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Research Paper

Effectiveness of Positional Release Technique Along With Exercises Versus Motor Control Exercises Using Swiss Ball On Pain, Range Of Motion, And Functional Disability In Subjects With Chronic Mechanical Low BackPain

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ABSTRACT
Background and objectives: *Chronic mechanical low back pain is defined as the musculoskeletal condition that is not attributable to recognizable or a known specific pathology often resulting in physical inactivity and disability that mainly occurs in women all over the world as they are more prone to repeated activities, movements and overtime workload. Some evidence based studies proved that positional release technique along with exercises and motor control exercises using swiss ball are effective in treating pain, ROM, functional disability in patients with CMLBP. But there is no comparative study of these two protocols. As this chronic mechanical low back pain is more prevalent in women due to their repeated activities and heavy workloads, the aim of this study is to compare the effectiveness of Positional release technique along with exercises versus motor control exercises using swiss ball on pain, ROM and functionaldisability in subjects with CMLBP .*
Methods*: Randomized controlled study design.A total of 60 subjects who met selection criteria were taken for the study and were divided through convenient sampling into 2 groups, 30 members in group A were treated with PRT along with exercises, 30 members in group B were treated with MCE using swiss ball . Both groups performed intervention as 3 days per week, 2 sessions per day up to 4 weeks. The outcomes of pain, ROM, functional disability were measured using VAS, MMST, MODI.*
Results*: Paired T test was used to access the statistical significance between pre and post test scores. Statistical analysis of the data revealed that when compared between pre and post test values of both groups, both PRT along with exercises and MCE using swiss ball were shown significant changes in treating chronic mechanical low back pain whereas when compared post test values between group A and B, PRT along with exercises group has shown more difference when compared to MCE using swiss ball group.*
Conclusion*: In this study, 4 weeks of PRT along with exercises and MCE using swiss ball showed significant changes in pain, ROM and functional disability. However, PRT along with exercises has shown more effective when compared to MCE using swiss ball in treating in subjects with chronic mechanical low back pain. Key words: Chronic mechanical low back pain, positional release technique along with exercises, motor control exercises using swiss ball, Visual Analogue Scale, Modified Modified Schober's test, Modified Oswetry Disability Index.*

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I. INTRODUCTION

Chronic mechanical low back pain is muscle tension or stiffness in low back that is below the coastal margin and above the inferior gluteal folds without leg pain. Chronic back pain is a pain that lasting for 12 weeks or longer even after intial injury or underlined cause The main mechanical causes are either injury to lumbo sacral muscles and ligaments or discogenic disorders related to trauma, or degenerative disc disease.
It affects up to 90% of world's population .In India approximately 35% people suffer from low back pain some research studies have shown that 70 to 80% of every person has had episodes of low back pain at least once in their life time.
The prevalence of back pain was, respectively 19.8%, in India Globally, lower back pain affects more than 540

million people and the condition has doubled in the last 25 years to 2016 .The prevalence of chronic mechanical low back pain is higher all over the world among females and expresses negative influence on health.
A biopsychosocial model of chronic pain attributes sex differences in pain to interactions between biological, psychological, and sociocultural factors The heightened pain sensitivity among women can also partially explain greater reports of pain by women compared to men .
Low back pain is classified as 3 types mechanical, non –mechanical, psychogenic.
Specific low back pain: A specific LBP diagnosis is attributed to LBP, referring to any diagnosis from a systemic disease, infection, injury trauma, cauda equine or structural deformity.
Non-specific low back pain: Non –specific low back pain is soreness or stiffness in the lower back region for which it is not possible to identify a specific cause of the pain. Low back pain episodes less than 6 weeks is termed acute, episodes lasting from 6 weeks to 12 weeks is termed as subacute, episodes lasting for more than 12 weeks is chronic.

Mechanical stress in the lower back can lead to mild pain or severe pain ,and the pain may occur suddenly or slowly .Most commonly ,lifting heavy objects can compress soft tissue around the lower back ,leading to strain mechanical low back pain .Repeated intense muscle work and longtime movements of lower limbs in the same direction may induce soft tissue injury result inlow back pain.

