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Pilates beyond fitness: Efficacy in chronic low back pain-A single-case perspective

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Abstract
Background: Lower back pain that persists for more than 12 weeks or three months after an acute low back injury or underlying cause is defined as Chronic low back pain (CLBP).
Case Presentation: We report a male patient of 36 years age complaining pain at the low back region along with difficulty in walking for 7 months who had been diagnosed with Chronic low back pain. The primary outcome measures used to assess Visual Analog Scale (VAS) and the Oswestry Disability Index (ODI) was used to assess functional disability. The patient received 15 sessions of Pilates exercise, weekly five days for 3 weeks.
Result: After completion of the Pilates exercise program, the patient showed a 5.2cm improvement in the VAS and a 22-percentage improvement in the ODI.
Conclusion: The patient with Chronic low back pain displayed improvement in all outcome measures. Pain and functional abilities were improved. Our observations conclude that Pilates exercise program has the ability to improve such condition.

Keywords: Pilates exercises, chronic low back pain, numeric pain rating scale, Oswestry disability index

Introduction
Chronic low back pain (CLBP) is a common illness that affects a sizable portion of the global population. It is distinguished by persistent pain in the lumbar area, which frequently causes in considerable restrictions in physical function and a worse quality of life. According to the Global Burden of Disease Study, low back pain is one of the top causes of years spent disabled worldwide. This disorder affects people of all ages and occupations, resulting in considerable medical expenses, absence at work, and significant societal responsibilities.
Physical therapy, pharmaceutical therapies, and surgical techniques have all been investigated as therapeutic options for CLBP. Pilates exercises have recently acquired popularity due to their ability to reduce pain and improve function in CLBP patients. Pilates is a low-impact, mind-body workout regimen that emphasizes core stability, posture, flexibility, and muscular control, making it a potentially useful tool for treating CLBP.
The current case study looks at the effectiveness of Pilates exercises in a 32-year-old female patient with CLBP. The primary goal is to evaluate pain and functional results following a four-week Pilates intervention using the Numeric Pain Rating Scale (NPRS) and the Oswestry Disability Index (ODI).

Background
CLBP is defined as pain that lasts longer than 12 weeks after an original injury or other source of low back pain has been treated. The syndrome can arise following an acute back injury or as a result of degenerative changes in the spine. While most cases of acute low back pain recover within a few weeks, a considerable number of people continue to have pain, which eventually becomes chronic.
Poor posture, muscular imbalances, a sedentary lifestyle, and inappropriate biomechanics are all risk factors for CLBP. Psychological variables such as stress, sadness, and anxiety have been linked to the persistence of CLBP. Conventional treatments for CLBP include medications (analgesics, nonsteroidal anti-inflammatory medicines, muscle relaxants),

physical therapy, and surgical procedures. However, these treatments do not always lead to long-term improvements in pain or function.

Pilates movements are useful in rehabilitation settings because they emphasize core stabilization, flexibility, muscular balance, and movement control. These exercises are designed to strengthen the deep stabilizing muscles of the spine, which are critical for decreasing mechanical stress on the lumbar vertebrae.

Case Presentation

The patient, a 36-year-old male, came to the physiotherapy clinic complaining of severe low back discomfort for seven months. The discomfort originated in the lumbar area and occasionally spread to the lower limbs. The patient also claimed difficulties walking, bending, and doing everyday tasks.

During the initial assessment, the patient's pain was assessed using the Visual Analog Scale (VAS), with a score of 8.1cm out of 10cm, signifying severe discomfort. The Oswestry Disability Index (ODI) was used to assess functional disability, and the results showed a considerable level of disability (62%).

The patient had no history of major trauma, spine surgery, or underlying systemic illnesses that may explain her CLBP. He was generally healthy, with no history of chronic ailments.

Intervention

The patient received a customized Pilates exercise regimen designed to meet his unique needs and limitations. The intervention comprised 15 sessions spread over three weeks, five sessions per week, lasting roughly 60 minutes each and incorporating a series of mat-based Pilates exercises that targeted postural control, flexibility, and core stabilization.

Design of Pilates Programs

- The following elements were part of this patient's Pilates exercise program:
- **Breathing exercises:** Aimed at improving lung capacity and relaxation through diaphragmatic breathing.
- **Core Stabilization Exercises:** Worked the pelvic floor, multifidus, and transversus abdominis muscles. There were three different exercises: the "hundred," "single-leg stretch," and "double-leg stretch."
- **Spinal Mobilization:** To increase lumbar spine flexibility and decrease stiffness, mild spinal articulation activities such "spine stretch forward" and "roll-up" were included.
- **Postural Alignment:** To improve pelvic and lumbar alignment and lessen excessive strain on the lumbar vertebrae, exercises such as the "bridge" and "pelvic tilt" were used.
- **Lower Limb Strengthening:** To enhance lower limb strength, exercises like "leg circles" and "side-lying leg lifts" focused on the hip and gluteal muscles.
- **Stretching:** To release tension in the lower back and pelvis, stretches for the hamstrings, hip flexors, and piriformis were incorporated.
- As the patient's functional capacity improved and their tolerance increased, the regimen was gradually modified.

