

## Role of Physical Rehabilitation and Ergonomics in Recovery of Patients: A Case Report

**Shubham Menaria\***, Danak Vaishnavi Ben G, Tittu Thomas James, Shubhi Saxena, Riddhi D Thakkar and Pradnya Dhargave

Physiotherapy Center, National Institute of Mental Health and Neuro Sciences, Bangalore, India

\***Corresponding Author:** Shubham Menaria, Physiotherapy Center, National Institute of Mental Health and Neuro Sciences, Bangalore, India.

**DOI:** 10.31080/ASOR.2023.06.0725

**Received:** March 28, 2023

**Published:** April 06, 2023

© All rights are reserved by **Shubham Menaria, et al.**

### Abstract

This case report describes a 25-year-old male, who presented with chronic low back pain. The chief complaints included unable to sit for a longer time that would aggravate his pain, which also hinders his occupation as software engineer. There was no significant history of any other pathology or any co-morbidities. Clinical investigation confirmed L4-L5 intervertebral disc prolapse with no neural compression. Proper guidance towards ergonomics and successful physical therapy management using Pain Neuroscience Education, electro therapy, and exercise therapy for low back pain. At the end of fourth session, the patient was completely pain free, functional and restarted his work. He was called for follow up on 10<sup>th</sup> day and found to have no relapse of pain.

**Keywords:** World Health Organisation (WHO); Ergonomics; Musculoskeletal Disorder

### Introduction

At present low back pain has become the most common health related issue due to changing lifestyles, bad posture, lack of physical activity and improper ergonomics. According to World Health Organisation (WHO), ergonomics, the technology of work design, is based on the human biological sciences: anatomy, physiology, and psychology.<sup>1</sup> In general terms anatomy is concerned with the structure of the body, physiology is concerned with the function of the body, and psychology is concerned with the behaviour [1]. Ergonomics, from Greek words ergo (work) and nomos (law), is a discipline that studies the interactions between human activity and the components of this activity (tasks, tools, methods, work environment, etc. As our body is stressed by an awkward posture, extreme temperature, or repeated movement during strenuous activities or work-related movements, our musculoskeletal system is affected leading to fatigue, discomfort and pain, which can be the first signs of a musculoskeletal disorder [2].

Some of the primary risk factors for developing musculoskeletal disorders are force, heavy lifting, push and pull, carrying, gripping, awkward prolonged postures repetitive activities, overhead work, contact stress, vibration and extreme temperatures.<sup>2</sup> When the work is intense and performed frequently for a prolonged period of time, it is likely to result in an injury. Ergonomics increases

overall comfort, alleviate pain in affected areas, reduce fatigue, boost efficiency, reduce probability of errors and associated risks, enhance awareness and management of risks, and reduces chances of injury [3]. With all the advantages, there are cons as well, such as financial requirements for developing and designing, efforts in planning and executing, and time constrains [4].

Physiotherapy has a wide range of skills, and can assist in assessing work spaces to correct posture and importance of maintaining a neural spine to decrease the impact on neuromusculoskeletal structures. While this advice may have an impact on musculoskeletal pain symptoms, specific ergonomic considerations to address fitness to work are lacking. The role of ergonomics has become an important component in the assessment of the risk factors associated with work related musculoskeletal disorders. In particular, the prevalence of neck, shoulder, and back pain related to more time being spent on computers is increasing. Therefore, the purpose of this study is to know how physical rehabilitation and ergonomics helps in faster recovery of the patient with back pain.

### Case Description

This case report describes a 25-year-old male who presented with low back pain to our institution. His chief complaints were that he was not able to sit for a longer time, which would aggravate his

pain as he works in software sector. It was making him difficult to sit for prolonged period and concentrate on his work. There was no significant history of any other pathology, but was just suffering from low back pain since 2 yrs which now have aggravated and hence came for physiotherapy treatment.

On examination, the pain intensity assessed with Visual Analog Scale (VAS) was 2/10 at rest and 7/10 on activity. Tenderness was present on the right side of the lower back than on left side. Patient reported to have centralized pain without radiating to the distal areas. Sitting for longer period would aggravate his pain and was relieved on lying down or standing. There were no tropical changes seen on the affected site. His posture was stooped with round shoulder and forward neck on sitting. In standing, there was reduced lordosis and the spine appears to be aligned straight. Pelvis was laterally tilted on left, making right leg appear short. There was no deviation in gait pattern on observation. There were no tropical changes such as spasm, scar tissue, redness, edema, or discoloration.

The range of motion of hip and lumbar spine was complete and painless. The lumbosacral rhythm was normal in flexion and extension. There were no muscle power deficits in bilateral lower limbs as well as for abdominal muscles. There appeared a mild limb length discrepancy, with right leg appeared 2 cm shorter than the left as there was hike of pelvis on the right side. The true length from ASIS to medial malleoli was 92cm bilaterally, whereas apparent length from umbilicus to medial malleoli was measured 97 cm in the right and 99cm at left side. There was no tightness of any muscle groups around the region.

Oswestry Disability Index (ODI) was used as an outcome measure, in which the patient scored 3, indicating no disability. Pain prehension tests such as 90-90 hamstring test, SLR test, Faber test and SI joint dysfunction test were negative, but spring test performed over lower lumbar spine showed positive results. Radiographic findings using MRI showed mild L4-L5 posterior lumbar intervertebral disc prolapse.

