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EFFECTIVENESS OF MOTOR CONTROL EXERCISES WITH INTERFERENTIAL THERAPY ON PAIN AND FUNCTIONAL ACTIVITIES AMONG THE SUBJECTS WITH NON SPECIFIC LOW BACK PAIN.

Physiotherapy

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ABSTRACT

Background And Purpose: Non-specific Low back pain (NS LBP) is a common symptom that can occur in all ages. Studies of individuals with NS LBP have identified impairments in the control of the deep trunk muscles (e.g. transversus abdomens and multifidus) Responsible for maintaining the stability of the spine, which causes the decrease the Lumbar ROM, functional activity and quality of life. MCE has obtained increasing attention in treating NSLBP. **Objectives:** The study is to find out the effectiveness of Motor control exercises with interferential therapy on pain and functional activities in subjects with nonspecific low back pain. **Methodology:** The study design is an experimental study which consists of 30 subjects, were screened on basis of inclusion and exclusion criteria and randomised into single group. All the subjects were treated with Motor Control Exercises and Interferential therapy for 4 weeks. Pre and post values are taken before and after the treatment. **Outcome Measures:** Pain was measured by numerical pain rating scale, and functional activities by revised oswestry low back pain disability questionnaire. **Results:** After the data analysis, the results revealed significant improvement {$p < 0.05$} in pain and functional activities. **Conclusion:** Motor Control Exercises and Interferential therapy are more effective in reducing pain and functional activities in subjects with nonspecific low back pain.

KEYWORDS

Nonspecific, Low back pain, Motor control exercises, Interferential therapy.

INTRODUCTION

Low back pain is a common, highly prevalent, disabling often chronic and costly musculoskeletal complaint [1] .Law back pain is defined as pain and discomfort localized from the 12th costal margin to inferior gluteal folds with or without leg pain [2]

Nonspecific low back pain is defined as pain over the lower back not usually associated with any specific pathological structural changes [3]. Chronic non-specific Low back pain of activity limitation, absenteeism, and high health care expenses.

People who report low back pain often have reduced spinal motion when motion is limited, spinal extension is frequently more restricted than flexion[5]

Low back pain affects men and women equally, with onset most often between the ages 30 to 50 years [12]

In India 48.32% males and 53.64% females are severely disabled due to low back pain, 45.63% males and 33.77% females are moderately disabled and 3.35% males and 8.68% females are crippled because of low back pain.[6]

LBP is common well documented and most prevalent a mild musculoskeletal conditions. The global burden is disease study 2020 reported LBP in the top of years lived with disability contributing 57.6 million of total lived with disability , largely because of aging and increasing world population .In low and middle-income nations LBP has rise by more than 50% since 2016 .

Acute low back pain describes episodes lasting less than six weeks , and sub acute LBP refers to episodes between six and 12 weeks in duration.

LBP generally from impaired physical and mental function , quality of life and working capacity .Physical therapies are recommended for patients with LBP is hot pack therapies , short wave diathermy, cryotherapy ,manipulations, meckenzie exercises.

According to several guidelines motor control exercises have been obtaining increasing attention in recent years. The biological rationale for motor control exercise is fundamentally based on the idea that the stability and control of the spine are altered in people with low back pain .May exhibit a delayed onset of activity of the deep trunk muscles (eg , transverses abdomens , multifidus) when the stability of the Spine is challenged in dynamic tasks.

NEED OF THE STUDY:

There are various studies done on systematic reviews and meta analysis have explored the positive effects of MCE on LBP subjects but with combination of IFT have few studies. this study focus to see the effectiveness of MCE with IFT in subjects with nonspecific low back pain.

Aim Of The Study:

To evaluate the effectiveness of motor control exercises with interferential therapy on pain and functional activities among the subjects with non-specific low back pain

OBJECTIVE OF THE STUDY:

1. To evaluate the pre and post values of pain after motor control exercises with IFT on nonspecific low back pain subjects by NPRS (Numerical pain rating scale).
2. To evaluate the pre and post values of functional activities after motor control exercises with IFT on nonspecific low back pain , functional disability by Revised oswestry disability index (RODI).

MATERIALS AND METHODOLOGY :

Study Design :

one group pre- test post -test design

Study Duration :

- 4 weeks .
- 3 non consecutive sessions per week.
- 1 hour per session.

Study Setup :

- College of physiotherapy, SVIMS, Tirupati.
- BIRRD hospital, Tirupati.

Sample Collection :

- College of physiotherapy, SVIMS, TIRUPATI.

- BIRRD hospital , tirupati.

Sample Method :
- simple random sampling

Sample Size : 30

Inclusion Criteria :
- Age of the subject : 25 to 40 yrs.
- Gender : Both male and female.
- Participants had to have nonspecific low back pain. With or withought referred pain.