The treatment guidelines of chronic mechanical low back pain promote avoidance of bed rest and continuation with activities as usual, preventing pain from getting worse. Exercise therapy is the first line of treatment that prefer in low back pain. Graded activity exercises, motor control exercises, yoga, taichi, biofeedback, manualtherapy, interdisciplinary rehabilitation, massage, spinal manipulation, acupuncture, walking, back schools, Pilates (controlled movement ,breathing and stretching), EMG biofeedback, technology support exercise therapy and electrotherapy like short wave diathermy, ultrasound, transcutaneous electrical nerve stimulation, back supports, traction, interferential therapy and core stability exercises.

Position release technique is an osteopathic treatment technique first developed by Jones 1981, positional release also known as strain counter- strain is an indirect osteopathic technique.PRT is a technique that involves passive body positioning ,which is clamied to elicit immediate and prolonged reductions in tenderness at trigger points and to reduce pain with musculoskeletal conditions.

positional release technique play a role in dysfunctional joints and their muscle are moved away from their restrictive barrier into position of ease in the treatment of both musculoskeletal . LBP exercises with PRT have higher effect PRT with exercise increases the abdominal strength and endurance more efficiently than the PRT without exercises.

PRT is a passive and indirect therapy for tissue resistance using the positioning of the body and sensitivity to identify and monitor the injury PRT acts on the muscle spindle mechanism and its associated reflex mechanism to promote a more normal firing of the spindle and a more normal level of tension in the muscle, which results in a more normal relationship within the various soft tissues surrounding the area.

These techniques work to reduce the overwhelming afferent nerve impulses within the arc that may lead to an overflow of neurotransmitters into the associated dermatome, resulting in referred pain.This phenomenon is known as a facilitated segment, PRT sets the stage for normal processes to occur more efficiently.

There is an evidence in the literature that motor control training using Swiss ball can change trunk muscle and spinal mobility during functional tasks. A range of mechanisms have been proposed to explain the effect of motor control on pain and improved quality of movement and proprioception as a result of improving coordination of trunk muscles .These changes in control may mediated by changes in motor cortex in the motor system.

Motor control exercises also known as specific stabilization exercise, motor training induces experience specific patterns of plasticity across the motor cortex and spinal cord.

However, no recent clinical controls exist to comparing positional release technique along with exercises and motor control exercises using swiss ball along with conventional physiotherapy. Therefore this study was designed to compare the effectiveness of positional release technique along with exercises versus motor control exercises using Swiss ball on pain, rangeof motion and functional disability in subjects with chronic mechanical low back pain.

AIM OF THE STUDY

Aim of the study is to compare the effectiveness of positional release technique along with exercises versus motor control exercises using Swiss ball on pain, range of motion and functional disability in subjects with chronic mechanical low back pain.

HYPOTHESIS:

Null hypothesis: There is no significant difference between positional release technique along with exercises versus motor control exercises using Swiss ball on pain ,range of motion ,functional disability in subjects with chronic mechanical low back pain .

Alternative hypothesis: There is a significant difference between positional release techniques along with exercises versus motor control exercises using Swiss ball on pain, range of motion, and functional disability in subjects with chronic mechanical low back pain

II. METHODOLOGY

Study design: pre test post test experimental design.
Study setting: Department of Physiotherapy, KIMS General Hospital.
Study duration: 4 weeks
Study period: The study was conducted during the period of December 2021 to December 2022(1 year).
Sample size : 60 subjects were included and they were divided into two groups. Each group contains 30 subjects based on selection criteria .
Informed consent was taken from all the subjects.GroupA PRT along with exercises
Group B MCE using swiss ball

INCLUSION CRITERIA
Age between 35 to 65 years old
Subjects suffering from chronic mechanical low back pain diagnosed andreferred by Orthopaedician.
Only Female subjects are taken Subjects who are willing to participate

EXCLUSION CRITERIA
Discitis
Spinal stenosis Spinal pathologies Vertebralfractures Tumour osteoporosis Structural deformity
NerverootcompressionSpinal osteophytesg
Patients with any previous spinal surgeryNeurological deficit
Patients with congenital musculo - skeletal deformity Cardio pulmonary disease with decreased activity tolerancePregnant
Unable to perform faber testObese
Open Wounds Sutures Hematoma Healing fractures
Hypersensitive skin Systemic or localized infection

