

Impact of Flexi-Bar Exercise on Core Strengthening in Tailors with Nonspecific Chronic Low Back Pain - A Randomized Control Trial

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Abstract: Background: Non-specific chronic low back pain (NSCLBP) is highly prevalent among tailors due to prolonged static sitting postures and repetitive work activities. Reduced core muscle strength and endurance contribute significantly to pain and functional disability in this population. Flexi-bar exercise is a form of oscillatory training that activates deep core musculature through reflexive muscle contraction and may be effective in managing NSCLBP. Objectives: To evaluate the Impact of flexi-bar exercise on core strengthening in tailors with nonspecific chronic low back pain. Method: A RANDOMIZED CONTROL TRIAL in 48 patients. A randomized controlled trial was conducted on tailors diagnosed with NSCLBP. Participants were randomly allocated into a control group and an experimental group. The control group received conventional physiotherapy exercises, while the experimental group received Flexi-bar exercises in addition to conventional therapy. Outcome measures included pain intensity measured using the Numeric Pain Rating Scale (NPRS), core muscle strength assessed using pressure biofeedback, and functional disability evaluated using the Oswestry Disability Index (ODI). Assessments were performed before and after the intervention period. Statistical analysis was carried out using appropriate parametric tests. Result: From the given statistics and the above study both the exercises that is Traditional exercise and Flexi bar exercise are effective in tailors with low back pain but the Flexibar exercise is more effective than the traditional exercise in improving core strength of tailors. Conclusion: Flexibar exercises and Traditional exercises are both effective in tailors with NSCLBP, but flexibar exercises are more significantly have better impact.

Keywords: Flexi-bar, Core strengthening, Chronic low back pain, Tailors.

1. Introduction

Tailoring is a prevalent small-scale service industry in which a big number of people from low-income families work. In India, both men and women work in the tailoring industry. Because of the machine's sight requirements, the worker is forced to remain in a static position, which is hazardous to his or her health.⁽¹⁾ The high rate of work related musculoskeletal disorders is characterized by a sitting posture with the worker's shoulders flexed and abducted, head and trunk flexed forward in this condition of job activities musculoskeletal disorder occurrence is expected.⁽²⁾ Poor work postures refer to working positions that deviate from the body's natural alignment, such as excessively hunched back, tilted or strained neck, and other positions that are not in accordance with their natural posture which affect workers' health and may trigger work-related illnesses.^(3,4) Mechanical low back pain making it the second most typical symptom related cause of medical consultation. According to the survey, there is a 5% annual variation in the lifetime incidence of low back pain, ranging from 60% to 90%⁽⁵⁾.

When elevating the arm, leaning the head and torso forward, and working for extended periods of time while seated, the less ideal ankle and knee alignment might cause these issues, or they can exacerbate them already. Tailors experience physical and mental strain in their line of work as they carry out different tasks with poor posture.^(2,6) The prevention of lower back injuries can be achieved by the use of a core strengthening program. Compared to people without low back pain, persons with low back pain have less trunk muscle

endurance. Jackson and Brown gave opinion in their study that strengthening exercise is effective to reduce pain, preserve and restore full range of motion, and increase the abdominal and lumbar muscles' strength and endurance⁽⁷⁾. The Flexi-bar is a recently developed adjustable vibratory device consisting of an elastic bar with oscillatory poles. When actively shaken, it produces low-frequency vibrations (5 Hz) that are transmitted throughout the body via elbow movement.^(8,9)

The effectiveness of Flexi-bar exercises in improving core strength and reducing functional disability among Indian tailors with nonspecific chronic low back pain remains unexplored. This study aims to evaluate the impact of Flexi-bar training on core strength, functional ability, and occupational well-being in this population.

2. Methodology

- **Study design:** Randomized control trial
- **Study type:** Intervention study
- **Data Source:** Tailors from Malegaon, Maharashtra
- **Sample size:** 48
- **Study duration:** 12 months
- **Study setting:** Royal College of Physiotherapy OPD, Malegaon
- **Inclusion criteria:** Both male and female with Age group 30 to 50 years. Tailors with complaint of NSCLBP > 3 months having NPRS > 3 & work hours more than 8 hours every day were included.