Exclusion Criteria :
- Pain due to associated with pregnancy.
- Infection
- Tumor
- Osteoporosis
- Fracture
- Structural deformity
- inflammatory disorder.
- Subjects who are not willing to participate
- Patient with pre surgery and post surgery also excluded.
- Under gone any back surgeries.

Outcome Measures :
- Pain is measured by NPRS (Numerical Pain Rating Scale.
- Functional activities measured by revised oswestry desability index (RODI)

METHODOLOGY

Motor Control Exercise Protocol:

The low back pain subjects meeting the inclusive criteria will be recruited for study. A 20 minutes training session provided on the first day. This includes three training activities aimed at increasing abdominal muscle awareness. Abdominal breathing in a supine position is used to provide an increased general awareness of the abdominal muscles and breath control .Quadruped abdominal hollowing, where gravity will be presumed to provide resistance to the contraction of the transverse abdomen while the subjects attempt to hollow the abdomen. The third activity is abdominal hollowing in a hook-lying position. This will be done using a stabilizer biofeedback unit.

The three chamber pressure cell of the stabilizer is placed beneath the back at the level of the umbilicus. The cuff will be inflated up to 40 mm Hg, and the aneroid meter is handed to the subject so that it is visible. the subject will be instructed to hollow the abdomen and increase or maintain the pressure at 40 mm Hg (±10 mm Hg) for 10 seconds.

Then The Exercises Follow The Sequence:

Breathing exercises in hook lying position: 10 repetitions 10 sec hold.

Abdominal draw in with pressure biofeedback: 10 repetition 10 sec hold.

Quadruped position and abdominal draw in: 10 repetition 10 sec hold.

Abdominal draw in with heel slide: 10 repetition 10 sec hold.

Abdominal draw in with hip abduction: 10 repetition 10 sec rest.

Quadruped alternate arm and leg lift with abdominal draw in: 10 repetition 10 sec rest.

2 minutes of rest given after every exercise

IFT PROTOCOL :

The patient will be positioned comfortably and skin is prepared , it is washed and skin insulated with petroleum jelly.

The site of treatment is accurately located and the two pairs of electrodes positioned so that crossing point of two currents is over or within the lesion.

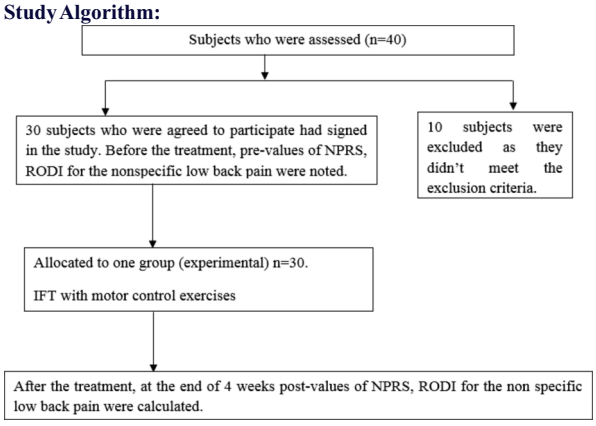
The patient warned that he will feel the tingling sensation which should not be too uncomfortable or burning.

Appropriate treatment frequency is selected 80-100 Hz

Short duration pulses at a frequency of 100 Hz may stimulate large diameter nerve fibers which will have an effect on the pain gait in the posterior horn, and inhibit transmission of small diameter nociceptive traffic.

Amplitude modulated frequency: 80to100Hz
Frequency sweep : 50 Hz
Poles of IFT : 4 poles.
Mode : vector mode.
Electrode : flat carbon rubber electrode.
Current intensity : bearable.
Treatment duration : 15 to 20 minutes.

Study Algorithm:

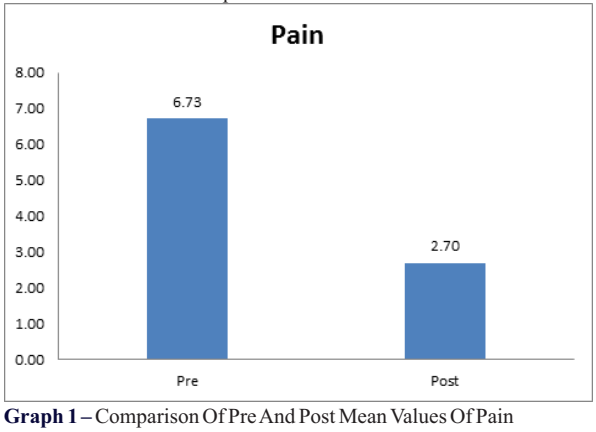


Data Analysis
- The statistical analysis was done by using the software SPSS statistics 25.0 version, the analysis was conducted to meet the objectives framed under the study.
- Microsoft excel was used to generate graphs and tables.
- Descriptive statistics was performed to find out the mean, standard deviation for demographic variables and outcome variables.
- The variables considered under the study low back pain and functional activities. These two variables are measured pre and post treatment after 4 weeks respectively.
- Data analysis was done and computed by using Z-test. Before and after intervention within the group were analysed by wilcoxon signed-ranks test .
- P value of < 0.05 is considered to be a statistical significance.

