

# Exercise Therapy Protocols in Treatment of Non-Specific Low Back Pain-A Literature Review

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## ABSTRACT

**Background:** Non-specific low back pain can be defined as pain or discomfort which arises via unknown cause or pathology, which may/ may not be radiating to legs. There is a need to assess the efficacy of currently used treatment protocols to find the best out of them.

**Materials and Methods:** Search was done on three sources i.e., google scholar, PubMed and springer nature and related literature was obtained. A thorough appraisal of twenty research papers was done to draw an accurate result.

**Result:** Observation was drawn that instead of using a single technique, a combination of two or more techniques [like combination of dynamic stabilization exercises and muscle energy technique]. Apart from that, app-based physiotherapy regimens were found to be more effective than conventional physiotherapy.

**Discussion:** The results were derived that use of technologies has been found to be effective in treating CNSLBP and it can also help in yielding better results when combined with physiotherapy techniques.

**Conclusion:** From the above study it was concluded that combining the treatment protocol can help achieve treatment goals earlier and can also help reduce disability.

**Keywords:** Non-Specific low back pain, Myofascial Release Therapy, Muscle Energy Technique, Latest Physiotherapy Protocols.

## INTRODUCTION

The most typical cause for dysfunction and absenteeism is low back pain (LBP), a serious health issue <sup>[1]</sup> Research on non-invasive therapies for treating the persistent LBP has been conducted over the past few decades and physiotherapy is one of them to be found effective in managing LBP <sup>[2]</sup>

Mechanical, non-mechanical, and psychogenic forms of LBP, all of them can take place. Further mechanical LBP distinct into specific and non-specific mechanical pain. Non-specific LBP is personified by

pain without any specific cause or underlying disease. Back pain that is not specific to any one causative agent or underlying condition is referred as non-specific LBP <sup>[3]</sup>

Predictions of the broader population's occurrence of LBP varies from 30 to 80% throughout the world, and is among the most prevalent musculoskeletal disorder in both developed and underdeveloped nations. Lower socioeconomic position and educational attainment in those countries have been linked to LBP. After a single episode of LBP, the persistence rate was found to be 60–80% <sup>[4]</sup> Additionally, it was found that the chronic type of LBP was

connected to the highest level of disability and that the frequency rose with increasing age.<sup>[5]</sup>

Physically, patients with chronic LBP may have limitations like weak and insufficient muscles for trunk stabilization, poor static postural control, and altered gait performance<sup>[5]</sup> Numerous neuromuscular factors, such as weakness of muscles, postural instability, altered equilibrium, and debilitated sacroiliac joint, can be a contributory factor of chronic LBP<sup>[6]</sup> Patients suffering from CLBP face trouble controlling their movements, and they become more disabled and limit their activities out of fear of their pain returning at different time.<sup>[6,7]</sup>

Non-specific low back pain consists of all possible medical conditions causing pain and discomfort in lower back region (below 12th ribs and above inferior gluteal fold), which may/may not be radiating towards legs. Hip muscles are crucial in conveying stresses from the lower extremities to the spine, especially in activities involving upright posture and hence could be the reason of LBP<sup>[8]</sup>

An internationally acceptable **categorization of LBP** divided it into 3 types:

- Particular pathophysiology of spine
- Pain throughout the nerve root
- Non specified LBP it was named as "diagnostic triage"(waddle 1987)<sup>[8]</sup>

Janda classified muscles into two types i.e., flexors in other words known as tonic muscles which were majorly prone for tightness or shortness and the second one was extensors or phasic muscles which were majorly prone for weakness or inhibition. Janda's approach resulted in lessened discomfort & reduced dysfunction in LBP's patients<sup>[8]</sup>

Treating the hip joint is the goal for NSLBP patients, particularly for those who also experience hip joint pain. For NSLBP, exercises that help in strengthen & stabilize the muscles is recommended as a rehabilitation approach. Exercises that induce the stabilization of core muscles helps stabilize the spine by training the

specific fashion in which muscle works without any undue pressure over the underlying tissue.<sup>[9]</sup>

Consequently, subjects with LBP are expected to benefit from a number of advantages associated with blended care—the integration of online applications into healthcare.<sup>[10]</sup>

