Efficacy of Muscle Energy Technique versus Myofascial Release on Function Outcome Measures in Patients with Chronic Low Back Pain

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ABSTRACT

Background: *Low-back pain is one of the leading causes of disability. Manual therapy is a specialization within physical therapy and provides comprehensive conservative management for pain and other symptoms of neuro-musculo-articular dysfunction in the spine and extremities.* ***Purpose:*** *The primary objective of this study was to assess the effectiveness of manual therapy techniques on outcome measures in patients with chronic low back pain.* ***Methods:*** *forty patients (male and female), their age range 30-55 years, with chronic low back pain (more than tree months) were assigned randomly to two equal treatment groups. The first group (A) underwent a four weeks specific muscle energy treatment program in form of post-isometric relaxation (PIR) plus specific physical therapy program. The second group (B) underwent a four weeks specific myofascial release program plus specific physical therapy program. Outcome measures include pain intensity, lumber movements and functional disability index were measured.* ***Results:*** *The present study revealed that although there was no statistical significance (P> 0.05) difference in pain intensity level, lumber range of motion and function disability level between both groups, patients in both groups showed statistical significance P< 0.05 differences in all outcome measures between pre group (A) pain level from (7.7±1.42) to (5±1.34), function disability from (56±12.06) to (30.35±9.16) and lumber movement from (30.75±11.69) to (41.25±7.39). Pre treatment group (B) pain level from (8.31±1.59) to (5.36±1.56), function disability from (55±10.07) to (33.57±11) and lumber movement from (27.89±12.7) to (41.05±8.36).* ***Conclusion:*** *The findings of this trial support the view that the functional integration of specific manipulative techniques are effective in reducing pain and functional disability in patients with chronic low back pain.*

Key words: *Muscle energy, Myofascial Release, chronic low back pain, outcome measures.*

INTRODUCTION

Low-back pain (LBP) has been identified as one of the most costly disorders among the worldwide working population[30]. LBP is a common problem throughout the industrialized world. Lifetime prevalence is reported between 50% and 80% with most studies reporting 50% to 60% of adults. The recurrence rate is reported to be between 50% and 88%. LBP symptoms are major contributors to ambulatory visits, economic burden, and reduced readiness among military personnel and employers in the civilian workplace as well[14].

Muscle energy technique (MET) and propioceptive neuoro-muscular facilitation (PNF) stretching methods have been clearly shown to bring about greater improvements in joint range of motion (ROM) and muscle extensibility than passive, static stretching, both in the short and long term[18]. MET is a safe, gentle and is believed to be in patients with a variety of symptoms. The popularity of MET will justifiably increase for the benefit of practitioners and patients alike[11]. It was reported that post isometric relaxation is considered a highly effective therapy for back dysfunction patients[9].

A key component of pain-related behavior is fear of pain with consequent decrease in physical activity[43,46]. While rest may be initially important in acute low back injury (e.g. disc herniation, muscle sprain), it is increasingly recognized that timely resumption of physical activity is critical to successful rehabilitation[44].

Myofascial release techniques (MFR) are a group of specific maneuvers that are directed toward the soft tissues of the body, particularly the muscles and fascia. Muscle and fascia are most commonly thought of as the tissues treated by these techniques, but all of the fibroelastic connective tissues, as well as skin, tendons, ligaments, cartilage, blood, and lymph, may be affected[16].

Manual therapy is beneficial for patients with sub acute and chronic non-specific low back pain, both reducing the symptoms and improving function[21]. Identifying which treatment works best for whom' in low back pain has been an on-going aim of clinicians and has been a research priority over the last decade[34].

SUBJECTS, MATERIALS AND METHODS

Subjects

Criteria for inclusion in the study were restricted to 40 patients of either gender between the ages of 30 and 55 years and had persisted low back pain longer than 3 months[8].

Instrumentations:

A- For Evaluation:

1. Pain measures: The short form McGill pain questionnaire was used to assess each patient's average symptoms[32].
2. Lumbar spine range of movement in standing: This was measured using inclinometers[25].
3. Functional measures: The Oswestry isability questionnaire was used to give a percentage score that indicated each patient's level of functional disability[17].

