EFFECTIVENESS OF LUMBAR STABILIZATION EXERCISE AND TENS ON PAIN AND DISABILITY FORPATIENT WITH MECHANICAL LOW BACK PAIN

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Abstract-
BACKGROUND: Low back pain is very common and can result from strain (injury) to muscles and tendons in the back. The purpose of this study is to evaluate theeffectiveness of lumbar stabilization exercises. and TENS on pain and disability forpatients with mechanical low back pain.
OBJECTIVE: This study is aimed to find out the effectiveness of lumbar stabilization exerciseand TENS on pain and disability for patients with mechanical Low Back Pain"
METHODS: 10 Subjects were chosen randomly between the age of 30 – 60 years, who had Low Back Pain for this study in the experimental group for all the subjects lumbar stabilization exercisesand TENS were given for 6 weeks. The outcome was measured by using Numerical Pain Rating Scaleand Modified Oswestry low back pain Disability Questionnaire Scale (MODQ) for LBA.
RESULT: After 6-week training period there were significant improvements in subjects whounderwent lumbar stabilization and TENS.
CONCLUSION: After treatment, it concluded that patients who underwent lumbar stabilizationexercise and TENS had a significant improvement in function and relief of pain.

***Keywords*: Mechanical low back pain, lumbar stabilization exercise, TENS, MODQ, NPRS.**

INTRODUCTION:

The Lumber Spine region or Low back is a remarkably well-manipulated Structure of interconnecting joints, bones, ligaments, nerves, and muscles adding together to provide support, strength, andflexibility. However, this Complex structure also leaves low back Susceptible to injury & pain.

The low back holds up the weight of the upper parts of the body and provides mobility for everyday motions such asbending and twisting. Muscles in the low back are back responsible for flexing and rotating the hipswhile walking as well as supporting the spinal column. Nerves in Low back supply Sensation & powertothe muscles pelvis Legs & feet.

Most acute Low back pain results from injury to muscles, Ligaments, joints, or discs. Depending onthe underlying cause of pain symptoms. Can be experienced in a variety of ways.

Some of them are:

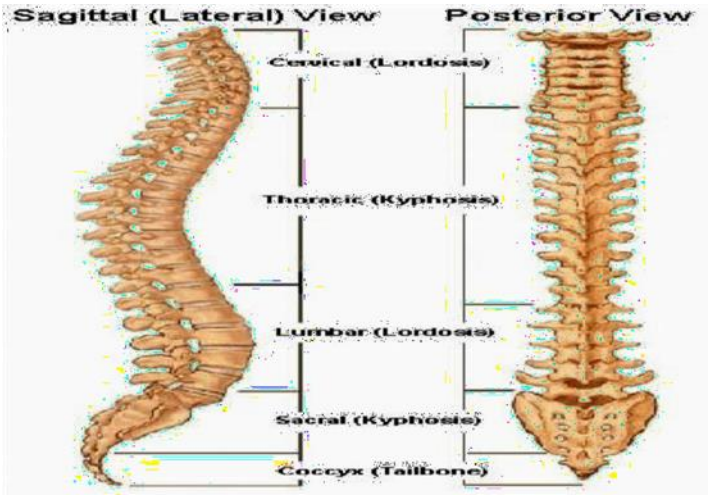
pain that is dull and Contained to the low back
Stinging, burning pain that moves from Low back to the back of the thighs, Sometimes to the lowerlegs or feet that include numbness or tingling (sciatic)
Muscle spasms and tightness in the low back, pelvis, and hips
Pain that aggravates after prolonged sitting or standing
Difficulty getting up straight, walking, or going from standing to sitting position

Treatment with medications and rest are usually common in low back pain due to enormous causes.

