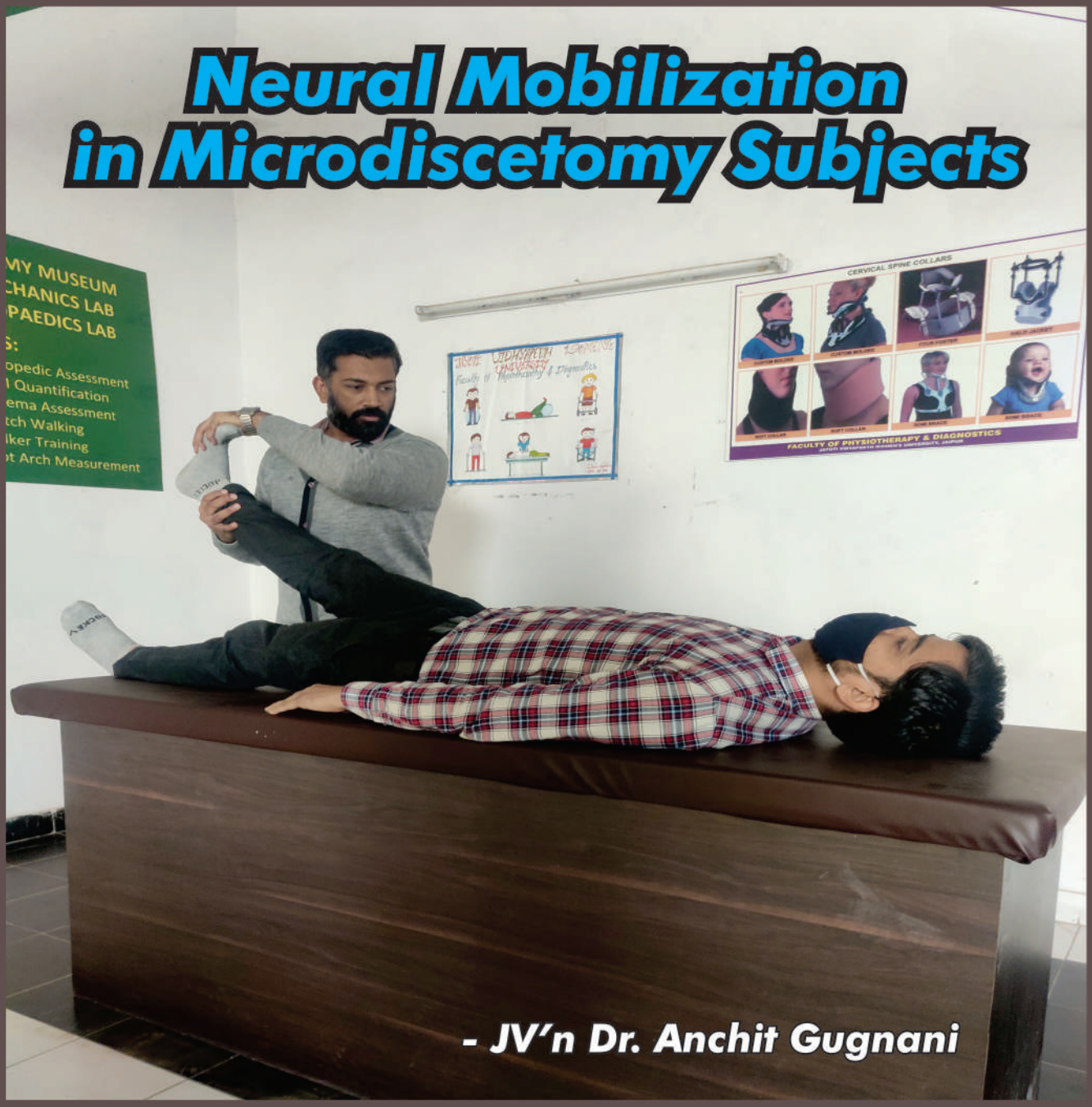
Women University Press
Jayoti Publication Desk
ISBN No. : 978-81-950200-9-6

Neural Mobilization in Microdiscetomy Subjects



- JV'n Dr. Anchit Gugnani

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Printed by :
JAYOTI PUBLICATION DESK

Published by :
Women University Press
Jayoti Vidyapeeth Women's University, Jaipur

Faculty of Physiotherapy & Diagnostics

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Author Name: JV'n Dr. Anchit Gugnani

Published By: Women University Press

Publisher's Address: Jayoti Vidyapeeth Women's University, Jaipur
Vedaant Gyan Valley,
Village-Jharna, Mahala Jobner Link Road, NH-8
Jaipur Ajmer Express Way,
Jaipur-303122, Rajasthan (INDIA)

Printer's Detail: Jayoti Publication Desk

Edition Detail: I

ISBN: 978-81-950200-9-6

2020

JAYOTI VIDYAPEETH WOMENS UNIVERSITY, JAIPUR

Dr ANCHIT GUGNANI
MPT (N) Ph.D

NEURAL MOBILIZATION IN MICRODISCETOMY SUBJECTS

A SUMMARY OF EVIDENCE PROVING THE EFFICACY OF NEURAL MOBILIZAION IN SUBJECTS WHO HAVE UNDERGONE SPINAL SURGERY AFTER A PROLAPSED INTER-VERTIBRAL DISC

NEURAL MOBILIZATION

IN

MICRODISCETOMY SUBJECTS

DEDICATION

This project is dedicated to Almighty and my family.

ACKNOWLEDGEMENT

I thank the Almighty for giving me the courage, strength and will power to embark upon and accomplish this project.

I am grateful to Dr. Panckaj Garg, Founder and advisor of Jayoti Vidyapeeth Womens University, Jaipur, for showing keen interest in my work and helping me out in maneuvering umpteen problems whenever approached.

I would like to thank Mr Sanjay Vohra for helping me out with statistical analysis.. I cannot forget to thank my wife, my colleagues and friends who have helped me whenever I needed them. Last but not the least I would like to thank all my subjects who participated in the study.

INDEX

CHAPTER 1

INTRODUCTION

Interverteberal disc prolapsed usually occurs with a sudden physical event, such as lifting a heavy object or sneezing and it causes nerve impingement and inflammation resulting in radicular pain or sciatica. The pain is deep and sharp, progressing downward in the involved leg. The onset is associated with a snapping or tearing sensation in the lumbar area. Degenerative disc disease and interverteberal disc prolapsed accounts for the maximum number of cases resulting in LBP. This disc herniation occurring is mainly due to the degenerative changes in the spine with associated radiation of pain down the leg commonly called as sciatica. More than 90% of symptomatic disc prolapsed occur at the L4- L5 and L5-S1 levels with a positive straight leg raise test.[4]

R.Parshad , M.F.Hooda et al examined in India the socio demographic characters of diagnosed case of lumbar disc prolapsed in India and they found that the most common age of presentation was 31-40 years (33.3%) followed by 21 -30 years(23.3%)with the highest percentage of patient (89.4%)were between 21-60 years. when level of disc prolapsed was taken into consideration L4-L5 disc prolapsed was most common 34.4% followed by L5-S1(26.7%)and multiple level disc prolapsed 25.6%.[36]

The studies have proved that disk herniation is often associated with low back pain and radicular symptoms. When resulting from a sudden force or normal biomechanical alteration in spine, the disc herniation causes nerve impingement and inflammation resulting in radicular pain. The pain is deep and sharp, progressing downward in the involved leg and is also called as sciatica; which may continues even though the back pain resolves. The pain may be very severe, limiting ambulation.[4]

Interverteberal disc prolapse can be treated by both conservative and surgical approaches. Whenever a surgical treatment is required, the most often opted surgery is microdisectomy but resulting perineural fibrosis is an unavoidable associated complication leading to high incidence of residual back pain.[6]