B- For intervention:

1. Infrared Radiation (IRR): model is 2004/2 N, a power of 400 w, voltage 203 v and frequency of 50/60 Hz.
2. Ultrasonic Device: Phyaction U 190, 230 V, 300 mA/50-60 Hz, Plus: 8 w.
3. Transcutanous Electrical Nerve Stimulation (TENS): (Dc: 6 v, Watts: 6 w, CE: 0120).

Treatment Procedure: Both treatment group are received the following intervention protocols:

1. Infrared Radiation.
2. Ultrasonic[4].
3. (TENS).
4. Therapeutic Exercise program: includes: Finger to Toes, Bridging Exercise, Back Extension from Prone, Sit-Up Exercise, Knee to Chest Exercise and Stretching of Lower Back Muscles. At this point group (A) was received PIR for Psoas group, Hamstring, Tensor Fascia Lata, Piriformis, Quadratus lumborum and Erector Spinae muscles, while group (B) was received MFR for the following muscles; Psoas, Hamstring, Tensor Fascia latae and Iliotibial Band, Piriformis, Lateral abdominal muscles and quadratus lumborum and Erectro Spinea muscles[1].

RESULTS

Statistical analysis revealed no statistically significant differences between both groups on entry to the study. Analysis of differences within each group after the intervention period revealed significant differences; in the PIR group, after the intervention period, there was a decrease in pain intensity (t = 7.37, P < 0.0001) and a reduction in functional disability levels (t = 9.05, P < 0.0001) and lumbar spine ROM improvement (flex, ext, R &L side bending) where (t = 4.22, 4.97, 4.14, 5.05 and P < 0.001, 0.001, 0.001, 0.001 respectively as shown in table (1).

PIR group revealed a statistical significant difference between pre and post treatment; pain intensity level as the pain level pre treatment was (7.7± 1.42) and for post treatment was (5±1.34) where the t-value was (7.37) and P-value was (0.0001), there was a significant difference between pre and post treatment lumbar flexion ROM as the lumbar flexion ROM pre treatment was (30.75± 11.96) and for post treatment was (41.25±7.39) where the t-value was (4.22) and P-value was (0.001), there was a significant difference between pre and post treatment lumbar extension ROM as the lumbar extension ROM pre treatment was (8.25±2.86) and for post treatment was (16.25±4.14) where the t-value was (4.97) and P-value was (0.001), there was a significant difference between pre and post treatment lumbar (Rt) side bending ROM as the lumbar side bending ROM pre treatment was (6.25±3.49) and for post treatment was (11.75±2.91) where the t-value was (5.14) and P-value was (0.001),), there was a significant difference between pre and post treatment lumbar (Lt) side bending ROM as the lumbar side bending ROM pre treatment was (7±2.91) and for post treatment was (12±3.32) where the t-value was (5.05) and P-value was (0.001), and finally, there was a significant difference between pre and post treatment functional disability as the functional disability pre treatment was (56±12.06) and for post treatment was (41.25±7.39) where the t-value was (9.05) and P-value was (0.0001) as shown in table (1).

While in the MFR group after the intervention period, there was a decrease in pain intensity (t = 7.15, P < 0.0001) and a reduction in functional disability levels (t = 9.04, P < 0.0001) and lumbar spine ROM improvement (flex, ext, R and L side bending) where (t = 4.77, 8.72, 7.68, 5.63 and P < 0.003, 0.001, 0.002, 0.004 respectively) as shown in (Table 1).

MFR group revealed a statistical significant difference between pre and post treatment; pain intensity level as the pain level pre treatment was (8.31± 1.59) and for post treatment was (5.36±1.56) where the t-value was (7.15) and P-value was (0.0001), there was a significant difference between pre and post treatment lumbar flexion ROM as the lumbar flexion ROM pre treatment was (27.89± 12.7) and for post treatment was (41.05±8.36) where the t-value was (4.77) and P-value was (0.003), there was a significant difference between pre and post treatment lumbar extension ROM as the lumbar extension ROM pre treatment was (7.89±3.74) and for post treatment was (15.78±6.74) where the t-value was (8.72) and P-value was (0.001), there was a significant difference between pre and post treatment lumbar (Rt) side bending ROM as the lumbar side bending ROM pre treatment was (6.57±3.64) and for post treatment was (10.52±3.58) where the t-value was (7.68) and P-value was (0.002), there was a significant difference between pre and post treatment lumbar (Lt) side bending ROM as the lumbar side bending ROM pre treatment was (6.89±3.68) and for post treatment was (11.05±4.16) where the t-value was (5.63) and P-value was (0.004), and finally, there was a significant difference between pre and post treatment functional disability as the functional disability pre treatment was (55±10.07) and for post treatment was (33.57±11) where the t-value was (9.04) and P-value was (0.0001) as shown in table (1).