1.1 RELEVANT ANATOMY

The structure of the spinal column consists of 33 vertebrae and their respective intervertebraldiscs. Articulating with the spine are:

the 12 pairs of ribs in the thoracic region
the cranium at the top of the spine at the occipital-atlas joint
the pelvis at sacroiliac joint.(SI Joint)



REGION	NUMBER OF VERTEBRAE
Cervical	7
Thoracic	12
Lumbar	5
Sacrum	5(Fused)
Coccyx	4

BIOMECHANICS:

- It is the transition zone between the lumbar spine, where there is virtually no rotation; and thethoracic spine, which has a rotational function.
- In the thoracic spine, the orientation is essentially in the coronal plane; while in the lumbarspine, the facet joint surfaces are sagitally aligned.
- As a result, the thoracic spine should be particularly mobile, especially in rotation, were it notfor the tethering effect of the ribs.
- Lumbar vertebrae are much larger in size to absorb the stress of lifting and carrying heavyobjects.
- On the other hand, there is virtually no rotation in the lumbar spine, except in slight flexion. Inextension, rotation of the lumbar spine is completely impossible.
- Anatomically and physiologically, T12 is a transitional vertebra, both in man and in mostquadrupeds.
- In some subjects, the transitional vertebra may be T11.
- The vertebra concerned marks the Boundary between the cervicothoracic part and the lumbosacral part of the spine.
- The superior facet joints of T12 are shaped like those of the thoracic vertebrae, while the inferior ones have the pattern of lumbar facet joints. This means that the harmonious movement of the spine is broken at this site, and explains why this part of the spine is particularly susceptible to stress.
- T 12 is, as it were, a hinge around which the two parts of the spine change position as the vertebral column is flexed laterally or forwards, or extended.

BIOMECHANICAL VARIATIONS

- Increased axial compression of the intervertebral disc combined with forward flexion force causes structural weakening of the vertebral body secondary to metabolic or neoplastic disease.
- Pre-existing degenerative changes predispose the intervertebral disc to herniation. Rapid flexion combined with axial compression of the vertebral end plate.
- Repetitive hyperextension, flexion, and torsional forces on the thoracolumbar spine areassociated with fatigue or stress fracture
- An abnormal curve of the lumbar spine is called “Lordosis”, also called “sway back”
- An abnormal curve of the thoracic spine is called “Kyphosis”, also called “hunch back”

An abnormal curve from side to side is called “Scoliosis

INCIDENCE :

Low back pain is extremely common, among the 60-75% working of people in that 90% in pt > 45yrs old

AETIOLOGY:

- Spondylosis -degenerative "wear & tear "
- Sprain /strains (IVD DEGENERATIVE OR HERNIATION)
- Radiculopathy (sciatica) Spondylolisthesis.
- Stenosis - Spinal. & foraminal
- Skeletal irregularities - Scoliosis kyphosis, Lordosis
- Vertebral fracture,
- Sacroiliac joint and myofascial joint pain
- Congenital abnormalities

PATHOPHYSIOLOGY

Musculoskeletal Causes.

- Nerve root Syndromes
- Musculoskeletal pain Syndromes
- Skeletal causes
- lifting or twisting while holding a heavy objects
- Operating a machine that vibrates
- Prolonged sitting
- Involvement in a motor vehicle collision

NUMERICAL PAIN RATING SCALE (NPRS)

The NPRC is a segmented numeric version of the visual analog scale (VAS) in which a respondentselects a whole number (0-10 integers) that best reflects the intensity of his/her pain.

MODIFIED OSWESTRY QUESTIONNAIRE (MODQ)

The modified Oswestry disability questionnaire (MODQ) is used for evaluating the functionaldisability in patient with low back pain.

METHODOLOGY

A total number of 10 subjects were randomly assigned for lumbar stabilization exercise andconventional therapy. The study design was a pre-test and post-test experimental design. The study was conducted in the outpatient department of cherrans institute of Health sciencedepartment of Physiotherapy, Coimbatore. The duration of the study is conducted for a period of 6 weeks.

