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EFFECTIVENESS OF MET V/S MARHYTHE IN INDIVIDUALS WITH CHRONIC LATERAL EPICONDYLITIS: A RANDOMIZED CLINICAL TRIAL

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ABSTRACT

Background: Lateral Epicondylitis is the tendinosis of the extensor musculature of the forearm that has their common origin from the lateral epicondyle of the humerus due to angioblastic degeneration. The study aimed to determine and compare the effectiveness of MET and MaRhyThe in individuals with chronic lateral epicondylitis concerning pain, grip strength, and function.

Methods: The study was a randomized clinical trial with 30 subjects divided into two equal groups, with 15 subjects in each group. Group A received MET for seven sessions, and Group B received MaRhyThe for one session. Both the groups received hot moist pack and conventional exercises for seven sessions. Visual Analogue Scale (VAS), Patient Rated Tennis Elbow Evaluation (PRTEE) Questionnaire, and Pain-Free Grip Strength (PFGS) were taken as the outcome measures.

Results: Within-group paired sample t-test showed statistical significance in VAS at rest, VAS on activity, PRTEE, and PFGS with a p-value of 0.001 for all. However, between-group analysis using independent sample t-test showed statistical significance in VAS on activity and PRTEE with a p-value of 0.049 and 0.029, respectively, and clinical significance for VAS at rest and PFGS for Group B.

Conclusion: The study concludes that both MET and MaRhyThe are effective in treating chronic LE concerning pain, improving function, and strength. However, MaRhyThe is more effective in pain reduction and improving functional activities.

Keywords: MET, MaRhyThe, Lateral epicondylitis, Patient Rated Tennis Elbow Evaluation Questionnaire, Pain-Free Grip Strength.

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INTRODUCTION

Lateral Epicondylitis, commonly referred as tennis elbow is the tendinosis of the extensor muscles of the forearm that have their common origin at the lateral epicondyle of the humerus and is characterized by Angiofibroblastic degeneration, i.e., rupture of normal collagen fiber architecture with partial healing, growth of fibroblast, granulation tissue and decreased blood flow to the extensor musculature of the forearm [1]. It mostly affects the ECRB tendon and is characterized by pain at the lateral epicondyle that sometimes radiates into the forearm distally, weakness in wrist flexion and extension, and occurs in individuals who perform repetitive, resistance-based wrist movements especially in eccentric contraction and gripping activities [2]. LE has been classified into four stages by Narschl. In the first stage, the inflammatory process sets in response to microtrauma. It is a reversible process without pathological changes that take place in this stage. After that, pathological changes take place and are characterized by angiofibroblastic degeneration in the second stage, tendinosis associated with structural alterations (tendon tearing) in the third stage, and lastly, progressed to fibrosis and calcification in the fourth stage [3]. LE has an incidence of about 4-7% in the general population. The condition is commonly evident in individuals aged between 40-50 years, with both males and females equally affected [4]. Physiotherapy plays a vital role in multidisciplinary health care services that focus on improving function, improving quality of life, making the patient as independent as possible. MET is a form of osteopathic manipulation of soft tissue that involves specifically guided and regulated, patient-initiated isometric or/and isotonic contraction, usually against the therapist's controlled matching counterforce. Fred Mitchell Sr., an osteopathic physician, formulated this technique in the 1950s [5,6]. MET helps in pain reduction, lengthening of shortened muscles, increasing range of motion, improving circulation, strengthening weak muscles, and is an active muscle relaxation technique [4,7]. MET is based on two fundamental principles, post isometric relaxation, and reciprocal inhibition.

Dr. Med Ulrich Randoll developed ED matrix rhythm therapy at the University of Erlangen, Germany, in the 1990s. MaRhyThe is the application of combined mechanical and magnetic pulses with an electrically powered oscillator, providing dynamic frequency ranging between 8-12 Hz. MaRhyThe is an in-depth acting modality, causing rhythmic micro-extension of the tendons, targeted relaxation of muscles, an increase in peripheral circulation, decreasing pain, healing, and regeneration. According to MaRhyThe concept, human skeletal cell oscillating between ranges of 18-12 Hz is healthy. The oscillating cell within the extracellular matrix is necessary for proper tissue circulation, i.e., adequate blood and oxygen supply for ATP production and lymphatic and venous drainage to remove waste products referred to as "logistics." When tissue is unhealthy, the rhythms of oscillations of the cells are altered, hampering the tissue "logistics" [8]. MaRhyThe

