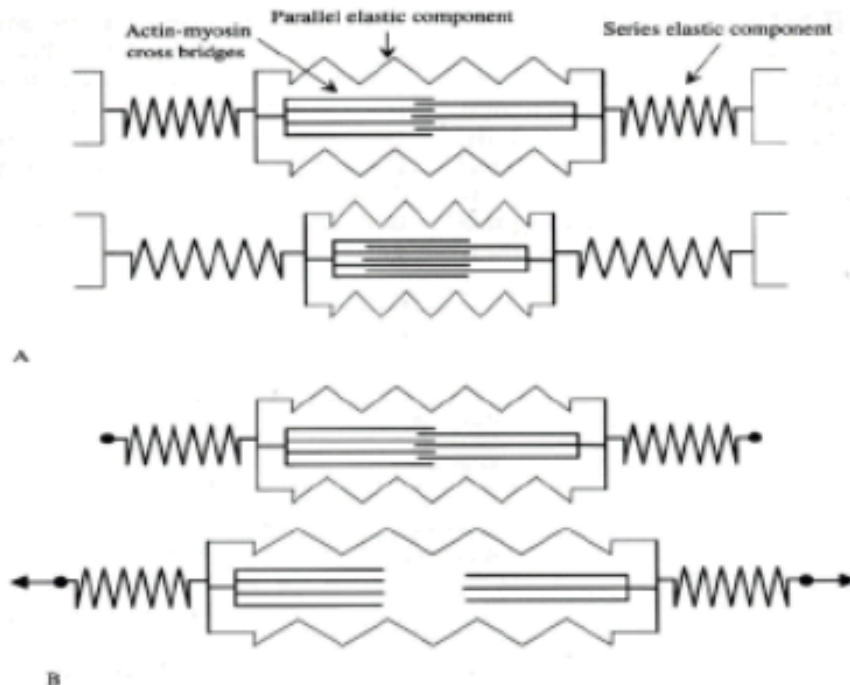


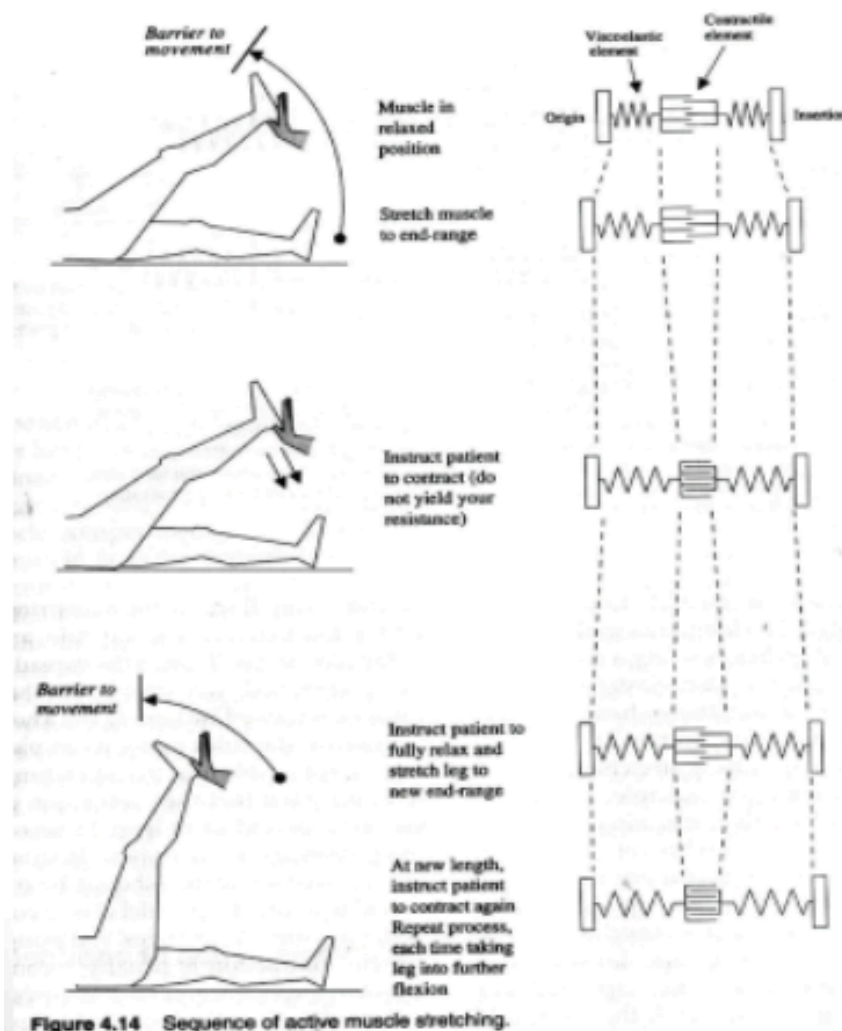
Figure 4.15 Changes in the connective tissue element of the muscle during muscle contraction and passive stretching. (A) During contraction, the series elastic components are under tension and elongate, whilst the tension in the parallel elastic components is reduced. (B) During passive stretching, both the parallel and elastic components are under tension. However, the less stiff parallel fibres will elongate more than the series component. (The separation between the actin and myosin has been exaggerated.)

For a muscle to stay the same length during an isometric contraction, the connective tissues must undergo lengthening to compensate for shortening of contractile elements.

This suggests that a combination of contractions and stretches (as used in MET) may be effective for producing **viscoelastic change and increased ROM.**

Lederman E. *Fundamentals of manual therapy*. London: Churchill Livingstone; 1997. p34
 Taylor DC, Brooks DE, Ryan JB 1997 Visco-elastic characteristics of muscle: passive stretching versus muscular contractions. *Medicine & Science in Sports & Exercise*. 29(12):1619-1624

Mechanism of Effect



Only with measurement of torque** can passive stretching force be kept consistent, pre and post contraction, and information gained about any change to the property of muscle tissue (i.e. change in the biomechanical structure – e.g. viscoelasticity - of the muscle)

**** Torque is a force that tends to rotate or turn things**

Lederman E 1997
Fundamentals of manual therapy. London: Churchill Livingstone p33

Summary

- Muscle Energy Techniques are an alternative to PNF stretching for the improvement of ROM and flexibility