Outcome Measures

Visual Analog Scale (VAS)

A valid and reliable scale called the VAS was created to gauge how much pain a patient is experiencing. Usually 10 cm long, it is made up of a straight line that can be either vertical or horizontal, with endpoints that indicate the extremes of pain perception. One end (bottom or left): Stands for "No pain." The other end (top or right) stands for "Worst imaginable pain." After being given the VAS line, patients are asked to select the point that most accurately depicts the level of pain they are experiencing at the moment.

Oswestry Disability Index (ODI)

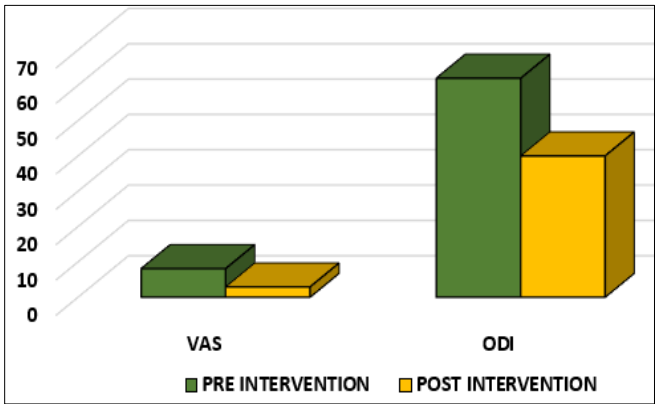
A valid tool for determining the level of impairment associated with low back pain is the ODI. It assesses a range of physical abilities, such as walking, sitting, standing, lifting, and social interactions.

Interpretation

- **The percentage that represents the ODI score is divided into different impairment levels:** 0–20%: Very little impairment. The patient may simply require guidance on lifestyle modifications as they are capable of handling the majority of tasks.
- **Moderate disability, 21–40%:** The patient may need physical therapy or specialized treatment since they have more trouble with everyday duties.
- **Severe disability (41–60%):** Most facets of life are greatly impacted by pain, which restricts activity.
- **Crippling disability:** 61–80%: Most social and personal activities are hindered by back discomfort.
- **81–100%: Exaggerated symptoms or bedridden:** The patient is probably totally reliant on other people to take care of them.

Results

The patient's pain and functional condition significantly improved as a result of the Pilates exercise regimen. There was a significant decrease in pain, as evidenced by the VAS score falling from 8.1cm to 2.9cm. The ODI score showed better functional ability, rising from 62% to 40%, a 22 percentage point improvement. Due to pain and stiffness, the patient previously found it difficult to conduct daily tasks like walking, bending, and lifting; now, these activities are easier.



Graph 1: Pre and Post Intervention Data

Table 1: Pre and Post Intervention Data

Outcome Measure	Pre-Intervention	Post-Intervention	Improvement
Numeric Pain Rating Scale (NPRS)	8.1cm	2.9cm	5.2cm reduction
Oswestry Disability Index (ODI)	62%	40%	22% reduction

Discussion

The case study's findings support earlier studies indicating that Pilates exercises may be a useful treatment for persistent low back pain. Because they address the muscle imbalances and mechanical strain that contribute to the persistence of pain, Pilates' core stabilization and postural control are crucial elements of a rehabilitation program for CLBP.

Core muscle dysfunction is common in people with CLBP, according to studies. Patients with CLBP frequently have weaker transversus abdominis and multifidus muscles, which can cause instability in the lumbar spine. These muscles are the focus of Pilates movements, which aim to restore their function and lessen the mechanical stress on the spine.

Pilates workouts also place a strong emphasis on precise, regulated movements, which may enhance proprioception and lessen aberrant movement patterns that exacerbate pain. Pilates' main tenets of increased spine mobility and flexibility can also help people with CLBP who frequently experience stiffness and restricted range of motion.

It's also important to take into account Pilates' psychological advantages. Since stress and anxiety are known to make chronic pain issues worse, the emphasis on breathing, body awareness, and relaxation may help lower them.

Conclusion

This case study demonstrates how Pilates exercises may help a patient with persistent low back pain by lowering pain and enhancing function. Given the patient's notable gains in VAS and ODI scores, Pilates may be a useful part of a thorough rehabilitation program for those with CLBP. To further evaluate the results of this case study and investigate the long-term advantages of Pilates in the therapy of CLBP, larger sample numbers and randomized controlled trials are required in future research.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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