The lumbar epidural scar that may occur after lumbar discectomy replaces the normal epidural fat with fibrotic tissue and binds the dura and nerve roots to the surrounding structures resulting in a perineural fibrosis. Literature supports that this scar tissue may lead to postoperative symptoms because the nerve fibers that are encased in scar tissue, are subjected to increased tension, impaired axoplasmic transport, restricted arterial supply and venous return. [29]

Spinal nerve roots and dorsal root ganglia are sensitive to these mechanical deformations and the compression of nerve tissue resulting in symptoms such as pain and numbness. Also the mechanical tethering of the nerve root or the dura may cause chronic low back pain and lower extremity pain following the surgery.[30]

Parke and Watanabe demonstrated epidural adhesions in 40% of cadavers with lumbar disc herniation at L4-L5, 36% at L5-S1, and in 16% at the L3-L4 level. They also suggested that perineural fibrosis can interfere with cerebrospinal fluid mediated nutrition, which can render the nerve roots hyperesthetic and hypersensitive to compression.[32]

With the high incidence of decreased nerve mobility being an associated complication, many neurodynamic techniques by David S butler have recently been incorporated post surgically for the treatment of the same. As per the suggested involvement of lower lumbar regions by perineural fibrosis, sciatic nerve mobility is most commonly found to be impaired resulting in radicular and residual pain symptoms affecting the functional independence of the patients.[24]

Till date only few researches has been published which studied the effect of sciatic nerve mobilization in post surgical PIVD subjects. As sciatic nerve mobility and post surgical perineural fibrosis seems to be directly related, this study aims at finding out whether early sciatic nerve mobilization can reduce the recurrence of post surgical radiating back pain and improve the functional performance of the patient.[25]

Functional independence being a qualitative measure is an important feedback of a successful surgery. Many scales are being used currently for the functional independence evaluation in post surgical back pain patients.[13]

Oswestry low back ache questionnaire being one of the widely used and highly reliable scale is being used to determine outcome in this research. Straight leg raise (SLR) has also been evaluated pre and post surgery (microdiscectomy) and intervention to ensure increase in sciatic nerve mobility.[20]

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Operational definitions

Low back ache: Thus low back pain is usually defined as pain, muscle tension, or stiffness localized below the costal margin and above the inferior gluteal folds, with or without leg pain sciatica and acute back pain is defined as any pain of duration less than 12 weeks.

PIVD: protrusion or extrusion of the nucleus pulposus through a rent in the annulus fibrosus. if the disk protrudes to 1 side , it may irritate the dural covering of the adjacent nerve root causing pain in buttock, post thigh and calf characteristic of sciatica.

Sciatica: sciatica is a term used to describe pain radiating from the buttock into the thigh and calf more or less in the distribution of sciatic nerve.

SLR: it stands for straight leg raise. It is also known as lasegues test and is used as a diagnostic tool for low back ache in PIVD.

Oswestry low back ache questionnaire: Modified oswestry low back ache Questionnaire is a functional independence evaluation scale which consists of 50 possible points and the severity can be judged by the score.

Scoring: 50 possible points

A = 0 0-4 = No Disability

B = 1 5-14 = Mild

C = 2 15-24 = Moderate

D = 3 25-34 = Severe

E = 4 > 34 = Complete

F = 5

Minimal Clinically Important Change: 6 points

Sensitivity: 91%

Specificity: 83%

ICC Reliability Coefficient: 0.90 as compared to Quebec pain disability

Perineural fibrosis: lumbar epidural scar can occur after disectomy replacing the normal epidural fat with fibrotic tissue and binding the dura and nerve roots to the surrounding structures**.**

Microdiscectomy: In a microdisectomy or micro decompression spine surgery, a small portion of the bone over the nerve root and/or disc material from under the nerve root is removed to relieve neural impingement and provide more room for the nerve to heal.

Organization of remaining chapters

The remaining chapters of this study are organized as follows. Chapter 2 deals with the objective. Chapter 3 deals with the review of literature Chapter 4 describes the procedures used in this study, including a description of subjects, equipments used and method of data collection. Chapter 5 deals with data analysis. The results of the study are discussed in chapter 6. Chapter 7 contains the discussion of the results. Chapter 8 contains the conclusion of this study. Chapter 9 contains the summary. References are given in chapter 10 followed by appendix.

CHAPTER 2

OBJECTIVE

STATEMENT OF QUESTION

Can sciatic nerve mobilization improve functional outcome in post surgical disc prolapsed subjects?

AIM OF STUDY

To determine the effectiveness of sciatic nerve mobilization in improving SLR and functional outcome in post microdiscectomy subjects.

NEED OF STUDY

The need of the present study was to formulate an effective treatment protocol to prevent post surgical perineural fibrosis in PIVD subjects.

RESEARCH HYPOTHESIS

EXPERIMENTAL HYPOTHESIS

Sciatic nerve mobilization group will show a more significant improvement in SLR ranges and on modified oswsestry scale as compared to the control group.

NULL HYPOTHESIS

Sciatic nerve mobilization group may not show more significant improvement in SLR ranges and modified oswestry scale as compared to the control group.

CHAPTER 3

REVIEW OF LITERATURE

This chapter deals with the view of literature associated with backache, PIVD, surgical procedure (microdiscectomy), perineural fibrosis, SLR test, sciatic nerve mobilization, Oswestry disability questionnaire.

LOW BACK ACHE

Low back pain is usually defined as pain, muscle tension, or stiffness localized below the costal margin and above the inferior glutei folds, with or without leg pain (sciatica). Non-specific low back pain is defined as symptoms without clear specific cause, i.e. low back pain of unknown origin.[1]

Low back pain should be considered a symptom, rather than a diagnosis. (Reported in a literature 2004 Canadian Institute for the Relief of Pain and Disability and the Massage Therapists Association of British Columbia).[1]

Anthony H Wheeler, MD Pain and orthopedic neurology in his book stated that low back ache is defined as chronic, after three months because most normal connective tissues heal within 6-12 weeks, unless path anatomic instability persists.

R. Parshad , M.F.Hooda et al Incidence and prevalence in India examined the socio demographic characters of diagnosed cases of lumbar disc prolapsed in India and they found that the most common age of presentation was 31-40 years (33.3%) followed by 21 -30 years(23.3%)with the highest percentage of patient (89.4%) being between 21-60 years. When level of disc prolapsed was taken into consideration l4 l5 disc prolapsed was most the common 34.4% followed by L5-S1 (26.7%) and multiple level disc prolapsed 25.6%.[36]

Low back pain is one of the most common symptoms evaluated and treated by primary care physicians. It is found that most episodes of low back pain resolve over a 2-month period. Most back pain cases are the result of mechanical sources of injury with PIVD being the most common cause.[2]

PROLAPSED INTERVERTEBRAL DISC

Interverteberal disc herniation usually occurs with a sudden physical event, such as lifting a heavy object or sneezing and it causes nerve impingement and inflammation resulting in radicular pain or sciatica. The pain is deep and sharp, progressing downward in the involved leg. The onset is associated with a snapping or tearing sensation in the lumbar area (Reported by David Brownstein 1998)[4]

Dr.J.J.A.Moij, Dr.R.T.W.M et al described that there are variable cause and symptoms of low back ache. Based on the duration of symptoms the low back ache can be classified into Transient low back pain, acute low back pain and chronic low back pain. And some Referred causes.[35]

Mechanical low back or leg pain accounts for 97 % of all case of LBP. Degenerative disc disease and herniated disc accounts for the maximum number of cases resulting in LBP.

This disc herniation occurring is mainly due to the degenerative changes in the spine with associated radiation of pain down the leg commonly called as sciatica. More than 90% of symptomatic disc hernias occur at the L4- L5 and L5-S1 levels with a positive straight leg raise test.[4]

Maarten H. Copper et al has reported that Discogenic pain most commonly affects the lower back, buttocks and hips and is likely due to internal disc degeneration. Disc degeneration is likely due to the injury and subsequent repair of annulus fibrosis. Also progressive annular breakdown and tearing of annulus stimulates pain fibers giving rise to sensation of low back ache. Concentrating on the disc herniation, lumbar region of the spine is the most commonly affected region. The lumbar disc herniation most commonly occurs in people of age between 20 to 50 years, lowest disc of the spine (L5/S1) being most commonly affected with the disc above (L4/L5) being the second most common.