Table (1): Paired t-test of the dependant variables in each group.

Group	Variable	Pre treatment	Post treatment	Paired t-test		
		Mean ±SD	Mean ±SD	t-value	P-value	Significance
Group (A) (PIR)	Pain level	7.7± 1.42	5 ±1.34	7.37	0.0001	S
	Lumbar flexion ROM	30.75±11.69	41.25±7.39	4.22	0.0001	S
	Lumbar extension ROM	8.25±2.68	16.25±4.14	4.97	0.0001	S
	Lumbar RT side bending ROM	6.25±3.49	11.75±3.27	5.14	0.0001	S
	Lumbar LT side bending ROM	7±2.91	12±3.32	5.05	0.0001	S
	Functional disability	56±12.06	30.35±9.16	9.05	0.0001	S
Group (B) (MFR)	Pain level	8.31± 1.59	5.36±1.56	7.15	0.0001	S
	Lumbar flexion ROM	27.89± 12.7	41.05±8.36	4.77	0.003	S
	Lumbar extension ROM	7.89±3.74	15.78±6.74	8.72	0.001	S
	Lumbar RT side bending ROM	6.57±3.64	10.52±3.58	7.68	0.002	S
	Lumbar LT side bending ROM	6.89±3.68	11.05±4.16	5.63	0.004	S
	Functional disa	55±10.07	33.57±11	9.04	0.0001	S

P-value = Probability S = Significance

Statistical analysis revealed no statistically significant differences between both groups (A) and (B) in the combined dependant variables both pre and post treatment.

Pre treatment there was no significant differences between group (A) and (B) in: (I) pain intensity level where the t-value was (1.94) and P-value was (0.069), (II) lumbar flexion and extension, RT and LT side bending ROM where the t-values were (0.74, 0.49, 0.21, 0.18) and P-values were (0.468, 0.639, 0.834, 0.861), and finally, (III) functional disability where the t-value was (0.12) and P-value was (0.908) as shown in table (2).

Post treatment there was no significant differences between group (A) and (B) in: (I) pain intensity level where the t-value was (0.87) and P-value was (0.397), (II) lumbar flexion and extension, RT and LT side bending ROM where the T-values were (0.34, 0.45, 1.16, 0.85) and P-values were (0.737, 0.659, 0.262, 0.408), and finally, (III) functional disability where the t-value was (0.95) and P-value was (0.365) as shown in table (2).

Table (2): Paired t-test of the dependant variables in both group.

Time of measurements	Variable	Group(A) (PIR)	Group (B) (MFR)	Paired t-test		
		Mean ±SD	Mean ±SD	t-value	P-value	Significance
Pre treatment	Pain level	7.7± 1.42	8.31± 1.59	1.94	0.069	NS
	Lumbar flexion ROM	30.75±11.96	27.89±12.7	0.74	0.468	NS
	Lumbar extension ROM	8.25±2.86	7.89±3.74	0.49	0.629	NS
	Lumbar RT side bending ROM	6.25± 3.49	6.57± 3.64	0.21	0.834	NS
	Lumbar LT side bending ROM	7± 2.91	6.89± 3.68	0.18	0.861	NS
	Functional disability	56±12.06	55±10.07	0.12	0.908	NS
Post treatment	Pain level	5±1.34	5.36±1.56	0.87	0.397	NS
	Lumbar flexion ROM	41.25±7.39	41.05±8.36	0.34	0.737	NS
	Lumbar extension ROM	16.25±4.14	15.78±6.74	0.45	0.659	NS
	Lumbar RT side bending ROM	11.75±3.27	10.52±3.58	1.16	0.262	NS
	Lumbar LT side bending ROM	12±3.32	11.05±4.16	0.85	0.408	NS
	Functional disability	30.35±9.16	33.57±11	0.93	0.365	NS