**Intervention**

The physiotherapy interventions were performed for a period of four days, with the following protocol;

- Interferential Therapy (15 minutes)
- Spinal stretching exercises
- Cat and camel exercises
- Knee to chest stretching
- Hamstring, piriformis and gluteus muscle stretches
- McKenzie extension exercises

- Hot pack application
- Maitland manual mobilization (Grade II and III distraction combined with traction).

Ergonomic advices provided to the patient in order to perform his occupation with less strain and increased efficiency. These includes the use of back support for chair, postural correction exercises, need for breaks between work using mild stretching exercises, avoiding prolonged sitting or any postures, avoiding lifting heavy weights till pain reduces, use of hot pack when there is an exacerbation of pain, and the need for squatting and lifting things up. The following table (Table 1) summaries the changes in the patient, assessed during the follow up on the 10<sup>th</sup> day.

Variable	DAY 1	DAY 10
Pain (VAS)	Rest - 2/10	Rest - 0/10
	Activity - 7/10	Activity - 2/10
Apparent limb length (cm)	Right - 97 cm	Right - 99 cm
	Left - 99 cm	Left - 99 cm
Oswestry Disability Index (ODI)	3	0

**Table 1:** Changes in outcome measures with treatment.

The results show that the patient’s pain was reduced from day 1 to day 10, with a normalisation of limb length. The poor posture adopted by the patient in the chair without proper back, arm, and leg support for more than 2 years have caused misalignment of his pelvis, which in turn lead to back pain and further problems. After the proper ergonomic advice given to the patient and with physiotherapy intervention, patient was able to manage his pain and prevent further damage to the spine.

**Discussion**

The case report describes about a patient who sought help with chronic low back pain. The physical evaluation found that there was an excess pelvic hike on right side which made his right limb appear shorter and turned out to be the major cause of his back pain. Since he works in a software sector where he sits for prolonged period in an incorrect posture, his body has adapted to that posture and muscles have undergone adaptive shortening on his right side of lower back causing him pain whenever he tries to do activity that activates the involved musculatures. This could also be the cause for his disc prolapsed.

An individualised treatment plan was prepared for the benefit of the patient to reduce his pain, improve the quality of his life and get back to his work. The paraspinal muscles are extremely impor-

tant as they help maintain proper posture and protect the spinal segments [5]. The lower back stretch was given which is a great exercise to increase flexibility, release tension, strengthen and stabilize core muscles, increases lumbar ROM and ease low back pain [6]. Cat and camel exercises and mobilization exercises of the spine helps in minimising joint compression during the movement [7,8]. McKenzie extension exercises were given on the basis that extension based exercises propose to mobilise nucleus pulposus within the annulus fibrosus within the intervertebral disc [9]. McKenzie extension exercises also restore and maintain normal lumbar lordosis in patients with low back pain [9]. Maitland manual therapy was also given with an aim to improve tissue extensibility and correct the limb length discrepancy which constituted rhythmic passive, painless movements introduced into the tissue (mobilizations) and rapid movements (manipulations) [10-12]. At the end of every session hot pack was placed in the affected region which gave the relaxation effects by increasing blood circulation and promotes healing. Thus, the individualised treatment sessions planned for the patient after detailed evaluation helped in improve his functional levels with reduction in pain and increasing the productivity of his work.

## Conclusion

It is observed that knowledge of ergonomics is lower in the younger generation who are having a continuous desktop job. Ergonomics plays a very important role in our lives. Improper posture, repeated strain to the body, and prolonged posture causes neuro-musculoskeletal disorders due to bad ergonomics. The physiotherapist must be knowledgeable in the field of ergonomics, back pain, and other musculoskeletal disorders which are more effectively identified, diagnosed, and treated and these are the necessary steps to forming a proactive prevention program.

## Bibliography

1. Singleton WT. "Introduction to Ergonomics". World Health Organization (1972): 1-146.
2. <https://osha.oregon.gov/OSHAPubs/ergo/ergoadvantages.pdf>
3. <https://activephysiohealth.com.au/corporate-health-tab/services/ergonomics/>
4. <https://www.slideshare.net/DrSusanJose/ergonomics-in-physiotherapy-and-workplace>
5. [https://www.physio-pedia.com/Paraspinal\\_Muscles](https://www.physio-pedia.com/Paraspinal_Muscles)
6. <https://www.spotebi.com/exercise-guide/lower-back-stretch/#:~:text=The%20lower%20back%20stretch%20is,lower%20back%20range%20of%20motion>
7. <https://mobilephysiotherapyclinic.in/cat-and-camel-back-extension-exercise/>
8. <https://burlingtonsportstherapy.com/blog/why-do-we-recommend-the-cat-camel/>
9. Mann SJ, et al. "McKenzie Back Exercises". Treasure Island (FL): StatPearls Publishing; (2023): 1-15.
10. Shin E, et al. "The Influence of Manual therapy for Sacroiliac Joint on Functional Leg Length Discrepancy". *The Journal of Korean Academy of Orthopedic Manual Physical Therapy* 26.1 (2020): 73-78.
11. [https://scholar.google.com/scholar?hl=en&as\\_sdt=0%2C5&q=manual+mobilization+for+correction+of+limb+length+discrepancy&btnG=#d=gs\\_qabs&t=1679504789789&u=%23p%3DrScdDIRpfVEJ](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=manual+mobilization+for+correction+of+limb+length+discrepancy&btnG=#d=gs_qabs&t=1679504789789&u=%23p%3DrScdDIRpfVEJ)
12. [https://www.physio-pedia.com/Manual\\_Therapy](https://www.physio-pedia.com/Manual_Therapy)