They also stated the factors that lead to the low back ache they are mechanical. Genetically, psychological, social and nutritional cause is the most common factors.[2]

TREATMENT FOR PIVD

David.S.Brownstein postulated that the treatment for most patients with a herniated disc is non operative, because 80% will respond to conservative medical therapy when

followed over a 5-year period. Education is essential for a successful outcome because the patient must understand the natural history of resolution of disc herniation. The initial component of therapy is controlled physical activity. Walking is encouraged as soon as the back and leg pain lessens. Drug therapy in the form of NSAIDs, analgesics, and muscle relaxants are helpful to decrease pain. NSAIDs are important for the control of back and leg pain since inflammation of the nerve root is the source of sciatica in disc patients. NSAIDs with prolonged action may be better able to control symptoms. Analgesic medications, including narcotics, are used for severe pain. Other analgesics are substituted for narcotics as soon as pain is diminished. Epidural corticosteroid injections are indicated for patients who continue with sciatica and do not respond to 4 to 8 weeks of conservative therapy. Surgical intervention (discectomy) is reserved for patients in whom all forms of conservative therapy fail and who have a concordance of sciatica, abnormal physical findings, and confirmatory radiographic tests.[4]

Dr.Alok Ranjan and Dr.Rahul lath dept. of neuro surgery Apollo hospital Hyderabad and Andhra Pradesh has done a study on 124 PIVD subjects and concluded that microendoscopic diskectomy is a safe and effective procedure for disc prolapsed subjects but the prevalence of pain exists following after the surgery for the lumbar spine was reported by kuslich et al and this prevalence of pain following surgery of lumbar spine is also known as post lumbar laminectony syndrome. It is estimated that it occurs in 5%-40% of patients after surgical intervention which may be related to perineural fibrosis.[19]

MICRO DISCECTOMY

Peter F. Ulrich, Jr., MD described microdiscectomy or micro decompression spine surgery is a spinal surgical procedure where a small portion of the bone over the nerve root and/or disc material from under the nerve root is removed to relieve neural impingement and provide more room for the nerve to heal.[32]

A microdiscectomy is performed through a small (1 inch to 1 1/2 inch) incision in the midline of the low back. First, the back muscles (erector spinae) are lifted off the bony arch (lamina) of the spine. Since these back muscles run vertically, they can be moved out of the way rather than cut. The surgeon is then able to enter the spine by removing a membrane over the nerve roots (ligamentum flavum), and uses either operating glasses (loupes) or an operating microscope to visualize the nerve root. Often, a small portion of

the inside facet joint is removed both to facilitate access to the nerve root and to relieve pressure over the nerve. The nerve root is then gently moved to the side and the disc material is removed from under the nerve root.

Importantly, since almost all of the joints, ligaments and muscles are left intact, a microdiscectomy does not change the mechanical structure of the patient's lower spine (lumbar spine).[34]

PAHOPHYSIOLOGY OF PERINEURAL FIBROSIS

Ross et al looked at peridural scar after lumbar discectomy .and found that there was a significant relationship between extensive peridural scarring and recurrent radicular pain. They felt that epidural fibrosis caused pain in failed back surgeries and found that for every 25% increased in fibrosis, the risk of recurrent radicular pain increased 2.0 times and subjects with extensive fibrosis were 3.2 times more likely to have recurrent radicular pain.[29]

Harrington et al in their study stated that peri neural fibrosis occurs due to the inflammatory reactions which occur after the surgery and epidural adhesion can occur from leaking and degenerative disc prior to the spinal surgery they also stated that hematoma formation in the epidural space during the post operated period is invaded by dense fibrous tissue from the periosteum and the deep surface of Para vertebral musculature. Fibrous tissue in the epidural space may adhere to the dura matter and nerve roots this causes a mechanical tethering of the nerve roots or the dura. Mechanical tethering may contribute to chronic low back pain and lower extremity following lumbar laminectomy in a significant PIVD subjects.[30]

L.A.Rocca and Macnab have demonstrated the presence of fibrous connective tissue causing epidural fibrosis into a post operative hematoma.[6]

J.S.lipetz they have stated in their study that chronic nerve root irritation and edema may lead to fibroblast infiltration and fibrosis formation within the injured neural tissue prolonged impairedment of nerve root’s nutritional supply also may lead to accumulation of waste products these products may include acidic components that can alter the local ionic balance within the nerve roots leading to more sustained pain production. Thus chronic fibrosis also can impair neural gliding leading to superimposed stress injuries that further contribute to chronic injury process.

Spinal nerve roots and their nutrient vessels lack a perineurium and demonstrate a poorly developed epineurium, rendering them particularly vulnerable to mechanical injury. Additionally, the blood supply to spinal nerve roots is not as secure as that to their peripheral nerve counterparts.

It is likely that the most pertinent mechanical effect of herniated disc material or degenerative stenosis on neural tissue is one of increased pressure. In vivo studies of the effect of pressure on nerve roots have revealed that the first effect probably is one of impaired venous blood flow within the vasa nervorum, which can be observed initially with compressive pressures as low as 5 to 10 mm Hg.

At these levels, capillary stasis and ischemia have been observed. Partial blockage of axonal transport also can be observed with pressure as low as 10 mm Hg. At approximately 50 mm Hg, local capillary permeability increases, resulting in an extravasation of albumin and local edema. Nerve conduction failure first occur when pressures of 50 to 75 mm Hg are sustained for 1 to 2hours, and neural ischemia can be complete with compressive exposures that reach 70 to 130 mm Hg. Although local compression of neural tissue may induce direct structural insults, including deformation of the nodes of Ranvier and Para nodal myelin, such effects typically occur with higher sustained pressures. The injuries more commonly observed in association with lower compressive exposures (i.e., less than 200 mm Hg) likely arise in the setting of impaired blood and nutritional supply to neural tissue. Compression o the peri radicular plexus within the foramen and resultant blood stasis can lead to congestion, ischemia, intraneural edema, and increased intraneural pressure.[28]

Jeffrey S.Ross et al in their study stated that lumbar epidural scar may occur after lumbar diskectomy, replacing the normal epidural fat with fibrotic tissue and binding the dura and nerve roots to the surroundings structures. The literature provides both clinical and scientific evidence that scar tissue may lead to post operative symptoms. Nerve fibers that are encased in the scar tissue are subjected to increased tension, impaired axoplasmic transport and restricted arterial supply and venous return and may lead to post operative pain and numbness symptoms.[29]

Parke and Watanabe demonstrated epidural adhesions in 40% of subjects with lumbar disc herniation at L4-L5, 36% at L5-S1, and in 16% at the L3-L4 level. Perineural fibrosis can interfere with cerebrospinal fluid mediated nutrition, which can render the nerve roots hyper esthetic and hypersensitive to compression.

