



Study of yoga versus exercise therapy in the management of mechanical low back pain

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ABSTRACT

Mechanical low back pain is one of the major 21st century adversity, and 2nd leading cause of disability. Back pain is a common health problem, with more than 50% of adults bothered by it each year and 70% to 80% of adults afflicted by it at some time in their lives. Yoga offers a holistic approach to health and is now considered a form of mind-body medicine within complementary and alternative medicine. Physiotherapists are beginning to recognize yoga as a form of treatment for musculoskeletal and cardio respiratory conditions. The objective of the study was to compare effectiveness of yoga and exercise therapy in the management of mechanical low back pain. Total 60 subjects with mechanical low back pain were divided in to two groups. Yoga group and exercise group. Yoga group underwent yogic counselling, asanas, and instant relaxation technique and exercise group underwent educational talk, strengthening exercises, and supine rest. Subjects evaluated for disability and flexibility with Roland Morris Disability Questionnaire and sit and reach box test respectively. Data was collected at baseline and at 4th & 8th week. Yoga and exercise therapy both showed a significant reduction in disability and improvement in back flexibility. Yoga and exercise therapy both are effective in the management of mechanical low back pain.

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Introduction

Mechanical low back pain is the general term that refers to any type of back pain caused by strain on muscles of the vertebral column and abnormal stress.¹

Mechanical low back pain is characterized by increased pain with motion and decreased pain with rest, whereas the pain of non-mechanical low back pain generally occurs at rest and is less affected by motion.²

The surrounding ligaments, muscles and facet joints may become irritated and inflamed. People with mechanical back pain experience pain primarily in the lower back, the pain can also radiate to the knees, thighs or buttocks. This is called sciatica, namely nerve pain from irritation of the sciatic nerve.³ There are 3 types of mechanical low back pain.³

- acute
- sub-acute
- chronic

Characteristics/clinical presentation of mechanical low back pain is usually aggravated by long levered activities, lifting heavy objects, levered postures (bending forward), static loading of the spine (prolonged sitting or standing)³ it's difficult to reliably identify by diagnostic testing. these typically involve processes in the muscles and/or ligaments.⁴

Common causes of mechanical back pain include spinal stenosis, herniated discs, zygapophysial joint pain, discogenic pain, vertebral fractures, sacroiliac joint pain, and myofascial pain. A wide variety of treatments are available, with different treatments specifically targeted toward different causes. A balanced approach, which takes into account patient psychosocial factors and incorporates multidisciplinary care, increases the likelihood of success from back pain interventions.⁵

Risk factors of mechanical low back pain are many, but none are convincingly causal. Probable risk factors include genetic factors, age, smoking, back pain history, job dissatisfaction, heavy physical work, static work postures, lifting, vibration, obesity, and psychosocial factors. Risk factors also have been associated with the work related back pain. Physical work factors include heavy manual work, lifting and twisting, postural stress, whole body vibrations. Psychosocial work factors include monotonous work, lack of personal control, low job satisfaction. Physiologic factors includes low physical fitness, inadequate trunk strength and health behaviour which includes smoking.⁶

MLBP symptoms and signs were pain when lifting; intermittent pain during day; pain that develops later in the day, pain on standing for a while, with lifting, bending forward a little, on trunk flexion or extension, when driving long distance, and getting out of chair, pain on repetitive bending, running, coughing, or sneezing.⁷

Although there are a wide variety of treatments for back pain, including medications, exercise, education, self-care, injections, life-style aids, manual therapies, complementary and alternative medicine (CAM) therapies, minimally invasive treatments and surgery, there is surprisingly little consistent evidence to support most of these treatments⁸, due to unavailable, insufficient or conflicting evidence. However, low back pain patients are relatively dissatisfied with their medical care⁹, especially in comparison to care provided by non-physician's.¹⁰⁻¹³ Eisenberg found that most people with back problems considered CAM care to be superior to conventional medical care for back pain.¹⁴

Yoga is an ancient discipline designed to bring balance and health to the physical, mental, emotional, and spiritual dimensions of the individual. Yoga is often depicted

metaphorically as a tree and comprises eight aspects, or "limbs:" yama (universal ethics), niyama (individual ethics), asana (physical postures), pranayama (breath control), pratyahara (control of the senses), dharana (concentration), dyana (meditation), and samadhi (bliss).¹⁵ Yoga is now emerging as a recognized means for effectively treating chronic back pain. Studies have shown reduction in pain and functional disability in subjects with chronic low back pain who undergo a yoga intervention. One of the first steps in practicing yoga is to correct postural alignment, which should help to reduce the pain. Yoga can selectively stretch shortened, tight muscles and strengthen weak, elongated muscles.¹⁸