One of the primary treatment modalities, manual acupuncture (MA), is primarily used for a variety of painful and other conditions. To enhance the benefits of it, electroacupuncture (EA) combines the ancient practices with electric current.<sup>[11]</sup>

Strong evidence points to nonspecific LBP to be a multidimensional disease wherein muscle guarding takes place in response to the pain and when it is combined with psychological (such as low will power, fear from pain, and emotional instability), social (like stressful living conditions), and lifestyle factors (such as sedentary lifestyle, disturbed sleep cycle) can lead to a very harmful triage of distress, pain & dysfunction.<sup>[12]</sup>

To identify and study the effect of currently used exercise therapy protocols in patients with Non-specific Low Back Pain.

## REVIEW OF LITERATURE

1. Cui D et al. (2023) The goal of this randomized controlled trial (RCT) is to analyse the clinical results of patients with CLBP who receive evidence-based in-person physiotherapy against those who receive digital intervention. As a possible approach to lessen the burden of CLBP, this RCT shows that a remote digital intervention can support recovery at the same levels as evidence-based in-person physiotherapy<sup>[1]</sup>
2. Aubin-Porras V et al. (2021) aims to assess how physiotherapy affects patient's subjective pain perception and autonomic nervous system activation in patients suffering from LBP. Only males participating in a strength of 30 suffering from NSLBP were divided into 3 groups: (A) manual therapy cantered on soft tissue techniques and joint mobilization in the lumbar region; (B) stretching exercises; and (C)

core muscle motor control exercises. In NSLBP patients, physiotherapy treatment was found to be able to reduce the subjective pain perception and increase the parasympathetic nervous system activation.<sup>[2]</sup>

3. Bhosale SV et al. (2021) aims to ascertain the short-term combined effects of quadratus lumborum muscle stretching, muscular energy technique (MET), and myofascial release (MFR) therapy on NSLBP. Thirty-five patients in all were distributed in a group of 2 for this study: first group was referred as the control group and the other one was named as experimental group. This study lasted for two weeks. The study concluded that treating individuals suffering from NSLBP with a combination of MFR, MET, and quadratus lumborum stretching has proven to be more effective for the experimental group.<sup>[3]</sup>
4. Ahmad UA et al. (2021) 125 patients were enrolled in a double-blind randomized control trial and splatted it in a group of 3: Only dynamic stabilization exercise (DSE) with total number of participants to be 39, one with only traditional physiotherapy with a total number of 45 patients and the last one with a combination of DSE with that of MET in total of 41 patients. Two weekly interventions were given during the course of the 12-week study. With the exception of functional disability, the results showed that group consisting of 41 subjects that were treated with a combination of DSE with met performed way better than the other two groups and that too in each and every measure of effects<sup>[4]</sup>
5. Schema L et al. (2021) conducted a RCT to examine the precise psychological, intellectual, and physical impact of multimode in individuals with CLBP. Over a 12-week period, the specific number of subjects were given multimode 2 times in a week for 1 hour and that group was named as intervention group. The study concluded that multimode can be helpful in enhancing the range of motion and functional capacity in the lower limb. Apart from this, physical and physiological functions will also be improved.<sup>[5]</sup>
6. Alvani E et al. (2021) performed an interventional study to look into how neuromuscular exercises affect military personnel with LBP's proprioception, balance, functional impairment, and level of pain. Random assignments were made to place subjects with LBP into two groups: intervention (15 people) and control (15 people). For eight weeks, regular daily life activities were performed via controlled group but on the other hand 3 sessions of 1 hour each of the neuromuscular exercises was performed via the other group. The findings show that among subjects with CLBP, eight weeks of neuromuscular exercise reduced pain intensity and enhanced functional ability, static and dynamic balance, and proprioception.<sup>[6]</sup>
7. Murtagh S et al. (2021) conducted a cross-sectional observational survey to provide an overview of the range of interventions that private United Kingdom based physiotherapists imply for patients with LBP & the degree till which these interventions are in line with clinical guidelines. This research sheds light on the self-reported practices of the involved physiotherapists and emphasizes how they typically used a multimodal treatment approach for LBP patients.<sup>[7]</sup>
8. Mirmoezzi et al. (2021) performed a semi-experimental study to analyse the effect of hydrotherapy-based McKenzie and Williams in patients with NSLBP. Hydrotherapy based McKenzie and Williams therapy for 3 days per week till 20 sessions was performed on total 28 patients with NSLBP. Outcomes measures were numeric pain rating scale, Roland-Morri's disability questionnaire, and straight leg raise test. Author concluded that after 10 sessions of hydrotherapy program

which was designed based on McKenzie and Williams therapy got relieved from NSLBP.<sup>[8]</sup>