To overcome the problem of perineural fibrosis the neural mobilization intervention is effective. Physiotherapy Management focused on mobility and education to facilitate early discharge with most patients being given exercises. However, there was a wide variation in the actual exercises prescribed. There was more variation in the provision of outpatient physiotherapy treatment. Not all patients have access to physiotherapy treatment post discharge in the UK and when treatment was available the content and amount was variable. This study raises many research questions and highlights the need for future research to optimize patient rehabilitation following first time lumbar discectomy.[32]

STRAIGHT LEG RAISE (LAISSEGUE TEST)

David J. Magee B.P.T PhD In his book of orthopedic physical assessment he described SLR test. It is done in complete relaxed supine position. It is one of the most common neurological tests of the lower limb. It is a passive test, and each leg is tested individually with the normal leg being tested first. With the patient in the supine position, the hip medially rotated and adducted, and the knee extended, the examiner flexes the hip until the patient complains of pain or tightness in the back or back of the leg. If the pain is primarily back pain, it is more likely a disc herniation or the pathology causing the pressure is more central. If pain is primarily in the leg, it is more likely that the pathology causing pressure on neurological tissue is more lateral. Disc herniation or pathology causing pressure between the two extremes is more likely to cause pain in both the areas. The examiner then slowly and carefully drops the leg back slightly until the patients feel no pain or tightness. Modifications of the SLR can be used to stress different peripheral nerves to a greater degree; these are referred to as SLR test with particular nerve bias.[27]

Dynamics of single SLR test:

- 0-35degree slack in sciatic arborization taken up during this range no dural movement.
- At 35 degree tension applied to sciatic roots.
- 35-70 degree sciatic nerve roots tense over interverteberal disc. Rate of deformation diminishes as angle increases.

- 70 degree practically no further deformation of roots occurs during further SLR. Pain is probably joint pain.[27]

NEURAL MOBILIZATION TECHNIQUE

David Butler and Jones School of Physical Therapy, stated in their study Endoneurial edema persists because the perineurial diffusion barrier does not allow inflammatory exudates to escape.

Persistent endoneurial edema leads to intraneural fibrosis and compromises the viscoelastic properties of neural connective tissues. When intraneural fibrosis has reduced the extensibility of neural connective tissues, already sensitized nociceptors in the Nervi nervorum and sinu-vertebral nerves will be subjected to more intense mechanical stimulation, because fibrotic connective tissues can no longer effectively attenuate the mechanical loads associated with daily and sport activities, or physical examination maneuvers. Consequently, intraneural fibrosis can further contribute to increased nociceptive input from Nervi nervorum and sinuvertebral nerves in peripheral neuropathic pain states.

Sensitization of neural connective tissue nociceptors proposed that conservative management incorporating neurodynamic and neurobiology education, nonneural tissue interventions, and neurodynamic mobilization techniques can be effective in addressing musculoskeletal peripheral neuropathic pain states.

Neural tissue mobilization techniques are passive or active movements that focus on restoring the ability of the nervous system to tolerate the normal compressive, friction, and tensile forces associated with daily and sport activities. It is hypothesized that these therapeutic movements can have a positive impact on symptoms by improving intraneural circulation, axoplasmic flow, neural connective tissue viscoelasticity, and by reducing sensitivity of AIGS.[24]

Cleland, Gladson et al they stated in their study that it was clear that neurodynamic techniques has a great role in management of sciatica resulted from herniated disc concerning pain and restoring mobility of nerve root. This comes agreement with who mentioned that when the nerve root was compressed and microcirculation was

compromised; and the pressure received by the nerve will affect the edema and the demyelination, neurodynamic techniques consists of short oscillatory movements and was sufficient to disperse the edema, thus alleviating the hypoxia and reducing the associated symptoms. It could also be directly associated with the immobilization reduction in the neurogenic inflammation. In addition, there is the hypothesis that nerve movement within pain-free variations can help to reduce nerve compression, friction and tension, therefore decreasing its mechanosensitivity. Therefore, a neurodynamic technique seems to be a better form of treatment when compared to passive stretching alone.[21, 22]

Man Ther. Abstract in 2006 reported in their study that slump stretching technique is beneficial in short term disability, pain and centralization symptoms.

Spine (Phila Pa 1976). Abstract: The straight leg raising test and the severity of symptoms in lumbar disc herniation a preoperative evaluation: In their study they stated there was an almost linear correlation between a positive straight leg raising test and pain at rest, pain at night, pain upon coughing, and reduction of walking capacity. Regular consumption of analgesics was more common in patients who had a very restricted positive straight leg raising test (30 degrees). A positive straight leg raising test early postoperatively correlated with inferior outcome of the surgical procedure.

Spine (Phila Pa 1976). The outcomes of lumbar microdiscectomy in a young, active population: correlation by herniation type and level.[25]

Dewing CB, et al they concluded in their study that the straight leg raising test as performed in clinical practice has a strong correlation with various parameters that signify the pain level of the patient. A positive straight leg raising test postoperatively correlates with inferior surgical outcome[10]

Microdiscectomy for symptomatic lumbar disc herniations in young, active patients with a preponderance of leg pain who have failed nonoperative treatment demonstrated a high success rate based on validated outcome measures, patient satisfaction, and return to active duty. Patients with disc herniations at the L5-S1 level had significantly better outcomes than did those at the L4-L5 level. Patients with sequestered or extruded lumbar disc herniations had significantly better outcomes than did those contained herniations. Patients with contained disc herniations, a predominance of back pain, on restricted duty and smoking should be counseled before surgery of the potential for less satisfaction, poorer outcomes scores, and decreased return to duty.[20]

Majlesi J, et al In their study they stated that the Slump test might be used more frequently as a sensitive physical examination tool in patients with symptoms of lumbar disc herniations. In contrast, owing to its higher specificity, the SLR test may especially help identify patients who have herniations with root compression requiring surgery.[24]

J Neurosurgery. Abstract: Significance of a persistent positive straight leg raising test after lumbar disc surgery.

Jönsson B, Strömqvist B. In their study they concluded that during the 2-year period, the reoperation rate was 18% (eight of 44) in patients with a positive postoperative SLR test compared with 4.5% (seven of 156) in patients whose postoperative SLR test was negative. A postoperative positive SLR test thus correlates to an unfavorable surgical outcome.[25]

Spine (Phila Pa 1976). A systematic review of the passive straight leg raising test as a diagnostic aid for low back pain.

Rebain R, Baxter GD et al Biomechanical devices improved intra- and interobserver reliability and so increased test reproducibility. Hamstrings were found to have a defensive role in protecting nerve roots by limiting PSLR range in cases of nerve root inflammation. A small diurnal variation in the PSLR may imply a poorer prognosis. A positive PSLR at 4 months after lumbar interverteberal disc surgery predicted poor reoperative outcome, and a negative 4-month PSLR predicted excellent outcome. The influence of psychosocial factors was not discussed, neither was the diagnostic significance of a negative PSLR outcome.[15]

Oswestry Disability Questionnaire

Fairbank JCT & Pynsent (2000) The Oswestry Disability Index spine: This questionnaire has been designed to give information regarding how the back or leg pain will affect the patient's ability to manage in everyday life.[12]

Davidson M & Keating J (2001) A comparison of five low back disability questionnaires: reliability and responsiveness: They stated that ODI and the Quebec pain and disability scale has sufficient reliability and scale width to be applied in an ambulatory group of population with LBA. [13]

Fritz JM, IRRGANG JJ et al: In their study they postulated the significance and the reliability of the Modified Low Back Pain Disability Questionnaire which consists of 50 possible points and the severity can be judged by the score.[17]

Scoring: 50 possible points

A = 0 0-4 = No Disability

B = 1 5-14 = Mild

C = 2 15-24 = Moderate

D = 3 25-34 = Severe

E = 4 > 34 = Complete

F = 5

Minimal Clinically Important Change: 6 points

Sensitivity: 91%

Specificity: 83%

ICC Reliability Coefficient: 0.90 as compared to Quebec pain disability.[17]

R. O. Niskanen oswestry low back pain disability questionnaire: a two-year follow-up of spine surgery patients. In their study in Finland they postulated that before an operation the average Oswestry index corresponded to severe disability on average. After successful treatment the Oswestry index dropped by 20–40 points on average. The more complex the problem the higher the postoperative lines remained. In his study he concluded that the results compared well with those of earlier studies.[14]

CHAPTER 4

METHOD

This chapter deals with the methods used for this study, these include information of the subjects, instrumentation used in the study and the intervention given.

SAMPLE

A sample of thirty PIVD subjects were selected to take part in the study based on the fulfillment of inclusion and exclusion criteria. The subjects were selected from the neuro surgery ward. The group consisted of fifteen subjects each in experimental group and control group, both male and females were allowed to take part in the study.