INCLUSION CRITERIA

- subjects were age group between 30 to 60 years
- Subjects were selected in both genders
- Subjects were clinically with low back pain
- Subjects with clinical stable before the study

EXCLUSION CRITERIA

- Subjects with lumbar radiculopathy.
- Subjects with spinal surgery
- Subject with prolapse lumbar intervertebral disc
- Subjects with any other spinal pathology

Independent variable

Lumbar stabilization exercise

TENS

Dependent variables

- Pain NPRS
- Disability MODQ

MEASUREMENT TOOL

- Numerical pain rating scale
- Modified oswestry disability questionnaire

Orientation of the subjects

Before the treatment, all the subjects were explained about the study and the procedure to be applied.They were asked to inform if they feel any discomfort from the subject.

PROCEDURE

A total number of 10 subjects of age group between 30 to 60 years with mechanical low back painwere randomly selected for this study. They were treated with lumbar stabilization exercise and conventional therapy (TENS) by random allocation method. The

subjects are given the treatment for a period of 6 weeks before the pre-test and post are measured.

I. LUMBAR STABILIZATION PROGRAM

1. Single Leg Knee to Chest Stretch

- With a hand behind the knee, pull one knee to the chest until a comfortable stretch is felt in thelower back and buttocks.
- Repeat with the opposite knee.
- Hold each stretch for 30 seconds.
- Repeat 3 times on each leg.

2. Double Leg Knee to Chest

- With hands behind the knees, pull both knees into the chest until a comfortable stretch is felt inthe lower back.
- Keep back relaxed.
- Repeat with the opposite knee.
- Hold each stretch for 30 seconds.
- Repeat 3 times on each leg.

3. Supine Piriformis Stretch

- Cross legs with the involved leg on top.
- . Gently pull the opposite knee toward the chest until a comfortable stretch is felt in the buttock/hip area.
- Repeat with the opposite leg.
- Hold each stretch for 30 seconds.
- Repeat 3 times on each leg.

4. Supine Hamstring Stretch

- Support the back of the thigh behind the knee.
- Starting with knee bent, attempt to straighten knee until a comfortable stretch is felt inback of thigh
- Repeat with the opposite knee.
- Hold each stretch for 30 seconds.
- Repeat 3 times on each leg.

5. Lower Trunk Rotation Stretch

- Keeping back flat and feet together, rotate knees to one side.
- Rotate to the other side.
- Hold each stretch for 10 seconds, Repeat 10 times on each side.

6. Lumbar Rotation Stretch

- Lie on your back with your knee from the uninvolved side drawn to your chest.
- Slowly bring the bent knee across the body until a stretch is felt in the lower back/hip area.
- Repeat with the involved side knee.
- Hold each stretch for 30 seconds, Repeat 3 times on each side.

7. Pelvic Tilt

- Bend both knees and place both feet flat on the floor.
- Flatten back by tightening stomach muscles and buttocks.
- Do not hold your breath.
- Hold for 5 seconds.
- Repeat 30 times.

8. Pelvic Tilt with Alternating Legs

- Bend both knees and place both feet flat on floor.
- Flatten back by tightening stomach muscles and buttocks.
- Slowly raise one leg 6 inches from floor.
- Keep trunk rigid.
- Do not hold breath.
- Hold for 5 seconds.
- Repeat with oppo site leg.
- Repeat 30 times.

TENS

- For acute LBA 80 and 120 Hz.
- For chronic LBA 2 to 10Hz
- Two hours per treatment, up to two to three times daily,

DATA ANALYSIS

The parameter was assessed in the experimental grasp having 10 subjects. The pre-test and post-test assessments were taken of the experimental group. The sample was assisted initially and then again at the end of the 6th week.

STATISTICAL ANALYSIS USING THE PATIENT'S T-TEST WASPERFORMED TO COMPARE
The pre-test and post-test scores of the Numerical Rating scale and Modified Oswestry Questionnaire Scores in subjects. The mean difference between the Numerical Pain Rating Scale and Modified Oswestry Questionnaire Scores in subjects. Theresults obtained from the statistical analysis are provided here follow.