works on the extracellular matrix to restore the disturbed rhythm at the cellular level. This is achieved by the supply of external vibrational energy matching the oscillating frequency of a natural healthy cell to actuate and re-establish the living environment within the cell that is healthy. Improved logistics after MaRhyThe helps to generate ATP and build up this standby potential energy by relaxing the tissue and facilitating the body's natural healing process [8]. The application of MaRhyThe is simple and without any complications. It reaches the deeper tissue layers in a mild, specific, guided pain-free way [9]. There are studies done by Dr. Roopa Desai et al. in 2019 [7], Rayees Unnisa et al. in 2019 [4], indicating the effectiveness of MET in lateral epicondylitis. In contrast, no study has been done to prove the effectiveness of MaRhyThe in LE. The objective of the study was to determine and compare the effectiveness of MET v/s MaRhyThe in subjects with Lateral epicondylitis in terms of pain, grip strength, and function.

METHODS

A total of 46 individuals were assessed, out of which 30 met the inclusion criteria. The study included 17 male and 13 female participants. The eligibility criteria were 1) Subjects with elbow pain over the lateral aspect that is provoked by at least 2 of 3 provocation tests (gripping, resisted extension of wrist or third finger, extensor forearm muscles stretching). 2) The age group of 18 to 65 years having pain for not less than three weeks. The exclusion criteria were 1) Subjects on steroids or any other medications for pain. 2) Any physical therapy treatment for elbow pain by a healthcare practitioner in the previous six months. 3) Previous elbow surgery. 4) History of dislocation or fracture of the elbow. 5) Subjects diagnosed with tendon ruptures. 6) Subjects diagnosed with cervical radiculopathy. 7) Any other elbow joint pathology such as metastasis or osteoporosis. 8) Subjects diagnosed with Peripheral nerve involvement [10]. The source of the population was tertiary care hospital, Belagavi.

The outcome measures were: 1) Visual analog scale (VAS). 2) Functional limitation was assessed using the Patient rated tennis elbow evaluation (PRTEE) questionnaire that measures forearm pain and disability in patients with LE through a designed 15 item questionnaire [6]. 3) Pain-free grip strength (PFGS) was determined using a handheld calibrated grip dynamometer. PFGS has been considered to be the most useful and sensitive tool in detecting the changes in LE by measuring physical impairment, and studies suggest that it should be considered in patients with LE as a prognostic indicator [11].

PROCEDURE

After obtaining the ethical clearance from the institutional ethical committee, the random allocation of the subjects into two equal groups of 15 each was done using the envelope method. A detailed explanation of the objective and procedure of the study was done and written informed consent was obtained from each subject.

Group A received seven sessions of MET for seven

consecutive days. With the subject in a comfortable sitting position and the affected forearm supported on the couch, one hand of the therapist stabilized the subject's distal arm taking the forearm of the subject into supination until discomfort or resistance was felt. The subject was instructed to pronate the forearm against the therapist's resistance (approximately 75% of the maximal isometric contraction) and hold it for 5 seconds, immediately followed by slightly increased supination until the resistance was met again. The procedure was repeated five times with a relaxation of 5 seconds between every contraction [10].

Group B received a single session of MaRhyThe for 60 minutes. With the subject seated on a chair/ supine on the couch and the affected forearm resting on the couch, the extensor compartment of the forearm was exposed, the powder was applied over the area to avoid friction, and longitudinal strokes were applied by pushing down the probe of the device.

Both the groups received conventional exercises for seven consecutive days which comprised of

- 1) With the patient seated/in supine lying, a hot moist pack wrapped with a towel was placed over the affected painful area for 15 minutes [12].
- 2) With the patient positioned in sitting, static stretching was performed three times before and after the eccentric strengthening exercises with a rest period of 30 seconds between each set. ECRB muscle was stretched in elbow extension, forearm pronation, wrist flexion with ulnar deviation position for 30 to 45 seconds depending on the patient's tolerance [13].
- 3) With the patient positioned in sitting, three sets of ten repetitions of eccentric strengthening exercises were performed with one minute rest period between them. With the starting position of the affected limb in elbow extension, forearm pronation, and maximum wrist extension, the patient was instructed to eccentrically contract the extensor muscles by slowly performing wrist flexion for a count of 30 and then return to starting position by using the contralateral hand. The subject was instructed to terminate the exercise if the pain became worse and disabling. Progression was given in the form of free weights to the subjects who could perform without discomfort [12]. The study was statistically analyzed using the software SPSS Version 23. The obtained data was inserted into an excel spreadsheet, tabulated, and subjected to statistical analysis. Statistical analysis of demographic data was done using mean, standard deviation, and paired t-test.