INCLUSION CRITERIA

- Age group between 30 to 60 years both male and female.
- Posterior lateral disc herniation surgery.
- Willingness to agree for neural mobilization intervention and testing.

EXCLUSION CRITERIA

- Any history of hip, knee and ankle surgery.
- Subjects with a post operative muscular weakness of ankle dorsiflexors, great toe extensors power less than grade 3 (myotomal level L2,L3,L4,L5,S1)
- Cauda equine syndromes.
- Any bladder and bowel involvement.
- Follow up case of PIVD.
- Multiple levels PIVD.
- Lumbar canal stenosis.

DESIGN

An experimental subject design was used in this study.

INSTRUMENTATION

Couch
Goniometer

SCALE

Oswestry disability questionnaire

PROTOCOL

A sample of thirty PIVD subjects fulfilling the inclusion criteria took part in this study. After taking the informed consent, the selected subjects were randomly divided into Group A (experimental) and Group B (control). All the subjects were dealt individually and were assessed for pre test functional disability by ODI questionnaire and the SLR range of motion. After assessing the initial ranges and disability scores, Group A received sciatic nerve mobilization along with conventional therapy whereas Group B received conventional physiotherapy alone. Both the groups were treated two times a day for three days. SLR ranges were recorded on the third and eighth post-op day whereas the Oswestry score was taken on the eighth post-op day for both the groups. The data recorded was used for analysis.

PROCEDURE

After taking the pre-test scores of Group A and Group B for functional disability and SLR range the subjects underwent the following treatment for the next three days.

Group B (control group) subjects underwent a standard physiotherapy treatment which included positioning, postural correction exercises, ankle toe movements, early mobilization to sitting and standing, and gait training. Subjects were also given electrotherapy if required. Back care advice was also given. The total therapy session lasted for 20-30 min.

The experimental group received sciatic nerve mobilization along with the conventional physiotherapy treatment. The experimental group underwent the following treatment protocol for three days.

On first post-op day Group A Subjects first received the conventional therapy same as group B; after that the pain free SLR was recorded by the goniometer. The sciatic nerve was mobilized in this pain free SLR range. To produce a sciatic nerve stretch, hip was maintained in flexion, adduction and internal rotation by the therapist while the knee was kept in extension. The therapist placed one hand under the ankle to provide support and by another hand the ankle was held in maximum dorsiflexion position with toes hyper extended. This Position was maintained for thirty seconds followed by relaxation period of five seconds. The stretch was repeated ten times within a session and two such sessions were given in a day. On subsequent days any change in pain free SLR range was recorded and the sciatic nerve was mobilized in the new range.

The treatment was given for three days in both the groups. Post test score of SLR range was recorded at the end of second treatment session of third day. Post test disability score was recorded on the day of suture removal i.e. eighth post-op day. Home exercise program and back care chart was given to both the groups.

Two examiners who were blinded for the study were used to take the pre-test and post-test scores to prevent any biasing. The scores obtained were sent for data analysis.

Data Acquisition

Based on the performance of the individual subject the data was collected and recorded on the data collection sheet. After completion of the study period the data was analyzed.