9. Bhat V et al. (2021) performed a parallel group study among 65 subjects with NSLBP. 33 Subjects were given strengthening exercises along with MFR and 32 subjects were given strengthening exercises with sustained natural apophyseal glides (SNAGs) for 6 sessions over a week. Outcome variables were pain, functional independence, disability, ROM, immediate and short-term effects. Results showed that both the group showed similar improvement in pain and restricted function. However, mulligans SNAGs performed better for limited flexion ROM of lumbar spine. So, the conclusion was drawn that both the manual therapies can help achieve better results along with exercises for patients with NSLBP.<sup>[9]</sup>
10. Tank SN et al. (2020) performed an intervention study consisting of 34 subjects 25 to 45 years of age (including both females and male) which were categorized in a group of 2. One of the groups was an intervention group that performed normal exercises plus stretching and strengthening exercises and another was a control group. Both the group performed the exercises for two weeks and at least 6 days in a week. Outcome was drawn via numeric pain rating scale and modified Oswestry index (MODI) and both the measures were found to be improved in the interventional group. When used in conjunction with traditional therapy, Janda's method assists patients with NSLBP to achieve greater improvements in pain and function.<sup>[10]</sup>
11. Kim B et al. (2020) carried out an RCT, on subjects with NSLBP to see if activity level & physical function could be enhanced or not with the help of hip muscle strengthening exercise and core stability exercise (CSE). Three groups were assigned to patients. Among which there was a strengthening group that specifically performed the strengthening of hip muscles consisting of total 22 subjects and while attempting to strengthen the muscles of hip also preserving the maximal isometric contraction, another group performed the exercises for hip muscles focusing on stretching the muscles to an extent to achieve maximal motion and it was referred as stretch group with a total number of 22 subjects and the last group was the sham group had their skin gently palpated in total of 22 subjects. This trial ran for six weeks, during which time three therapy interventions were given each week. According to the study's findings, it was concluded that CSE while performed along with stretching of hip muscles can help in patients with NSLBP.<sup>[11]</sup>
12. Koppelaar T et al. (2020) also performed a RCT to compare the cost-efficiency of internet-based home exercise program to that of traditional physiotherapy care in LBP patients, as well as the short-and the long-term impact of the program on physical functioning. Two hundred eight subjects suffering from LBP received treatment using either standard care physiotherapy or e-exercise for LBP. The results have not been concluded yet but aims at how well blended treatment works for LBP patients and will contribute to better blended physiotherapy in the future.<sup>[12]</sup>
13. Camacho J et al. (2020) intended to determine the impact of manual acupuncture (MA) and electro- acupuncture (EA) on discomfort and dysfunction in subjects suffering from NSLBP. Overall subjects were 66. Outcome measures were Roland Morris disability questionnaire (RMDQ) and numeric pain rating scale (NPRS). It was concluded that no significant difference was found in both EA group and MA group, both were same in decreasing depth of pain and dysfunction in patients with NSLBP.<sup>[13]</sup>
14. Loss JF et al. (2020) conducted a RCT to identify the immediate effect of lumbar manipulation over pain and postural control in patients with NSLBP. Only single



session was given to 24 subjects that were divided into two groups: group 1 was given simulated manipulation and group 2 were given high velocity low amplitude (HVLA) manipulation. Results revealed reduction in pain intensity in both groups however no significance was seen in postural control in both groups.<sup>[14]</sup>