P-value = Probability S = Significance NS = Non significance

DISCUSSION

I. Pain intensity level: both PIR and MFR groups revealed a statistical significant reduction in pain intensity level after the intervention period in patient with CLBP. For PIR group, the analgesic effect of PIR could be explained by both spinal and supraspinal mechanisms; Activation of both muscle and joint mechanoreceptors occurs during an isometric contraction. This leads to sympatho-excitation evoked by somatic efferents and localized activation of the periaqueductal grey that plays a role in descending modulation of pain. Nociceptive inhibition then occurs at the dorsal horn of the spinal cord, as simultaneous gating takes place of nociceptive impulses in the dorsal horn, due to mechanoreceptor stimulation[20]. PIR stimulates joint proprioceptors, via the production of joint movement, or the stretching of a joint capsule[23]. This is supported by the study of Degenhard et al., 2007[15], who reported that concentrations of several circulatory pain biomarkers (including endocannabinoids and endorphins) were altered following muscle energy. The degree and duration of these changes were greater in subjects with C LBP than in control subjects. Moreover myofascial trigger point deactivation was shown to be enhanced by use of different forms of MET[19]. Consistent with these findings, Selkow et al., 2009[37], who described the effectiveness of treating "lumbopelvic pain due to rotations of the ilium" with PIR for hamstring muscle. Also the analgesic effect of MET is confirmed by work Strunk, 2008[42], Buchmann et al., 2005[7], and Wilson et al., 2003[45]. On the other hand, Ballentyne et al., 2003[3], still argue and hesitate about the efficacy of MET in form of post-isometric relaxation PIR.

For MFR group, manual therapy may have an effect on spinal cord[5] and has been associated with hypoalgesia[33]. The hypoalgesia results from segmental postsynaptic inhibition on dorsal horn pain pathway neuron during manual therapy. The analgesic effect of MFR could be explained by both spinal and supraspinal mechanisms; Activation of both muscle and joint mechanoreceptors occurs during sustained release[38,41,47]. Nociceptive inhibition then occurs at the dorsal horn of the spinal cord, as simultaneous gating takes place of nociceptive impulses in the dorsal horn, due to mechanoreceptor stimulation[20]. MFR procedures claim to encourage the circulation of fluid in and around the tissues to enhance venous and lymphatic systems and aid in decongesting areas of fluid stasis[22]. The result of the current study was supported by Cisler 1997[12], who studied the possible use of myofascial release in whiplash injuries. Another study revealed significant reduction in pain of female runners who had extremely chronic hamstring pain and deficit in flexibility in leg. MFR stimulates joint proprioceptors, via stretching of a joint capsule, may be capable of reducing pain by inhibiting the smaller diameter nociceptive neuronal input at the spinal cord level[23]. This is supported by the study of Degenhard et al., 2007[15], who reported that myofascial trigger point deactivation was shown to be enhanced by use of different forms of MFR.

II. Lumbar spine flexion and extension (ROM): Both PIR and MFR groups showed a statistical significant improvement in lumbar spine ROM after the intervention period in patient with CLBP. For PIR group, The improvement in ROM can be explained by reduction of pain and a proposed hypothesis by Hong 1999[24]; The current findings of PIR group are supported by the work of Blanco et al., 2006[6], Rajadurai, 2011[35], Willson et al., 2003[45], AL-Khayer and Gervitt, 2007[2] and Jisha, 2007[26] concluded that muscle energy techniques has been shown to improve joint range of motion, including spinal joints[27,28], other studies have showed that PIR is effective in increasing range of motion in the cervical spine[10,39].

For MFR group, The improvement in ROM can be explained by reduction of pain and a proposed hypothesis by Hong, 1999[24]; The viscoelastic explanation for the palpable changes associated with fascial release enjoys widespread support[40]. The theoretical base for chosen MFR technique was to free barriers within the deeper layers of fascia and the surrounding muscle fibers[31]. Through this process it was believed that there would be significant increase in ROM and pain.

III. Functional Disability: both PIR and MFR groups revealed a statistical significant reduction in Function disability level after the intervention period in patient with CLBP. This improvement is the resultant of combined findings of pain reduction and increasing of lumbar spine mobility. MET group is supported by a study of Wilson (2003)[45] concluded that using MET may benefit a patient to reduce low back pain and improve low back functional disabilities.