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- **Exclusion criteria:** Patient having recent surgery (abdominal, spinal), Pregnant females, Past history of fracture in spine or ribs. Spinal or disc pathology & Red flags (cancer, cauda equine syndrome, tumors) were excluded.

Therapeutic Intervention: 48 patients are divided into 2 groups and one group is given traditional exercise and another is given flexibar exercise.

Treatment given for 3 weeks

Exercises given:

Traditional exercises: SLR, Hamstring stretch, Drawing in, cat and camel, Bridging, Modified bridging, supine trunk twisting, knee to chest, cobra pose, Bird dog position

Flexi-bar exercise: Low squats, for core, deep muscles of back, extensors, abdominals, glutes, spine, torso musculature, obliques, waist and hip, lumbar and pelvis

Outcomes Measures

- Numeric pain rating scale (NPRS): To determine the pain intensity of patients.
- Oswestry Disability Index (ODI): To measure function disability.
- Pressure Biofeedback: To check the strength of the core muscles.

Statistical Analysis:

The survey data collected for N=25 patients, all those are tailors by profession with the nonspecific chronic low back pain, data collected pre and post the exercise and below are the results of data collected. On average, pain intensity (NPRS) decreased markedly, from a pre-intervention mean of 6.36 (SD 1.78) to a post-intervention mean of 3.28 (SD 1.88). Median pain also fell from 6.0 to 3.0.

Interpretation summary

All three outcomes show statistically highly significant ($p < 0.001$) pre-to-post improvements.

The largest standardized change was in pain reduction ($t = 8.28$).

Core strength also improved substantially ($t = 8.10$).

The ODI improvement ($t = 4.5$) is moderate but still significant.

Both t- and z-tests yield identical conclusions.

3. Result

From the given statistics and the above study both the exercises that is Traditional exercise and Flexi bar exercise are effective in tailors with low back pain but the Flexibar exercise is more effective than the traditional exercise in improving core strength of tailors.

4. Discussion

This research aimed to compare the effectiveness of traditional exercises and flexi-bar exercises concerning to tailors having CNSLBP on pain, functional impairment or disability, and core muscle strength. Traditional exercises were found to be useful in reducing functional impairment and pain severity.⁽¹⁰⁾ This decline could result from retraining, strengthening muscles, and regaining the neuromuscular system's capacity to regulate the spine, preventing damage while doing functional activities or tasks. According to Dohnert's research, stabilization exercises outperformed McKenzie exercises in terms of engaging lumbopelvic stabilizing muscles. In previous study of Areeudomwong for CLBP patients, four-week Core stabilization exercise programs shows improvement in pain-related outcomes, such as pain intensity, functional impairment, and patient satisfaction, both short and long term. There was also evidence of increased deep trunk muscular activation after therapies.⁽¹¹⁾

Flexi-bar oscillations send low-frequency vibrations to the body, causing cyclic disruptions in the trunk and upper limbs before the trunk muscles are activated. A flexi-bar can increase core and trunk muscular activation to maintain trunk stability by acting as an external load that disrupts the body's balancing system. Muscle contraction is greatly impacted by proprioceptive stimulation, which is created when vibration is delivered to muscles by shaking the flexi-bar. Additionally, it improves physical endurance and strength. Exercises using flexi bars were successful in lowering functional impairment and the severity of discomfort.⁽¹²⁾ This improvement is more feasible because the gray matter interneuron synapses with the A-delta or C fibers that transport pain to the spinal cord's posterior horn. Following the synapse, the interneuron travels to the higher centers via the spinal cord's anterolateral horn. When mechanical sensors like Pacini and Meissner are stimulated by vibrations, they detect them. A-beta myelinated fibers then send this vibrational sensibility to the spinal cord's posterior horn, where it inhibits the transmission of pain to the higher centers. The support base may become more unstable if the flexi-bar is shaken while the hip is raised. Thus, there was an increase in the activation of muscles in the abdominal region as well as those close to the spine because the trunk's increased muscular activation, which was necessary to preserve posture.⁽¹²⁾

5. Conclusion

Flexibar exercises and Traditional exercises are both effective in tailors with NSCLBP, but flexibar exercises are more significantly have better impact.

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