RESULTS

Statistical analysis of demographic data was done using mean, standard deviation, and test of significance, such as paired t-test where age and duration of symptoms were heterogeneous between both the groups. (Table 1)

Table 1: Demographic data of the subjects

Particular	Group A		Group B		p-value
	Mean	SD	Mean	SD	
Age	49.7333	8.81125	33.2000	10.97530	0.001*
Weight	61.0000	7.50238	62.8667	12.04080	0.615
Height	165.2000	7.26243	165.8667	8.23639	0.816
BMI	22.3800	2.60527	22.5733	3.09434	0.854
Duration of symptoms	4.3333	1.63299	15.5333	17.31996	0.019*

Table 2: Gender and side involvement distribution

Particular	Group A				Group B			
	Frequency		Percent		Frequency		Percent	
Gender	Male	Female	Male	Female	Male	Female	Male	Female
	9	6	60	40	8	7	53.3	46.7
Side	Right	Left	Right	Left	Right	Left	Right	Left
	9	6	60	40	8	7	53.3	46.7

Table 2 indicates a demographic distribution concerning gender and side involved, which showed 60% and 53.3% males in Group A and Group B respectively and 40% and 46.7% females in Group A and Group B, respectively.

Table 3: Comparison of group a and b concerning pre-test and post-test scores using paired sample t test [within group analysis – dependent test]

Variable	Group	Pre		Post		p-value
		Mean	SD	Mean	SD	
VAS AT REST	Group A	39.00	9.86	10.67	8.84	0.001*
	Group B	32.67	23.44	5.67	9.23	0.001*
VAS ON ACTIVITY	Group A	76.67	10.47	38.00	9.41	0.001*
	Group B	82.67	9.61	29.00	13.91	0.001*
PRTEE	Group A	50.80	7.30	23.37	6.65	0.001*
	Group B	47.47	14.00	16.07	10.20	0.001*
PDF	Group A	28.00	12.22	37.00	16.12	0.001*
	Group B	35.00	21.30	50.67	21.20	0.001*

*Significant at 5% level

Within-group analysis using paired sample t-test showed statistical significance for both the groups with a p-value of 0.001 for VAS at rest, VAS on activity, PRTEE, and PFGS. (Table 3)

Table 4: Comparison of group A and B concerning pre-test and post-test scores using independent samples t-test [between groups analysis – independent test]

Variable	Time frame	Group A		Group B		p-value
		Mean	SD	Mean	SD	
VAS AT REST	Pre-test	39.00	9.86	32.67	23.44	0.347
	Post-test	10.67	8.84	5.67	9.23	0.141
VAS ON ACTIVITY	Pre-test	76.67	10.47	82.67	9.61	0.113
	Post-test	38.00	9.41	29.00	13.91	0.049*
PRTEE	Pre-test	50.80	7.30	47.47	14.00	0.423
	Post-test	23.37	6.65	16.07	10.20	0.029*
PFGS	Pre-test	28.00	12.22	35.00	21.30	0.281
	Post-test	37.00	16.12	50.67	21.20	0.057

*Significant at 5% level

Between-group analysis using independent sample t-test showed statistical significance for VAS on activity and PRTEE with a p-value of 0.049 and 0.029, respectively. In contrast, group B showed clinical significance for VAS at rest and PFGS. (Table 4)

DISCUSSION

The current study determined and compared the effectiveness of MET and MaRhyThe in subjects with chronic lateral epicondylitis concerning pain, grip strength, and function.