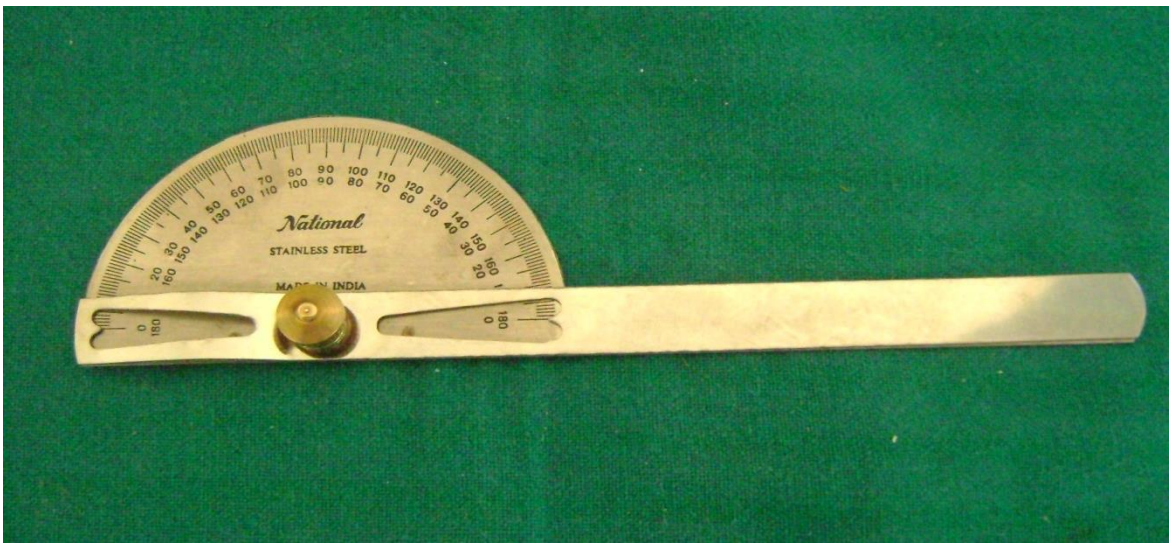


Figure: 4.1 Instrument used in the study

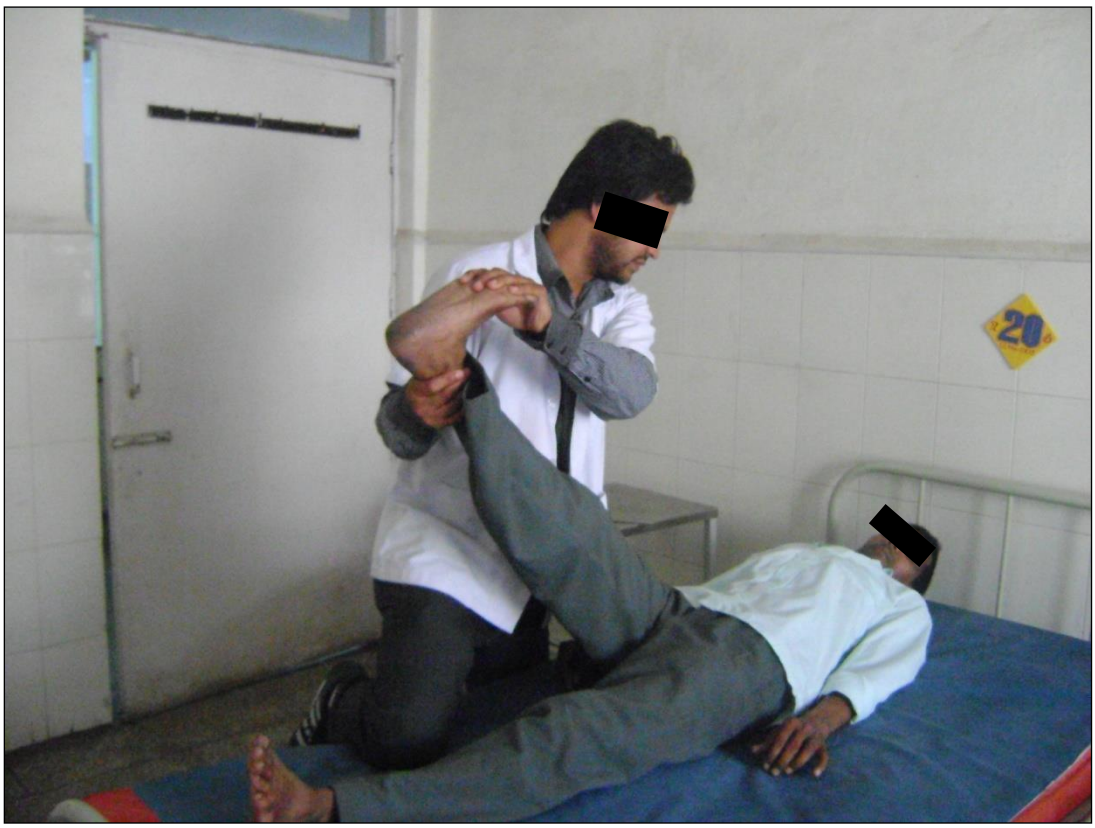


Figure 4.2: SLR Test

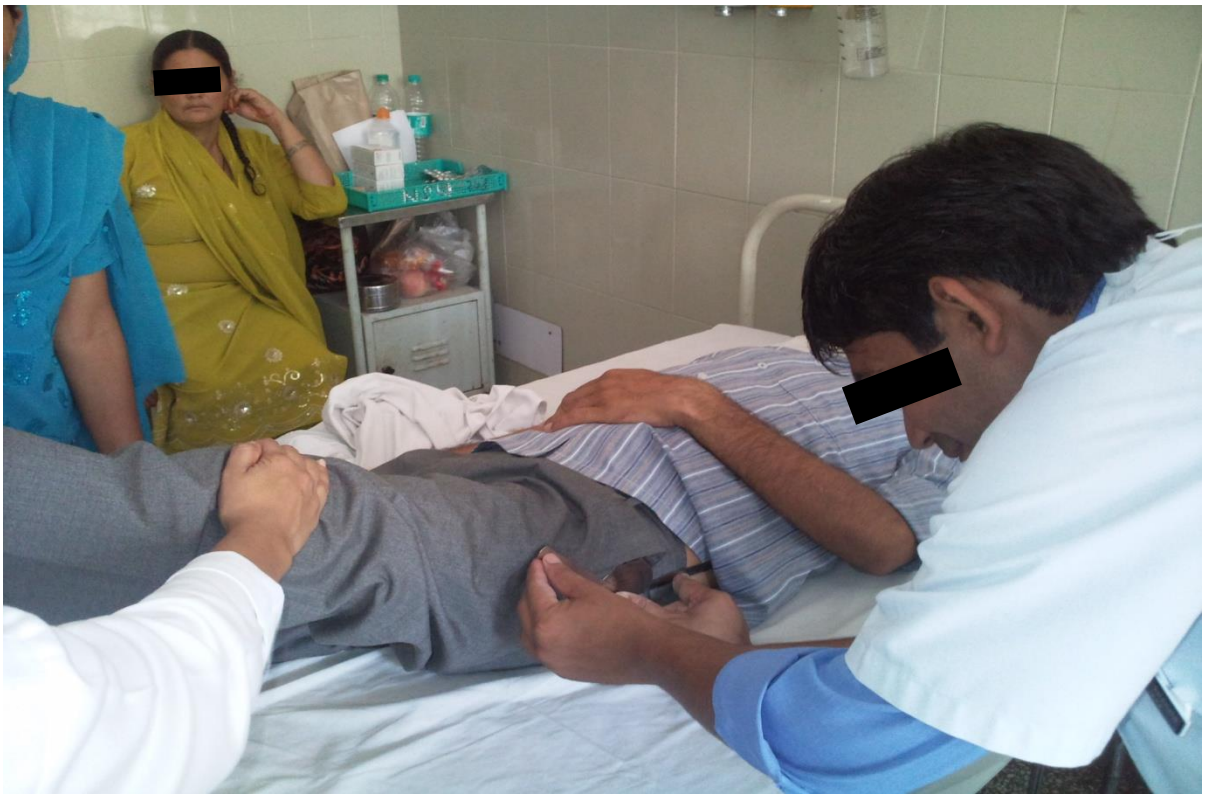


Figure: 4.3 Measuring the range of SLR test

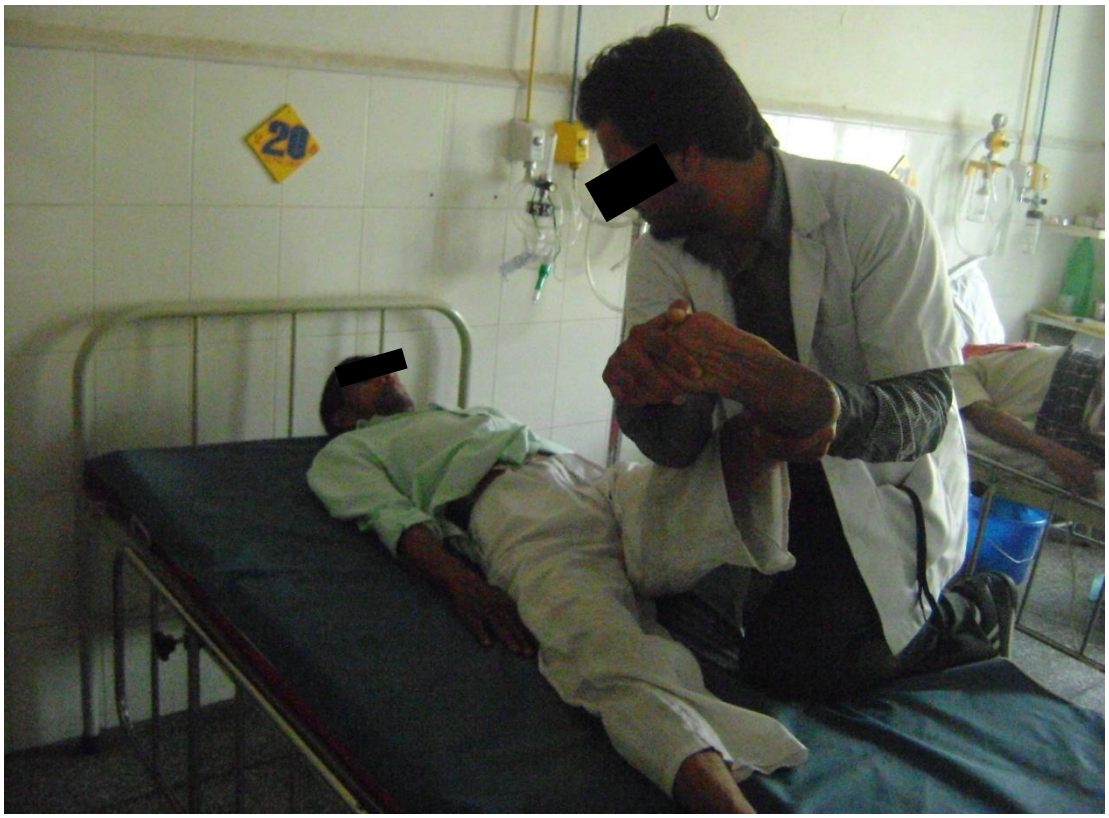


Figure 4.4: Neural mobilization intervention (Stretch given at pain free SLR range)

Statistics were performed by using SPSS software. Results were calculated by using 0.05 level of significance. Paired t-test and unpaired t-test was used to analyze and compare the scores within the group and between the groups respectively. The initial score and the range of initial SLR ranges were assessed and score after sciatic nerve mobilization were measured and compared. A significance level of $P<0.05$ was set for data analysis.

CHAPTER-5

DATA ANALYSIS

This chapter deals with the results of the data analysis for the pre intervention and the post intervention SLR ranges and functional disability index score in post surgical PIVD subjects.

Paired t-test and unpaired t-test was used to compare pre test and post test Oswestry disability questionnaire (ODI) score within and between groups A and B respectively.

Intra group analysis for ODI scores in group A and group B revealed.