Table 1 : Comparison Of Pain Within Pre And Post Mean Values.

Parameter		N	Mean	SD	Z-test	p- value
Pain	Pre	30	7.57	1.716	-4.883	0.000
	Post	30	1.60	1.163		

As P < 0.05, there is a significant difference within the pre and post treatment interventions of pain.



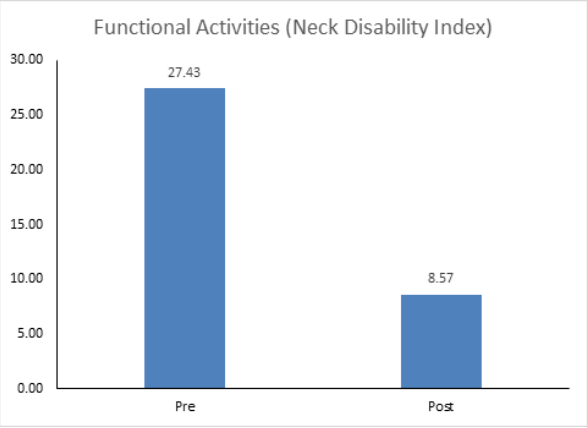
Graph 1 – Comparison Of Pre And Post Mean Values Of Pain

Table 2: Comparison Of Functional Activities Within Pre And Post Mean Values.

Parameter		N	Mean	SD	Z-test	p- value
Functional Activities (RODI)	Pre	30	46.60	11.119	-4.784	0.000
	Post	30	15.93	6.762		

As P < 0.05, there is a significant difference between the pre and post

treatment interventions of Functional activities.



Graph 2 – Comparison Of Pre And Post Mean Values Of Functional Activities.

DISCUSSION

The aim of the present study is to know the effectiveness of Motor control exercises with interferential therapy on pain, functional activities in subjects with nonspecific low back pain.

All the 30 subjects are screened on basis of inclusion and exclusion criteria and were randomised by simple random sampling method into single experimental group. Subjects were treated with Motor control exercises with interferential therapy for 4 weeks. Pre and post values are taken before and after the treatment.

The results of the current study shows that, there is a significant improvement in pain NPRS ($p = 0.05$) and functional activity RODI ($p=0.05$) with the pre and post treatment.

In Previous conducted studies, the reported reasons to decrease pain and functional activity by Motor control exercise and IFT therapies as by following mechanism,

Mechanisms

According to Hao-RanXu , yong –Hui Zhang The underlying improvement mechanisms of MCE on NSLBP from brain, biochemistry, inflammatory, and neuromuscular aspects.

Brain

MCE is proposed to reactivate deep trunk muscles , enhances lumbar spine proprioception, and increase sensory input, there by maintaining normal representation in corresponding brain regions.

Similarities with resistance training suggest that MCE may alleviate white matter atrophy during age related degeneration.

Exercise induced alterations in brain activity , such as decreased functional connectivity in the anterior cingulate cortex, contribute the positive effects of MCE.

Biochemistry

Motor control exercise can increase the release endorphins , which bind to opiate receptors in peripheral and central regions , resulting in analgestic effects.Elevated endorphin level after MCE indicate the involvement of the endogenous opiod system in mediating pain relief.MCEs impact on the endocanabinoid system , particularly CB receptors further contributes to its analgesic effectiveness.

Inflammatory

The limited studies have explored the anti inflammatory effects of MCE , but research suggest that it may prevent the generation of inflammatory factors , inhibiting the inflammatory process . further investiations is needed to fully understand the anti inflammatory mechanism of MCE.

Neuromuscular

By Targetting deep trunk muscles in MCE helps correct improper activation of patterns by strengthening weak core muscles , providing stability , and signalling optimal activation patterns to the brain.Improved proprioception, decreases motion errors and enhanced sensorimotor integration are achieved through repeted MCE training.

MCE programes contribute to lower intramuscular adipose tissue , hypertrophy in low back muscles , and overall neuromuscular improvements , preventing abnormal componsesation and promoting proper body postures.In summary the combination of motor control exercises with interferential therapy demonstrates significant improvements in pain and functional activities in individuals with nonspecific lowback pain .

CONCLUSION

This study states that in nonspecific low back pain is due to stress and strain on low back which causes pain and functional activities. The results shows that, there is a statistical significance in pre and post treatment with p-value < 0.005. so the alternate hypothesis is accepted and null hypothesis is rejected. According to the present results, the study concluded that the IFT along with motor control exercises are effective in reducing pain and increasing functional activities in nonspecific low back pain subjects.

Limitations

- Sample size is very small.
- Short duration study.
- There was no long term follow-up.
- There is a lack of control group.

Recommendations

- Study can be done with large sample size.
- The future research can also be carried out with increased duration of treatment protocol.
- Further study can be done with different protocol comparison.

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