According to Romeo et al., in 2010 [4], the incidence of LE is independent of gender. Similar results were obtained in our study with 60% and 53.3% males in Group A and Group B, respectively, and 40% and 46.7% females in Group A and Group B, respectively. A study done by Rayees Unnisa et al. compared MET with Oscillating Energy Therapy in chronic lateral epicondylitis. It showed significant improvements in pain, grip strength, and functional ability of the elbow joint, which agreed with the present study [4]. A comparative study of MET versus Cyriax technique in LE was done by Dr. Roopa Desai et al. (2019) [7], which concluded that MET was an effective treatment in reducing pain and improving functional disability and is a valid treatment protocol in the management of LE [7].

The positive results of the study may be due to the reflex muscle relaxation that occurs with inhibition of Golgi tendon reflex when a muscle is contracted isometrically [13]. Application of MET may even desensitize the peripheral nociceptors and reduce the proinflammatory cytokinins. Descending pain modulation could be the reason for pain reduction. Here, when the joint mechanoreceptors get activated, there is the excitation of somatic afferents leading to sympathoexcitation and localized activation of periaqueductal gray matter [14].

According to Chaitow (2006) [15], MET is an active isometric contraction method that relaxes the muscle, restores the normal blood and lymphatic circulation by altering the interstitial pressure and transcapillary blood flow that helps in washing out the nociceptive stimulants which relieve pain. MET increases muscle flexibility due to viscoelastic changes in the muscle. Stretching of the connective tissue components allows the muscle to contract effectively hence improves the strength.

Moreover, improvement in function was because of the decrease in pain and increase in strength, which allows the forearm musculature to stabilize the hand and wrist so that precision and prehension functions are achieved to optimal level [16].

A study was conducted to investigate the effectiveness of MaRhyThe in Frozen shoulder concerning pain and range of motion concluded that MaRhyThe showed more significant and faster results in gaining a range of motion and subsequently reducing pain in the frozen shoulder [9].

A study was done to ascertain the effects of MaRhyThe in plantar fasciitis concerning pain, skin temperature, and function concluded that a single session of MaRhyThe

treatment was to be effective in pain reduction, improved skin temperature, and improved functional activities in patients with plantar fasciitis [17].

The objective of the current study accepts the hypothesis in effectively treating chronic LE subjects. The hypothesis testing of MaRhyThe has shown positive effects in treating LE. However, MaRhyThe is a newer tool in the field of physical therapy, and limited research has been published.

LE has been effectively treated by using oscillating energy manual therapy concerning pain reduction improvement in grip strength and function. It is the release of electromagnetic signals ranging from 7-8Hz from the therapist's hand. These electromagnetic waves affect tissue healing, bone healing, synthesis of growth factor, and connective tissue growth and healing [4]. MaRhyThe work on a similar principle of providing external electromagnetic oscillations ranging between 8-12 Hz that would produce similar effects.

In the present study, the significant reduction in pain could be due to the restoration of altered cell logistics. MaRhyThe acts at a cellular level providing oscillations to the extracellular matrix ranging between the frequency of 8-12Hz, which increases oxygenated blood flow and promotes drainage of noxious substances. MaRhyThe also helps in tissue healing, thereby improving function [9].

A study was done to determine the effects of Myofascial Release Therapy and active stretching on pain and grip strength in LE and concluded that MFR with active stretching produces a significant improvement in pain reduction and increase in grip strength. According to the study, when the pin reduces the muscle tightness reduces, therefore relaxing the muscle. This relaxation helps in producing a good amount of contraction [18]. In the current study, the clinically significant increase in grip strength could be attributed to the study as mentioned above as MaRhyThe works at a cellular level causing micro extension and relaxation of the muscles, thus producing a good amount of contraction. Also, the increase in the grip strength may perhaps be because of the stand by potential energy gained by the muscle as it relaxes. This potential energy is necessary for the muscle to contract [8].

Improvement in the functional level could be attributed to pain reduction and increased strength allowing pain-free movement and optimal stabilization of the forearm musculature that was hampered because of muscle overuse and imbalance. The limitation of the study is that age distribution and duration of symptoms between groups were heterogeneous. The present study can be further taken into consideration as a randomized controlled trial or/and prospective studies.

CONCLUSION

The study concludes that both MET and MaRhyThe are effective in treating chronic lateral epicondylitis concerning the reduction in pain, improving strength, and improving functional activities; however, MaRhyThe is more effective in pain reduction and improving functional activities.

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