Post ODI score for group (A) at day 8 (mean =42, SD=9.50) showed more significant improvement in functional disability as compared to pre ODI score for group (A) (mean= 69.73, SD= 8.31) with t value (12.61) and p value is (≤0.05)

Post ODI score for group (B) at day 8 (mean =60.80, SD=13.49) showed significant improvement in functional disability as compared to pre ODI score for group (B) at day 8 (mean= 69.6, SD= 12.83) with t value (3.44) and p value is (≤0.05)

Inter group analysis for ODI score in group A and B,

Pre ODI score for group (A) (mean=69.73, SD= 8.31) showed no significant improvement between pre ODI score of group (B) (mean= 69.60, SD= 12.83) with t value is (.032) and p value is (≥0.05)

Post ODI score for group (A) at day 8 (mean=42, SD= 9.50) showed more significant improvement as compared to post ODI score of group (B) at day 8 (mean= 60.80, SD=13.49) t value is (3.826) and p value is ((≤0.05).

Paired t-test and unpaired t-test was used to compare pre test, day 3 and post intervention SLR ranges within and between groups A and B respectively.

Intra group analysis for SLR ranges in group A and group B revealed.

Post SLR range for group (A) at day 3 (mean=50.46, SD=8.55) showed significant improvement in SLR range as compared to pre SLR range of group A (mean=43.13, SD=8.85) with t value (7.63) and p value is ((≤0.05).

Post SLR range for group (A) at day 8 (mean= 60.33, SD=10.85) showed significant improvement in SLR range as compared to pre SLR range of group A (mean=43.13, SD=8.85) with t value (7.63) and p value is ((≤0.05).

Post SLR range for group (A) at day 8 (mean= 60.33, SD=10.85) showed significant improvement in SLR range as compared to post SLR range at day 3 for group A (mean= 50.46, SD=8.55) with t value (7.22) and p value is (≤0.05).

Post SLR range for group (B) at day 3 (mean= 48.73, SD=10.59) showed significant improvement in SLR range as compared to pre SLR range for group B (mean= 45.6, SD=12.21) with t value (3.229) and p value is (≤0.05).

Post SLR range for group (B) at day 8 (mean= 52, SD=11.16) showed significant improvement in SLR range as compared to pre SLR range for group B (mean= 45.6, SD=12.21) with t value (9.38) and p value is (≤0.05).

Post SLR range for group (B) at day 8 (mean= 52, SD=11.16) showed significant improvement in SLR range as compared to post SLR range at day 3 for group B (mean= 48.73, SD=10.59) with t value (3.32) and p value is (≤0.05).

Inter group analysis for SLR ranges between group A and B revealed

Pre SLR range for group (A) (mean=43.13, SD= 8.85) showed no significant improvement between pre SLR range of group (B) (mean= 45.6, SD=12.21) with t value is (0.924) and p value is (≥0.05)

Post SLR range for group (A) at day 3 (mean= 50,SD= 8.8) showed slightly significant improvement between post SLR range at day 3 for group (B) (mean= 48.73, SD= 10.59) with t value is (1.226) and p value is (≥0.05)

Post SLR range for group (A) at day 8 (mean= 60.33, SD=10.85) showed more significant improvement as compared to post SLR range at day 8 for group B (mean= 52, SD=11.16) with t value is (3.219) and p value is (≤0.05)

Thus an overall analysis of various scores showed that SLR ranges increased more significantly in the experimental group A with an associated decrease in the Oswestry disability outcome scores.

Table 6.1 Mean, standard deviation t value and p value of comparison between the pre test and post test oswestry score (suture removal day) of group A.

Variable	Mean ± St deviation	T value	P value
Score , pre intervention	69.73 ± 8.31	12.61	≤ 0.05
Score , post intervention	42.00 ± 9.50		

Table 6.2 Mean, standard deviation t value and p value of comparison between the pre test and post test oswestry score Day 8 of group B.

Variable	Mean ± St deviation	T value	P value
Score, pre intervention	69.6 ± 12.83	3.44	≤0.05
Score, post intervention	60.80 ± 13.49		

Table 6.3 Mean, standard deviation t value and p value of comparison between the pre test oswestry score (suture removal day) for group A and B.

Variable	Mean ± st deviation	T value	P value
Pre score, group A	69.73 ± 8.31	.032	≥0.05
Pre score, group B	69.60 ± 12.83		

Table 6.4 Mean, standard deviation, t value and p value of comparison between post intervention oswestry score (suture removal day) for group A and B.

Variables	Post treatment Mean ± St. deviation	T value	P value
Post score, group A	42.00 ± 9.50	3.826	≤ 0.05
Post score, group B	60.80 ± 13.49		

Table 6.5 Mean, standard deviation, t value and p value of comparison between pre and post intervention (day 3) SLR range for group A.

Variables	Mean ± St deviation	T value	P value
Pre intervention range	43.13 ± 8.85	4.737	≤ 0.05
Post intervention range (day 3)	50.46 ± 8.55		

Table 6.6 Mean, standard deviation, t value and p value of comparison between pre and post intervention (day 8) SLR range for group A.

Variables	Mean	St deviation	T value	P value
Pre intervention range	43.13	8.85	7.63	≤ 0.05
Post intervention	60.33	10.85		

range (day 8)				

Fig 6.7 Mean, standard deviation, t value and p value of comparison between post intervention (day 3) and post intervention (day 8) SLR range for group A.

Variables	Mean	St deviation	T value	P value
Post intervention (day 3)	50.46	8.55	7.22	≤ 0.05
Post intervention range (day 8)	60.33	10.85		

Fig 6.8 Mean, standard deviation, t value and p value of comparison between pre SLR ranges for group A and B.

Variables	Mean	St deviation	T value	P value
Pre SLR range , group A	43.13	12.8	0.924	≥ 0.05
Pre SLR range , Group B	45.6	12.2		

Fig 6.9 Mean, standard deviation, t value and p value of comparison between post SLR ranges (day 3) for group A and B.

Variables	Mean	St deviation	T value	P value
Post SLR range , group A	50.00	8.8	1.226	≥ 0.05
Post SLR range , Group B	48.73	10.59		

Fig 6.10 Mean, standard deviation, t value and p value of comparison between post SLR ranges (day 8) for group A and B.

Variables	Mean	St deviation	T value	P value
Post SLR range , group A	60.33	10.85	3.219	≤ 0.05
Post SLR range , Group B	52.00	11.16		

Fig 6.11 Mean, standard deviation, t value and p value of comparison between pre SLR range and post SLR ranges (day 3) for group B.

Variables	Mean	St deviation	T value	P value
Pre SLR range , group B	45.6	12.21	3.229	≤ 0.05
Post SLR range , Group B (day 3)	48.73	10.59		

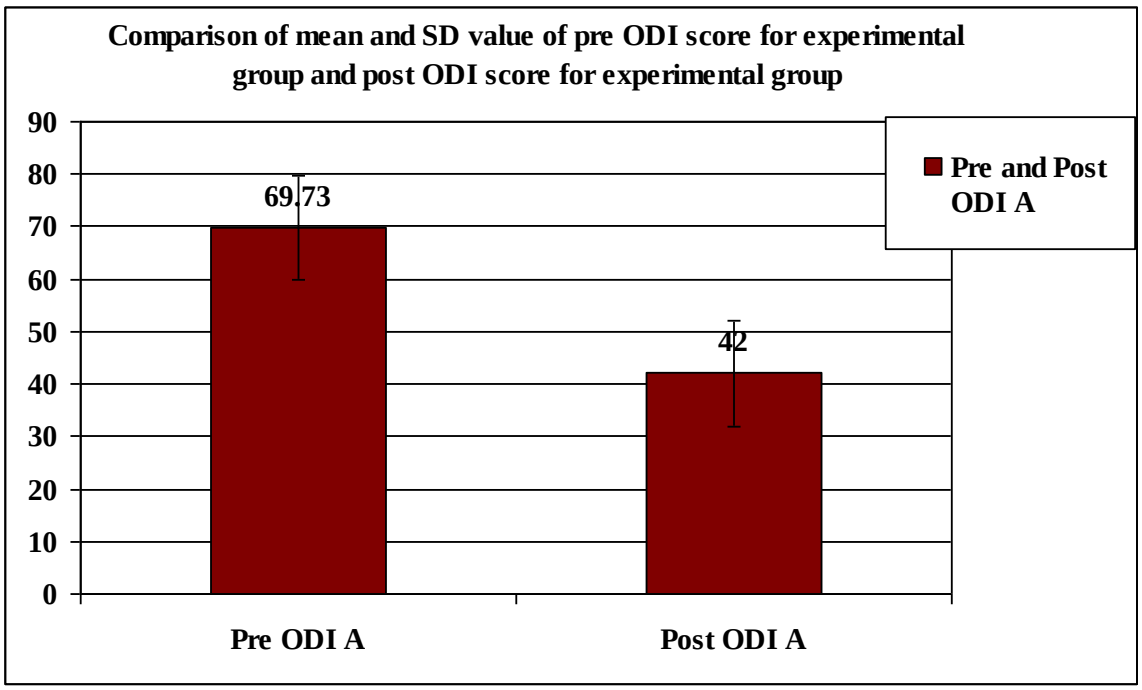
Fig 6.12 Mean, standard deviation, t value and p value of comparison between pre SLR range and post SLR range (day 8) for group B.