OUTCOME MEASURES

PRIMARY OUTCOME MEASURES
Visual analogue scale for measuring pain
Modified modified schober's test for measuring range of motion
SECONDARY OUTCOME MEASURES
Modified oswestry disability index for functional disability

PROCEDURE:
A total of 60 subjects were included for this study on basis of inclusion and exclusion criteria. All the patients were recruited from KIMS general hospital, Amalapuram. These subjects are advised with back care education with following.
Correct postural habits while sitting, standing, walking and sleeping Back ergonomics and modifications in activities of daily living Correct way of turning, lifting, etc
Correct selection of bed, foot wear, chair etc
Subjects in group A were given Positional release technique (PRT) is an osteopathic technique, where by dysfunctional joints and their muscle are moved away from their restrictive barrier into position of ease in the treatment of both musculoskeletal
It is a therapeutic method that utilizes tender point and a position of comfort in order to resolve the associated dysfunction
In PRT the patient is prone the therapist stands on the side opposite the strain ,grasping the leg on the side of the dysfunction tender point ,just above the knee ,bringing it into extension and adducting it towards the practitioner with pressure on the tender point .
The patient is side- lying the therapist stands in the side of strain, hip can be flexed abduction and knee flexed 90 degrees, while the fine tuning is accomplished by slightly flexion of the leg with pressure on the tender point in the latero posterior muscles of the back .PRT for seven minutes per session.
PRT along with back pain exercises for low back pain are also included.Exercises for low back pain
Supine bridging on physio ball: Lie facing upward on floor with knees
straight, feet resting on physio ball, arms at sides; draw in abdominal muscles and maintain throughout exercise;

slowly lift your butt off floor until trunk is parallel to thighs; hold for 3 - 5 seconds; slowly return to starting position. Repeat 10 - 20 time for 3 minutes
Prone Cobra's: Lie on your stomach on a table or mat with your arms at your side; lift your head and chest off the table/mat; hold your gluteus (buttock muscles) tight and squeeze your shoulder blades together; hold briefly and return to starting position. Repeat 10 - 20 times for 3 minutes Supine butt lift with arms across chest: Lie on your back on table or mat with hips and knees bent to 90 degrees with feet flat on floor and arms across chest; draw in abdominal muscles and maintain throughout exercise; slowly raise your butt off the table/mat by using your gluteus and hamstrings until your torso is in line with thighs; hold for 3 - 5 seconds. Repeat 10 - 20 time for 3 minutes
Conventional physiotherapy: cryotherapy given for 20min twice a day for 4 weeks DOSAGE : It was applied for 90 seconds hold time with 2 repetitions with 7 min per session, 3 visits per week for 4 weeks
Low back exercises are included for15 min, for every exercise and 2 positional release technique were applied for 15mins the sessions duration was last for 30mins

MOTOR CONTROL EXERCISES USING SWISSBALL
Motor control can be increased by coordination exercise program, which has been proved and reported in many studies.
Coordination exercise for the spinal muscles can produce effective motor control on trunk muscles to reduce low back pain
Lumbar spinal stability and mobility are important factors related to low back pain, strong muscular control around the lumbar spine is necessary to maintain stability and function of the lower back, dynamic stability and balance are required to prevent soft tissue damage around the lumbar spine
Swiss ball coordination exercise can improve motor control, increasing dynamic balance and flexibility in the lumbar spine
Coordination exercise using swiss ball can also improve muscle strength and endurance, which better functional mobility in the lower back spine, this exercise program thereby can reduce low back pain.

Motor control exercises using Swiss ballPROCEDURE
BRIDGING SUPERMAN POSITION
BILATERAL HIP EXTENSION
Conventional physiotherapy: cryotherapy given for 20min twice a day for 4 weeks DOSAGE: It was applied for 4 weeks, 3 sessions per week, total 12 sessions of treatment The program consisted of training 3 days per week, with each session lasting 30mins During the first week, all subjects performed 3 sets of 15 repetitions of each exercises **STATISTICAL ANALYSIS**
T paired test Statistical analysis was performed by using SPSS software version 21.0 and Microsoft Excel-2007. Descriptive Statistical data were presented in the form of mean +/- Standard deviation and mean difference percentages were calculated and presented.
Between the Groups: Independent student "t" test was performed to assess the Statistical significant difference in mean value between the groups PRT and MCE using swiss ball.
Within the Groups: Paired Student "t" test was performed to assess the Statistical difference with in the groups for PRT along with exercises and MCE using swiss ball.