15. Spivakian S et al. (2020) conducted a study including 70 females with sedentary lifestyle and complains of low back pain often. They were randomly allocated either lumbar stabilization exercises (LSE) or to lumbar muscle strengthening exercises for 20 weeks. Results revealed that both groups showed positive response in reducing LBP and functional disability. However, LSE was more effective comparatively.<sup>[15]</sup>
16. Vibe Fersum K et al. (2019) executed RCT to look into the effectiveness of exercises performed in combination with manual therapy (MT-EX) and the cognitive functional therapy (CFT) for individuals with NSLBP with a follow-up of 3 years. A total of one hundred and twenty-one subjects were allocated into two groups: a group treated with only CFT containing sixty-two subjects and another group treated with combination of MT-EX with total fifty-nine subjects. Outcomes were derived via MODI and NPRS primarily. At a three-year follow-up, CFT is superior to MT-EX in certain extents such as decreasing dysfunction, overcoming fear of pain, & depression.<sup>[16]</sup>
17. Toelle TR et al. (2019) through a randomized controlled trial, they examined the effects of an app specifically designed to analyse back pain (Kaia App). 101 subjects assigned into control and experimental group (used Kaia app for 3 months). The Kaia App, is better than physiotherapy plus online education when it comes to treating LBP patients, according to the results.<sup>[17]</sup>
18. Oz soy G et al. (2019) conducted a single-blinded RCT to check the combined effect of core stabilization exercise (CSE) along with MFR (with roller massager) in elderly patients with NSLBP. A total number of 45 subjects were randomly allocated into two groups, in first group only CSE was performed while in another group CSE along with the MFR with roller massager

was given. Both groups performed these exercises 3 day per week for 6 weeks. Outcome measures were flexibility in lower back, pain, mobility of spine, disability in lower back, characteristics of gait, endurance of core stability, Kinesio phobia, and quality of life (QOL) that too both before starting the treatment and after the treatment. Results revealed that second group that was treated with both CSE and MFR performed better in terms of mobility of spine and endurance of core stability. However, no such difference was found in other aspects. So, this study suggested that CSE along with MFR is a better choice of treatment than core stabilization alone.<sup>[18]</sup>

19. Eshowe AM et al. (2018) performed RCT to analyse the effectiveness of traditional non-invasive treatment modalities with pulsed electromagnetic field therapy at a low intensity of 20 Gauss and 50 Hz frequency for subjects suffering from recurrent NSLBP. Total of 50 participants divided into 2 groups: control & experiment group. When combined with conventional physical therapy, pulsed electromagnetic field therapy produces better clinical outcomes than only using conventional physical therapy in subjects suffering from NSLBP in terms of discomfort, inability to perform functional tasks, and ROM in lumbar region.<sup>[19]</sup>
20. McCaskey MA et al. (2018) performed a cross-sectional study which not only looked after the linear parameters of posture control but also assessed the non-linear parameter of posture control to analyze individuals with chronic nonspecific LBP, both of them were combined in a group and total of 24 subjects were assessed for the same and these 24 subjects were compared to another group consisting 34 subjects that does not reflected any symptoms. In the end, the author concluded that this research validates the idea that multi-segmental analysis should be used in conjunction with summary results to detect postural abnormalities in CNLBP patients.<sup>[20]</sup>

#### **METHODOLOGY**

Search was done through three search engines: google scholar, PubMed, and springer nature and literature was derived from them. A thorough investigation of 20 research papers was done.

### Inclusion Criteria

- Studies between year 2018-2023
- Randomized controlled trial
- Interventional studies
- cross-sectional studies/surveys

### Exclusion Criteria

- Systemic review and meta-analysis
- Case-studies
- Studies before year 2018

### RESULT

From the above review of literature, the results were derived that instead of using a single technique combining two or more techniques could help in extracting better therapeutic effects. As described by Bhosale SV et al, combined effect of MFR, MET and quadratus lumborum stretching exercises has been proven to be an effective treatment for the individuals with NSLBP. Even digital sessions and app-based exercise program also enhanced the outcomes as compared to conventional physiotherapy.

### CONCLUSION

From the above study it was concluded that combining the exercise therapy protocol can be found helpful in reducing impairment and helping treatment goals be met sooner. Also, usage of app-based exercises along with cognitive functional therapies and exercise therapy protocols can even perform better to yield best results.

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