
MUSCLE ENERGY TECHNIQUE AS MODALITY IN REDUCED LOW BACK PAIN THROUGH ACTIVATED BETA ENDORPHINS

Al Gifari M.Y¹, Hidayah A.R,¹ Nafi'ah,^{1*}

¹DIII Physiotherapy, Politeknik Unggulan Kalimantan, Banjarmasin, South Kalimantan, Indonesia

*Corresponding author: nafiah.alwafi@gmail.com

Abstract

Introduction : Low back pain is an emerging problem with an incidence that is the highest in the third decade of life worldwide. One way to manipulate low back pain is using Muscle Energy Technique (MET). MET is a manual therapy treatment technique contracts specific muscles against the resistance of the clinician and stimulate beta endorphins produce analgesia by binding to opioid receptor to modulate pain. Beta-endorphins are neuropeptides involved in pain management. However, studies on MET regarding magnitude and duration of effectiveness MET to reduction LBP through activated beta endorphins are limited. Therefore in this study we will discuss effectiveness MET as modality to reduction LBP through activated beta endorphins. **Method:** literature study with descriptive qualitative design. data obtained through secondary data taken from research journals. **Results:** MET reducing pain through stimulation of agonist and antagonist muscles, seems to decrease perception of pain through activated beta endorphins. This technique could be applied prior to other rehab techniques, such as strengthening exercises, to decrease pain and enhance the effect of applied exercise program. **Conclusion:** MET can be used as one of the modalities in reducing low back pain through activated beta endorphins.

Keywords : Muscle Energy Technique, Beta Endorphins, Low Back Pain

INTRODUCTION

Low back pain is an emerging problem with an incidence that is the highest in the third decade of life worldwide (Ganesan *et al.*, 2017). Low Back Pain also represents a major social and economic problem. The prevalence of low back pain estimated to range from 15 to 45% in French healthcare workers, the point prevalence of low back pain in US adults aged 20–69 years old was 13.1% and in Italy the general population prevalence of low back pain is estimated to be 5.91%. The high prevalence of low back pain has a significant impact on functional capacity, as pain restricts occupational activities and is a major cause of absenteeism. Its economic burden is represented directly by the high costs of health care spending and indirectly by decreased productivity. These costs are expected to rise even more in the next few years (Allegri *et al.*, 2016). Low back pain caused pain in the area on the posterior aspect of the body from the lower margin of the twelfth ribs to the lower gluteal folds with or without pain referred into one or both lower limbs that lasts for at least one day and may be having a significant impact on emergency departments around the world (Hoy *et al.*, 2014). Therefore, low back pain should be handled properly, one way to manipulate low back pain is using Muscle Energy Technique (MET), it was developed by osteopathic physician Fred Mitchell and has continued to evolve with contributions from many individuals (Fryer, 2011).

MET is a manual therapy treatment technique contracts specific muscles against the resistance of the clinician (Franke and Fryer, 2012). Manual therapy has long been a component of physical rehabilitation programs, especially to treat those in pain by modulatory effects of neurophysiological origin and may be mediated by the descending modulatory circuit stimulate like beta endorphins to produce analgesia by binding to opioid receptor to modulate pain. Beta-endorphins are neuropeptides involved in pain management (Hill, 2009). Beta-endorphins are primarily synthesized and stored in the anterior pituitary gland from their precursor protein proopiomelanocortin (POMC). POMC is a large protein that is cleaved into smaller proteins such as beta-endorphin, alpha-melanocyte stimulating hormone (MSH), adrenocorticotropin (ACTH), and others. The pituitary gland synthesizes POMC in response to a signal from the hypothalamus; that signal being corticotroponin-releasing hormone (CRH). They turn hypothalamic CRH production off – that is, feedback inhibition occurs (Sprouse-Blum *et al.*, 2010).

However, the physiological mechanisms underlying the therapeutic effects of MET are unclear and may involve a variety of neurological and biomechanical mechanisms, including hypoalgesia, altered proprioception, motor programming and control, and changes in tissue fluid. Furthermore, the studies on MET as manual therapy regarding magnitude and duration of effectiveness MET to reduction LBP through activated beta endorphins are limited. Therefore in this study we will discuss effectiveness MET as modality to reduction LBP through activated beta endorphins.

METHODE

Literature study with descriptive qualitative design, data obtained through secondary data taken from research journals. Content analysis refers to a technique commonly used in qualitative research to analyze words or phrases in text documents (Allegrì *et al.*, 2016). Terms used to guide search strategy patient low back pain with intervention or assessment manual therapy using muscle energy technique, muscle energy technique release beta endorphin.

RESULTS

Tabel 1. Summary of research

Year	Research
2009	Short-Term Effect Of Muscle Energy Technique On Pain In Individuals With Non-Specific Lumbopelvic Pain (Selkow <i>et al.</i> , 2009)
2009	Comparative Analysis on the Efficacy of G.d. Maitland's Concept of Mobilization & muscle Energy Technique in Treating Sacroiliac Joint Dysfunction (Rana K, Bansal N, Savita, 2009).
2010	Effectiveness of muscle energy technique on quadratus lumborum in acute low back pain-randomized controlled trial (Prachi et al, 2010)
2012	The Effect of Muscle Energy Techniques on Disability and Pain Scores in Individuals With Low Back Pain (Day and Nitz, 2012).