III. DISCUSSION

This study was done to compare the effectiveness of Positional release technique along with exercises versus Motor control exercises using swiss ball on pain, range of motion and functional disability in subjects with chronic mechanical low back pain. It was proposed to see whether the effects of PRT along with exercises benefits addition to those of MCE using swiss ball in chronic mechanical low back pain. The outcomes used in this study to measure pain, ROM, functional disability are VAS, MMST, MODI.

In present study, VAS score is used to measure intensity of pain, MMST is used to measure range of motion of lumbar spine, MODI is used to measure functional ability of the lower back. As the validity and reliability of these outcome measures were established, significant difference has shown in VAS, MMST and MODI in all subjects after 4 weeks of treatment with PRT along with exercises and MCE using swiss ball. However, when compared between groups, it was noted that VAS, MMST and MODI was reduced in the subjects PRT along with exercises showed significant improvement when compare to MCE using swiss ball group.

The prevalence on chronic mechanical low back pain is higher all over the world because of dimension work organization, excessive work rate and repetitive tasks are physiological and psychic workloads which can cause tiredness and fatigue, feelings of boredom, anger, those enhances by pressure for productivity and time to

perform activities. There are many protocols available for treating chronic mechanical low back pain. MCE can improve motor control exercises trunk coordination by improving trunk muscles that support spine stability and mobility. Among them, I found PRT along with exercises and MCE using swiss ball as more effective and want to compare between these two protocols.

Hence the subjects in this study were divided into two groups and are given PRT along with exercises and MCE using swiss ball with conventional therapy that is cryotherapy added for both groups A and B Positional release is a type of manual therapy that may be used effectively in treating chronic and sub-acute muscle spasm and the pain and disability that is often associated with it and In present study individuals who received PRT along with exercises showed better improvement in pain, ROM and functional disability with core and abdominal muscle strength and endurance , There is an improvement in VAS, PRT along with exercises .

The goal of PRT acts on the muscle spindle mechanism and it's associated reflex mechanism (which controls spasm) to promote a more normal firing of the spindle and a more normal level of tension in the muscle, which results in a more normal relationship within the various soft tissues surrounding the area.

There is some evidence that PRT technique work to reduce the hyperactivity of the myotatic reflex arc and to reduce the overwhelming afferent nerve impulses within the arc that may lead to an overflow of neurotransmitters into the associated dermatome, resulting in referred Pain.

This phenomenon is known as a "facilitated segment". This includes restoring the normal mechanics ,improves muscular function, mobility and flexibility.

PRT 'sets the stage' for normal processes to occur more efficiently. Reduction in localized spasm increases range of motion, decreases pain, allows more normal

circulation and improves lymph drainage and increases the potential for more normal biomechanics. PRT strongly complements traditional therapy regimens by allowing them to be more effective. PRT is a technique that involves passive body positioning, which is claimed to elicit immediate and prolonged reductions in tenderness at trigger points and to reduce pain with musculoskeletal condition

However, this study showed a statistically significant difference in pre and post treatment of chronic mechanical low back pain in subjects and in terms of pain, ROM, functional disability with both PRT along with exercises and MCE using swiss ball . This study favors a conclusion that subjects trained with PRT along with exercises were showed better results when compared to subjects trained with MCE using swiss ball.

IV. RESULTS

The aim of the study was to compare the effectiveness of positional release technique along with exercises versus motor control exercises using swiss ball on pain, range of motion and functional disability in subjects with chronic mechanical low back pain.

The consort flow chart of the study showed the study organization in terms of subjects screening, convenient allocation and, analysis following the intervention.

A total of 60 subjects were screened for eligibility who met selection criteria have undergone baseline assessment and included subjects were divided into two equal groups consisting of 30 subjects in GROUP-A and 30 subjects in GROUP-B.

In this study, 30 participants completed training in GROUP-A and 30 subjects completed training in GROUP-B. Results showed that statistical analysis when compared between pre and post test values within Group A and Group B, both groups showed significant improvement. Whereas, when compared the post test values between the two groups, Group A have shown better improvement than Group B in pain, ROM, functional disability in subjects with chronic mechanical low back pain .