The most obvious benefit of exercise is its ability to improve or maintain musculoskeletal and cardiovascular function; exercise may be useful for improving back function for patients with low back pain. Rehabilitation programs are typically designed around the goals of strengthening the back, increasing back flexibility and improving cardiovascular fitness. This focus resulted from research demonstrating that impairments of trunk strength, flexibility and endurance are present in many people with chronic low back pain. These impairments result in part from long-term inhibition of movements and physical inactivity those results in neurological and physiological changes in the spine. These changes include weakness of the paraspinal musculature, with selective loss of Type 2 muscle fibres, alteration of the relaxation response of the paraspinal musculature associated with full spinal flexibility and shortening of muscles and connective tissues of the spinal region.¹⁹

Objectives Of The Study

- To find out the effectiveness of yoga in the management of mechanical low back pain
- To find out effectiveness of exercise therapy in the management of mechanical low back pain.
- To compare the effectiveness of yoga versus exercise therapy in the management of mechanical low back pain.

Materials And Methodology

The data reported here is a part of research project in which 60 subjects underwent yoga and exercise therapy

Source Of The Data: Justice K. S. Hedge Charitable Hospital, Mangalore.

Selection Criteria:

Inclusion Criteria

- Patients diagnosed with back pain of mechanical origin and which existed more than 12 weeks.
- Age between 18 to 45 years
- Both male and female
- Consent to participate

Exclusion Criteria

- Inter vertebral disc prolapse
- Spondylolisthesis
- Any surgical history within last 6 months
- Spinal deformity
- Rheumatic diseases
- Hip osteoarthritis
- Renal disease
- Abdominal aortic aneurysms
- Peripheral vascular diseases
- Communication constraint

Procedure

60 subjects were recruited for the study. Subjects were divided in to two groups by using convenient sampling technique after fulfilling the inclusion criteria and subjects were

blinded. Each group was containing of 30 subjects. Group 1 received yoga and Group 2 received exercises therapy.

In yoga group yogic counseling, yogic stretching and therapeutic aspect of yogic elements i.e. Asanas, Pranayama, and relaxation techniques was employed to give therapeutic intervention. 5 minutes for yogic counseling, yogic stretching and 5 repetitions were made for each asana for 5 minutes and total 50 minutes intervention was given.

For exercise group educational talk, auto stretching, strengthening and stretching exercises were given that emphasized on leg, hip, abdominal, and back muscles. 5 minutes for educational talk, 5 minutes for auto stretching, 10 repetitions were made for each exercise for 5 minutes and total 50 minutes intervention was given.

GROUP 1 (YOGA GROUP)

- Yogic counseling
- Yogic stretching
- Ekpada\dwipadauttasana
- Pawanamuktasana
- Paschimottasana
- Ardhakatichakrasana
- Bhujangasana
- Padahastasana
- Instant relaxation techniques
- Shavasana

GROUP: 2 (EXERCISE THERAPY GROUP)

- Educational talk
- Auto stretching
- Straight Leg Raise (bilateral/unilateral)
- Side leg raise (both side)
- Supine cycling
- Prone lying spinal extension
- Prone contra lateral limb raise
- Prone quadruped
- Bilateral limb raise
- Supine rest

It was two weeks intervention and followed by six weeks home practice period. This was observed by random visits to subjects. Practice diary and telephonic monitoring was also done in home practice period.

Outcome Measures

Roland Morris Disability Questionnaire (RMDQ)

The degree of functional impairment was assessed by means of Roland Morris Disability Questionnaire (RMDQ) which is having clinically acceptable reliability, validity and responsiveness. The RMDQ is a 24-item self-report condition-specific functional status assessment that measures patient disability caused by LBP. RMDQ is a 24-item self-report condition-specific functional status assessment that measures patient disability caused by LBP. The questions in the test are taken from the Sickness Impact Profile (SIP), which is a generic test to measure health status. The developers of the RMDQ added the phrase "because of my back or back pain," to the original SIP questions in order to generate a questionnaire which includes disability information on mobility, sleep, mood, recreation, assistance needed, appetite, and other daily activities that may be effected by LBP. This tool is reliable, test-retest ICC = 0.53 and valid.

Sit and Reach Test

Back pain related flexibility was assessed by using Sit and reach test. The test was administered using a Sit and Reach Box. This test involves sitting on the floor with legs out straight ahead. Feet (shoes off) are placed with the soles flat against the box, shoulder-width apart. Both knees are held flat against the

floor by the tester, if required. With hands on top of each other and palms facing down, the subject reaches forward along the measuring line as far as possible. After three practice reaches, the fourth reach is held for at least two seconds while the distance is recorded in centimetres (cm). It was made sure there were no jerky movements and that the fingertips remained level and the legs were flat. This tool is reliable test-retest $r = 0.65$

• Data was collected on baseline, 4th week and 8th week for both the groups for disability and flexibility. The scores were obtained and statistically compared.

Results

Statistical analysis was done by using SPSS version 21.00.

Inter and intra group differences were analyzed using the Repeated Measures of ANOVA for each group and each outcome.