2014	Effect of Muscle Energy Technique on Pain Perception and Functional Disability of Women with Postnatal Low Back Pain (El-bandrawy, Mohamed and Mamdouh, 2014).
2016	Muscle Energy Technique: a useful aid to manual treatment of Low Back Pain
2016	Muscle energy technique for non-specific low-back pain. A Cochrane systematic review (El-bandrawy, Mohamed and Mamdouh, 2014).
2018	Effect of muscle energy technique with and without strain counterstrain technique in acute low back pain: A randomized clinical trial (Patel <i>et al.</i> , 2018)

MET reducing pain through stimulation of agonist and antagonist muscles, seems to decrease perception of pain through activated beta endorphins. This technique could be applied prior to other rehab techniques, such as strengthening exercises, to decrease pain and enhance the effect of applied exercise program.

DISCUSSION

Several factors are claimed to be important for successful use of MET. These include an exact diagnosis, a precise positioning of the joint or tightened muscle by the therapist, an active and appropriately regulated muscle contraction by the patient against a defined resistance of the therapist, an accurate control of the modification in range of movement, and if necessary, repositioning of the joint at a new barrier of movement restriction (Fryer, 2011).

Muscle Energy Technique is a commonly used treatment in reducing pain through many concepts. The first concept is through golgi tendon reflex. This reflex is believed to be activated during isometric contraction of muscles, which is claimed to produce a stretch on the golgi tendon organs and a reflex relaxation of the muscle (Ballantyne, Fryer and McLaughlin, 2003). In addition MET is a therapeutic tool used to improve function through the release of hypertonic musculature and has been found to be more effective than simple stretching, it is often applied to relief of local pain and the relief of pain due to sciatic nerve entrapment. MET also utilises an isometric contractual phase followed by gentle stretching of the same muscle, whereas reciprocal inhibition (RI) muscle energy technique utilises an antagonist contractual phase followed by gentle stretch (Ballantyne, Fryer and McLaughlin, 2003). MET is a manual therapy has long been a component of physical rehabilitation programs, especially to treat those in pain by modulatory effects of neurophysiological origin and may be mediated by the descending modulatory circuit stimulate like beta endorphins to produce analgesia by binding to opioid receptor to modulate pain (Franke and Fryer, 2012).

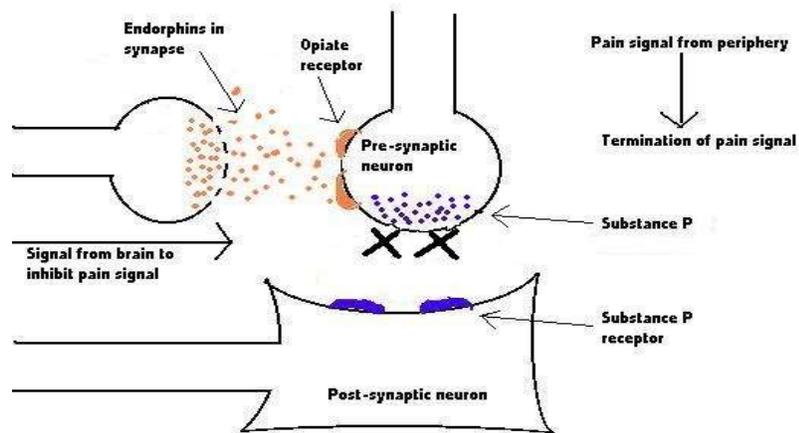


Fig. 1 1 visual interpretation of the process of blocking the release of substance P by activating opioid receptors by beta endorphins.

In the peripheral nervous system (PNS), beta-endorphins produce analgesia by binding to opioid receptors (particularly of the mu subtype) at both pre and post synaptic nerve terminals, primarily exerting their effect through presynaptic binding. When bound, a cascade of interactions results in inhibition of the release of tachykinins, particularly substance P, a key protein involved in the transmission of pain. In the PNS, mu-opioid receptors are present throughout peripheral nerves and have been identified in the central terminals of primary afferent neurons, peripheral sensory nerve fibers and dorsal root ganglia. In the central nervous system, beta-endorphins similarly bind mu-opioid receptors and exert their primary action at presynaptic nerve terminals. However, instead of inhibiting substance P, they exert their analgesic effect by inhibiting the release of GABA, an inhibitory neurotransmitter, resulting in excess production of dopamine to modulate pain (Sprouse-Blum *et al.*, 2010). Based on this study, it is suggested that beta endorphin will be induced by MET to decrease low back pain. MET can be used as one of the modalities in reducing low back pain through activated beta endorphins. However, to prove this theory, need an experimental research to find out beta endorphins levels are produced when patients with low back pain conditions are given MET.

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