V. CONCLUSION

In this research, we determined the effects of four weeks of PRT along with exercises versus MCE using swiss ball on pain, range of motion, and functional disability in subjects with chronic mechanical low back pain by analyzing the variables related to research and comparing them with existing research.

The changes in the VAS scale before and after the four week intervention showed statistical significance of the inter group differences are significant. But group A have shown better improvement than group B.

The statistical difference of changes in range of flexion and extension before and after the four week intervention of both groups are significant. Group A have shown better improvement when the post test values are compared between two groups.

Also, the changes in MODI before and after the four week intervention showed significant difference in both group A and group B. Group A have shown better improvement when post test values are compared between both groups A and B.

Our results showed that, although both mechanisms of the exercises vary, data suggests that both protocols are effective in reducing pain, range of motion and functional disability. However, PRT along with exercises were

shown greater effective than MCE using swiss ball on pain, range of motion ,and functional disability in subjects with chronic mechanical low back pain.

LIMITATIONS

Small study sample
Less Treatment Duration
Lack Of Follow Up After 4 Weeks

REFERENCES

[1]. Rutuja surve, Dr sayli paldhikar, Dr.snehal ghodey To study the added effect of sensor motor retraining in the management of chronic mechanical low back- A pilot study of 5 participants. IOSR Journal of Nursing and Health science Volume 7, (May – June 2018).

[2]. Peterronai et.al Chronic non specific low back pain and exercises: strength and conditioning journal, volume 35, number 1, Feb 2013.

[3]. B w koes, m w van tulder, s Thomasdiagnosis and treatment of low back pain Netherlands b w koes professor of general practice s Thomas professor of general practice emgo institute, vu university medical centre, vander boechorststraat 7, 1081 bt Amsterdam, Netherlands m w van tulderprofessor of health technology assessmentbmj2006;332:1430–4.

[4]. Jayanta chakraborty, Pravin Kumar, Bibhuti sarkar. Comparative study of motor control exercises and global core stabilization exercises on pain, ROM and function in subject with chronic nonspecific low back pain – A randomized clinical trail VOL.9; Issue: 8, 2019.

[5]. M.J Thirunavukkarasu, Bikash kumar das, H.N. Vrushabhendra The prevalence of mechanical low back pain among proprioceptive neuro muscular fascilitation and core muscle stabilization vol4 ;issue 6 ,2017.

[6]. Sathya et al. comparative effect of motor control exercise using swiss ball over stretching exercise on mechanical low back pain Int J physiother 2021 ; 8(1)

[7]. Effect of motor control exercise on Swiss ball and PNF technique on non- specific low back pain. International journal of medical research and health sciences.2018.

[8]. Azzam Alarab, et al. Effect of positional release technique with /out exercise in treatment of chronic low back pain patients''.Acta scientific orthopaedics 3.6 (2020):18- 27 .

[9]. Zakari Usman ,et al.''Comparison of the effects of positional release therapy and lumbar stabilization exercises in the management of chronic mechanical low back pain; randomized controlled of trail'.'Critical reviews in physical and rehabilitation medicine (2020)

[10]. Mohamed MN and EL Shiwi AMF. ''Effect of therapeutic exercises with or without positional release technique in treatment of chronic mechanical low back pain patients; A Randomized controlled trail.'' Egyptian journal of occupational medicine.38.2 (2014): 125-139.

[11]. Eldin Emad,et al.''Conventional therapy versus positional release technique in the treatment of chronic low back

[12]. Dysfunction.'' International journal of physiotherapy and research.5.5 (2017):2325-2331.

[13]. Soumik basu jharna mantri et al.Effect of positional release technique versus deep transverse friction massage on gluteus medius trigger point in mechanical low back pain GJRA volume 6 issue 5 may 2017

[14]. El Mohamed, et al." Positional release versus myofascial release technique in chronic low back dysfunction "International journal of Chem. Tech Research10.2 (2017):496-522.

[15]. Richard N. Pierce, ATC, LAT Positional release techniques by Dr.LawerenceH.jones in 1964 ISBN 0-8151-0096-5.