The mean age for both groups (yoga group and exercise therapy group) was 24.7833 ± 5.03241 years; height was $5.3792 \pm .33533$ and weight 59.5667 ± 12.28664 kilograms. The results show the yoga group had initial mean values for RMDQ 17.7667 ± 2.28463 which was reduced to 12.7000 ± 2.40903 after 4 weeks, and it was 6.3667 ± 2.14127 after 8 weeks and initial mean values for S&R was 8.1000 ± 2.61758 had improved to 11.8333 ± 2.22963 after 4 weeks and it was 17.4000 ± 2.37225 after 8 weeks. The results for the group 2, which is exercise group, had initial mean values for RMDQ was 17.5333 ± 2.30042 had reduced to 14.3667 ± 2.35597 after 4 weeks and it was 10.6667 ± 1.82574 after 8 weeks and initial mean values for S&R was 8.1667 ± 2.58755 had improved to 11.2667 ± 2.43443 after 4 weeks and it was 14.1333 ± 2.33021 after 8 weeks.

Mauchly's test of sphericity shows p-values .007 for RMDQ and .000 for S&R that shows significant reduction in disability and improvement in flexibility. Mauchly's test of sphericity is significant for RMDQ and S&R. Sphericity assumed value for RMDQ is .000 which is highly significant and for S&R sphericity assumed value is .000 which is also highly significant. Thus both RMDQ and S&R are highly significant within groups. Between groups RMDQ is statistically significant p value is < 0.05 and S&R is also statistically significant p value is < 0.05

Discussion

Most treatments for chronic low back pain have modest efficacy at best. Exercise is one of the few proven treatments for chronic low back pain. Yoga is a popular alternative form of "mind-body" therapy. Yoga may benefit patients with back pain simply because it involves exercise or because of its effects on mental focus. We found no published studies in western biomedical literature that evaluated yoga for chronic low back pain; therefore, we designed a clinical trial to evaluate its effectiveness and safety for this condition.

This study was designed to compare the effectiveness of yoga and exercise therapy for the management of mechanical low back pain. The purpose of the study was to find out which of these programs will be more beneficial in reducing disability and improving flexibility for the management of mechanical low back pain. The study consisted of 60 subjects who were assigned into two groups. Group 1 consisting of 30 subjects received yoga and group 2 comprising of 30 subjects received exercise therapy. Both the groups were assessed to determine the extent of the reduction in the level of disability and improvement in flexibility by using RMDQ and sit and reach test for low back respectively.

The results of this study show that both RMDQ and S&R are statistically significant for both within and between groups. Therefore, we can say that yoga and exercise therapy both are

effective for the management of mechanical low back pain. This may offer some support to the findings of **Sherman KJ, Cherkin DC, Wellman RD, et al. (2011)** Yoga and conventional stretching were equally effective in improving function and reducing symptoms from chronic low back pain, with benefits lasting at least several months.²⁵

Comparing only mean values for both the groups the group 1, which is yoga group, had initial mean values for RMDQ was 17.7667 ± 2.28463 had reduced to 6.3667 ± 2.14127 after 8 weeks and The results for the group 2, which is exercise therapy group, had initial mean values 17.5333 ± 2.30042 for RMDQ had reduced to 10.6667 ± 1.82574 after 8 weeks. Initial mean values for group 1, which is yoga group, had initial mean values for S&R 8.1000 ± 2.61758 had improved to 17.4000 ± 2.37225 after 8 weeks and for group 2, which is exercise group, initial mean values for S&R was 10.6667 ± 1.82574 had improved to 14.1333 ± 2.33021 after 8 weeks. These findings go along with the previous results of the Tekur et al, which concluded that Seven (7) days of a residential intensive yoga-based lifestyle program reduced pain-related disability and improved spinal flexibility in patients with CLBP better than a physical exercise regimen.

There has been little research on the mechanisms by which yoga practice might relieve back pain. Although westerners often think of yoga as a form of exercise, the practice of yoga places as much emphasis on mental focus as on physical movement and considers the breath, which links the mind and the body, as the key to achieving both physical and psychological benefits.

Yoga may be beneficial for back pain because it involves physical movement, but it may also exert benefits through its effects on mental focus. Yoga increases flexibility and strength, tones muscles, and releases muscle tension, and several studies of patients with low back pain found that yoga increased hip flexion and spinal and hamstring flexibility. However, the mental focus induced by yoga could also help people to increase their awareness of how they had been moving and positioning their body in maladaptive ways, to relax tense muscles, and to relieve mental stress, as was anecdotally reported by our yoga participants.

This study has shown reduction in functional disability and improvement in flexibility in subjects with mechanical low back pain who undergo an exercise therapy intervention. Exercises can selectively stretch shortened, tight muscles and strengthen weak, elongated muscles. Building up strength in muscles and improving flexibility in muscles.

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