COMPARISON OF PRE AND POST-TEST VALUE ON SCORES OF LEVEL OFMODIFIED OSWESTRY DISABILITY QUESTIONNAIRE SCALE (MODQ)

SLNO	MEASUREMENT	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	PAIRED "t" VALUE	P VALUE
1	PRE-TEST	38	11	1.2	28.9	<0.001
2	POST-TEST	27				

The above table shows that out of 10 patients, the Pre & Post-test Mean, Mean Difference, Standard Deviation, and 't' value using the Modified oswestry disability questionnaire (MODQ) Since the calculated t-value (28.9) of Subjects is greater than P<0.001

COMPARISON OF PRE AND POST-TEST VALUE ON SCORES OFLEVEL OF NUMERICAL PAIN RATING SCALE (NPRS)

SLNO	MEASUREMENT	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	PAIRED "t" VALUE	P VALUE
1	PRE-TEST	6.8	1.3	0.16	25.6	<0.001
2	POST-TEST	5.5				

The above table shows that out of 10 patients, the Pre & Post-test Mean, Mean Difference,Standard Deviation, and 't' value using the numerical pain rating scale (NPRS) Since the calculated t-value (25.6) of Subjects is greater than P<0.001

RESULTS
The Pre & Post-intervention data of parameters NPRS & MODQ following were statistically analyzed using paired 't' with a baseline level of significance kept as 0.001. The subjects are given the treatment for a period of 6 weeks. Before the treatment, the pre-test of the NPRS scale, and MODQ are measured. After 6 weeks of treatment the post-test values of the NPRS scale, MODQare measured. The paired 't' test was used on the pre-test and post-test values of NPRS, and MODQ for the groups. Based on the statistical analysis, the result of the present study showsthat there is a significant improvement in the subjects following the effect of lumbar stabilization exercise and conventional therapy. The calculated' value of NPRS is greater than the tabulated value at 0.001 level of significance and it shows a statistical reduction of pain in post-test value. The calculated 't' value of MODQ is 28.9 which is greater than the tabulated 't' value is at 0.001 level of significance and it shows a statistical reduction of painin post-test value.

DISCUSSION
The purpose of the study is to analyze the effectiveness of lumbar stabilization exercise TENS for reducing pain and disability for mechanical low back pain. The treatment session was given30 days (5 days/week for 6 weeks). The proposed mechanism of lumbar stabilization exercise tostrengthen muscles to support the spine and help prevent low back pain. Low back pain has become an increasing problem around the world. It is increasing as a resultof an aging and expanding world population (Clark S, Horton R 2018). Mechanical low back pain (MLBP) is a major cause of illness and disability, especially in people of working age. The lumbar stabilization exercise given in this study is aimed of improving the neuromuscularcontrol, and endurance strength of muscles central to maintain dynamic spinal stability(Richard C, JULL G). Before the treatment, the pre-test of the NPRS (numerical pain rating scale) scale and modified Oswestry disability questionnaire were measured and after 6 weeks of the treatment, the post-testvalues of the numerical pain rating scale and modified Oswestry disability questionnaire are measured. The paired "t" test was used to compare the pre and post-value of the NPRS scale and MODQ forthe subjects. There is a significant improvement in functional ability and reduction of pain in the subjects The study concluded that the subject who received the lumbar stabilization and TENS showedsignificant improvement in functional disability and in pain for subjects who had mechanical low back pain. The statistical results also show that there is improvement in the subject

CONCLUSION
An experimental study to analyze the efficacy of lumbar stabilization exercise and conventional therapy (TENS) on pain and disability in subjects with low back pain. Ten subjects were selected for this study in a simple random sample manner, pain disability was measured using the NPRS and MODQ. This study supports the alternative hypothesis. The analysis of the study concluded that the subjects who received the lumbar stabilization exercise and conventional therapy (TENS) had reduced pain and improved functional disability that was due to low back pain. The statically result show that is improvement in the subjects

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