Conclusion

The findings of this study support the view that the functional integration of specific manipulative techniques directed at the low back muscles are effective in reducing pain and functional disability and improving lumbar spine mobility in patients with CLBP.

REFERENCES

1- Alexander, S. Nicolas, DO, FAAO: Atlas of Osteopathic Techniques, 181-183, 2008.

2- Al-Khayer, A. and Gervitt, M.P.: The sacroiliac joint: an underestimated cause for low back pain. Journal of Back and Musculoskeletal. Rehab. 20: 135-141, 2007.

3- Ballantyne, F., Fryer, G. and McLaughlin, P.: The effect of muscle energy technique on ham string extensibility: The mechanism of altered flexibility. J OsteopathMed; 6: 59-63, 2003.

4- Barian, V., Ashikage, T., Bradan, C. F. and Nancy, J.Z.: "The effect of ultrasound and stretch on Knee ligament Extensibility" JOSPT, 30(6): 341-347, 2000.

5- Bialosky, J.E., Bishop, M.D., Price, D.D., Robinson, M.E. and George, S.Z.: The mechanism of manual therapy in the treatment of musculoskeletal pain. A comprehensive model. Man. Ther. 14(5): 531-538, 2009.

6- Blanco, C.R., Fernández-De-Las-Peñas, C., Xumet, J.E.H., Algaba, C.P., Fernández-Rabadán, M., and Lillo-de-la-Quintana, M.C.: Changes in active mouth opening following a single treatment of latent myofascial trigger points in the masseter muscle involving postisometric relaxation or strain/counter strain. J Bodywork Mov Ther, 10(3): 197-205, 2006.

7- Buchmann, J., Wende, K., Kundt, G. and Haessler, F.: Manual treatment. Effects to the upper cervical apophysial joints before, during, and after endotracheal anesthesia: a placebo-controlled comparison. Am J Phys Med Rehabil.; 84(4): 251-257, 2005.

8- Campbell, R. and Muncer, L.M.: The causes of low back pain: A net work analysis. Social science and medicine; 60(2): 409-419, 2005.

9- Captin, C.D.: Low back pain. Br Med J.; 328(7448): 1119-1121, 2003.

10- Cassidy, J.D., Lopes, A.A. and Yong-Hing, K.: The immediate effect of manipulation versus mobilization on pain and range of motion in the cervical spine: A randomized controlled trial. J Manipulative Physiol Ther; 15: 57, 1992.

11- Chaitow, L.: Muscle Energy Techniques: 3rd edition. London: Churchill Living stone. 1: 152-153, 2006.

12- Cisler, T.A.: Whiplash as a total body injury. Journal of American osteopathic association Feb (2): 145-148, 1997.

13- Cox, M., Asselins, L., Gracovestkg, S., Richards, M. and Newman, N.: Relation between functional evaluation measures and self assessment in non acute low back pain, Spine, 25: 1817-1826, 2000.

14- Dariales, C., Huang, G., Feuerstein, M. and Lopeg, M.: Self report measure of low back. Related biomechanical exposures clinical validation, J Occup Rehabil., 15(2): 113-280, 2005.

15- Degenhard, T.B., Darmani, N. and Johnson, J.: Role of Osteopathic Manipulative Treatment in Altering Pain Biomarkers: A Pilot Study. J Am Osteopath Assoc. 107: 387-400, 2007.

16- Digiovanna, E.L., Stanley Schiowilz, Dennis J. Dowling, DO, FAAO: An Osteopathic Approach to Diagnosis and Treatment, 3rd Ed., 80-81, 2005.

17- Fair bank, J.C.T. and Pynsent, P.B.: The Oswestry disability index. Spine, 25(22): 2946-2953, 2000.

18- Ferber, R., Osternig, L.R. and Gravelle, D.C.: Effect of PNF stretch techniques on knee flexor muscle EMG activity in older adults. Journal of Electromyography and Kinesiology , 12: 391-397, 2002.

19- Fernández-De-Las-Peñas, C., Sohrbeck-Campo, M., Fernández- Carnero, J. and Miangolarra-Page, J.: Manual therapies in the myofascial trigger point treatment: a systematic review. Journal of Bodywork and Movement Therapies, 9: 27-34, 2005.

20- Fryer, G. and Fossum, C.: Therapeutic mechanisms underlying muscle energy approaches. In: Fernandez-de-las-Penas C, Arendt-Nielsen Lars, Gerwin R D editor(s). Tension-Type and Cervicogenic Headache: Pathophysiology, Diagnosis, and Management. Sudbury, MA: Jones and Bartlett Publishers, 2008.

21- Furlan, A.D., Brosseau, L., Imamura, M. and Irvin, E.: Massage for low-back pain: a systematic review within the framework of the Cochrane Collaboration Back Review Group. Spine; 27: 1896-1910, 2002.

22- Gould, J.: Orthopedic and sports physical therapy. In .Malone (ED). ST Loui; CV, Mosely, 1997.

23- Hamilton, L. et al. (2007): The effects of high-velocity, low-amplitude manipulation and muscle energy technique on suboccipital tenderness International Journal of Osteopathic Medicine 10: 42e-49, 2007.

24- Hong, C.Z.: Pathophysiology of myofascial triggers point. Journal of Formosan Medical Association, 95(2): 93-104, 1999.

25- Jackson, C.T., Jung, H. and Matthew, N.: Practical manual of physical medicine and rehabilitation, 52-53, 2006.

26- Jisha, J.H.: On the distribution of pain arising from deep somatic structures with charts of segmental pain areas. Clin Sci.; 4: 35-46, 2007.

27- Kamani, H. and Walters, N.: Muscle energy technique. The effect on joint mobility and agonist/antagonist muscle activity. 2nd International Conference on Advances in Osteopathic Research (ICAOR). The Law Society, London. 25-26 November, 2000.

28- Lenehan, K.L., Fryer, G. and McLaughlin, P.: The effect of muscle energy technique on gross trunk range of motion. Osteopath Med.; 6: 13-18, 2003.

29- Lewit, K. (1999): Functional Soft Tissue Examination and Treatment by Manual. Methods. New Perspectives. 2nd ed. Soft tissue and relaxation techniques in myofascial pain. Maryland: Aspen Publishers, Inc., 479-532, 1999.

30- Lis, A., Black, K., Korn, H. and Nordin, M.: Association between sitting and occupational LBP, Eur Spine J, 16(2):283-298, 2006.

31- Manheim, Aral: The myofascial release 3rd Ed., Slack INC, 2001.

32- Marc, A.: Pain measurement, in P. Prithvi Ray: pain medicine a comprehensive review, mobsy, Los Angeles, California, USA, 36-37, 2001.

33- O'Leary, S., Falla, D., Hodges, P.W., Jull, G. and Vicebzino, B.: Specific therapeutic exercise of the neck induces immediate local hypoalgesia. Clinical J. Pain. 8: 832-839, 2007.
34- Pransky, G. and Cifuentes, M.: Point of view. Spine, 34(12): 1250, 2009.
35- Rajadurai, V.: The effect of Muscle Energy Technique on Temporomandibular Joint Dysfunction: Randomized Clinical trial. Asian Journal of Scientific Research 4(1): 71-77, 2011.
36- Schenk, R., MacDiarmid, A. and Rousselle, J.: The Effects of Muscle Energy technique on Lumbar Range of Motion. The Journal of Manual and Manip ulative Therapy; 5(4): 179-183, 1997.
37- Selkow, N., Grind staff, T., Cross, K., Pugh, K., Hertel, J. and Saliba, S.: Short-term effect of muscle energy technique on pain in individuals with. Non-specific lumbopelvic pain: A pilot study. Journal of Manual & Manipulative Therapy; 17(1): 14-18, 2009.
38- Shaclock, M.: Neural mobilization: A systematic review of randomized control trials with an analysis of therapeutic efficacy. J Man Manip Ther, 16(1): 23-24, 2008.
39- Shlenk, R., Adelman, K. and Rousselle, J.: The effects of muscle energy technique technique on cervical range of motion. Journal of Manual & Manipulative Therapy. 2(4): 149-155, 1994.
40- Stanborough, M.: Direct Myofascial Release, Victoria, Australia, 2004.
41- Sterling, M., Jull, J. and Wright, A.: Cervical mobilization concurrent effects on pain, sympathetic nervous system activity and motor activity. Man Ther 6: 72-81, 2001.
42- Strunk, R.G. and Hondras, M.A.: A feasibility study assessing manual therapies to different regions of the spine for patients with subacute or chronic neck pain. J Chiropr Med.; 7(1): 1-8, 2008.
43- Swinkels- Meewisse, I.E., Roelofs, J., Oostendorp, R.A., Verbeek, A.L. and Vlaeyen, J.W.: Acute low back pain: pain-related fear and pain catastrophizing influence physical performance and perceived disability Pain, 2005.
44- Van Tulder, M.W., Koes, B. and Malmivaara, A.: Outcome of non invasive treatment modalities on back pain: an evidence based review. Eur Spine J; 15(Suppl. 1): S64-81, 2006.
45- Wilson, E., Payton, O., Donegan-Shoaf, L. and Dec, K.: Muscle energy technique in patients with acute low back pain: A pilot clinical trial. J Orthop Sports Phys Ther ; 33: 502–512, 2003.
46- Woby, S.R., Watson, P.J., Roach, N.K. and Urmston, M.: Adjustment to chronic low back pain–the relative influence of fear avoidance beliefs, catastrophizing, and appraisals of control. Behav Res Ther, 42(7): 761-774, 2004.
47- Zusman, M.: Mechanism of musculoskeletal physical therapy. Phys Ther Rev 9: 39-49, 2004.

الملخص العربي

مقارنة الطاقة العضلية والانفراج العضلي الليفي على المخرجات الوظيفية لمرضى آلام أسفل الظهر المزمنة

مقدمة : يعرف ألم أسفل الظهر بأنه الأكثر كلفة من الناحية الاقتصادية على مستوى العالم . تتراوح نسبة الإصابة به بين ٥٠ % - ٨٠% بين البالغين . كما تبلغ نسبة عودة الألم بعد الشفاء منه ما بين ٥٠ % - ٨٨% . تتعدد وسائل العلاج الطبيعي المستخدمة في علاج ألم أسفل الظهر إلا أنه بدأ التركيز في الآونة الأخيرة على استخدام العلاج اليدوي في صورة كل من تقنية طاقة الانقباض العضلي (علاج يدوي إيجابي) وكذلك الانفراج العضلي الليفي (علاج يدوي سلبي) للتحكم والسيطرة على هذا النوع من الألم . **الهدف :** تهدف هذه الدراسة إلى تقييم فاعلية كل من طاقة الانقباض العضلي وكذلك ا لانفراج العضلي الليفي على المخرجات الوظيفية لمرضى آلام أسفل الظهر المزمن.
الطريقة : تم إجراء هذا البحث على 40 مريضا (رجال – نساء) تتراوح أعمارهم بين٣٠ – ٥٥ عام ويعانون من آلام أسفل الظهر لمدة تزيد عن ثلاثة أشهر . تم تقسيم المرضى عشو ائياً إلى مجموعتين متساويتين في العدد حيث تم علاج المجموعة الأولى بواسطة تقنية طاقة الانقباض العضلي والثانية بطريقة الانفراج العضلي الليفي وبرنامج علاج طبيعي يتكون من أشعة تحت الحمراء ، موجات فوق الصوتية ، ذبذبات كهربائية ، تمرينات علاجية لكلتا المجموعتين ٣ مرات لمدة ٤ أسابيع لمدة ١٢ جلسة . **النتائج :** أظهرت النتائج فروق ذات دلالة معنوية إحصائية في كلتا المجموعتين بين المتغيرات موضع الدراسة وهي شدة الألم ، المدى الحركي (الثني والفرد) للفقرات القطنية وكذلك مقياس أوسوستري للعجز الوظيفي قبل وبعد العلاج إلا أنها أوضحت أيضا أنه ليس هناك فروق ذات دلالة معنوية إحصائية بين كل من تقنية الطاقة العضلية والانفراج العضلي الليفي على هذه المتغيرات الثلاثة . **الخلاصة :** التقنيات العلاجية اليدوية لها تأثير في التحكم والسيطرة على آلام أسفل الظهر المزمن .
الكلمات الدالة : تقنية الطاقة العضلية – تقنية الانفراج العضلي الليفي – آلام أسفل الظهر المزمن .