Variables	Mean	St deviation	T value	P value
Pre SLR range , group B	45.6	12.21	9.38	≤ 0.05
Post SLR range , Group B (day 8)	52	11.16		

Fig 6.13 Mean, standard deviation, t value and p value of comparison between post SLR range (day 3) and post SLR range (day 8) for group B.

Variables	Mean	St deviation	T value	P value
Pre SLR range , group B	48.7	10.59	3.323	≤ 0.05
Post SLR range , Group B (day 8)	52	11.16		

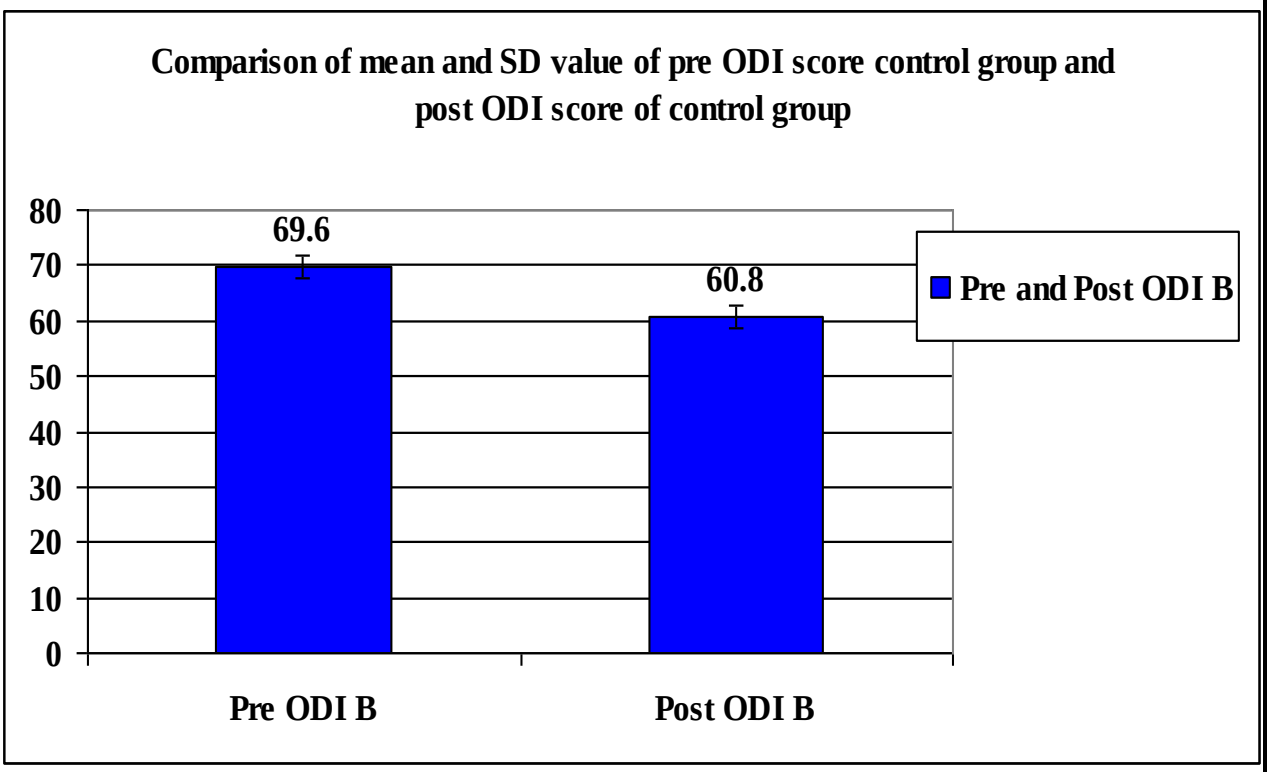
Fig 6.1: Comparison of mean and SD of pre ODI score of experimental group and post ODI score for experimental group



Pre ODI A: Pre intervention Oswestry disability index score of experimental group A

Post ODI A: Post intervention Oswestry disability index score of experimental group A

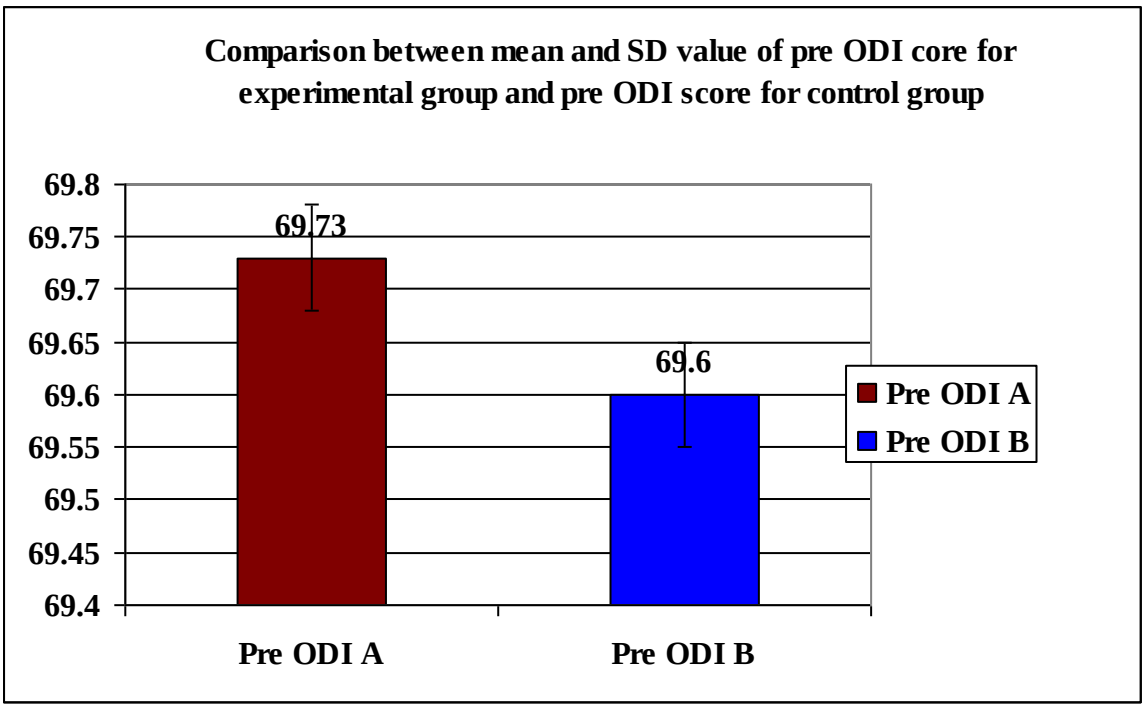
Fig 6.2: Comparison of mean and SD of pre ODI score for control group and post ODI score for control group



Pre ODI B: Pre intervention Oswestry disability score of control group B

Post ODI B: Post intervention Oswestry disability score of control group B

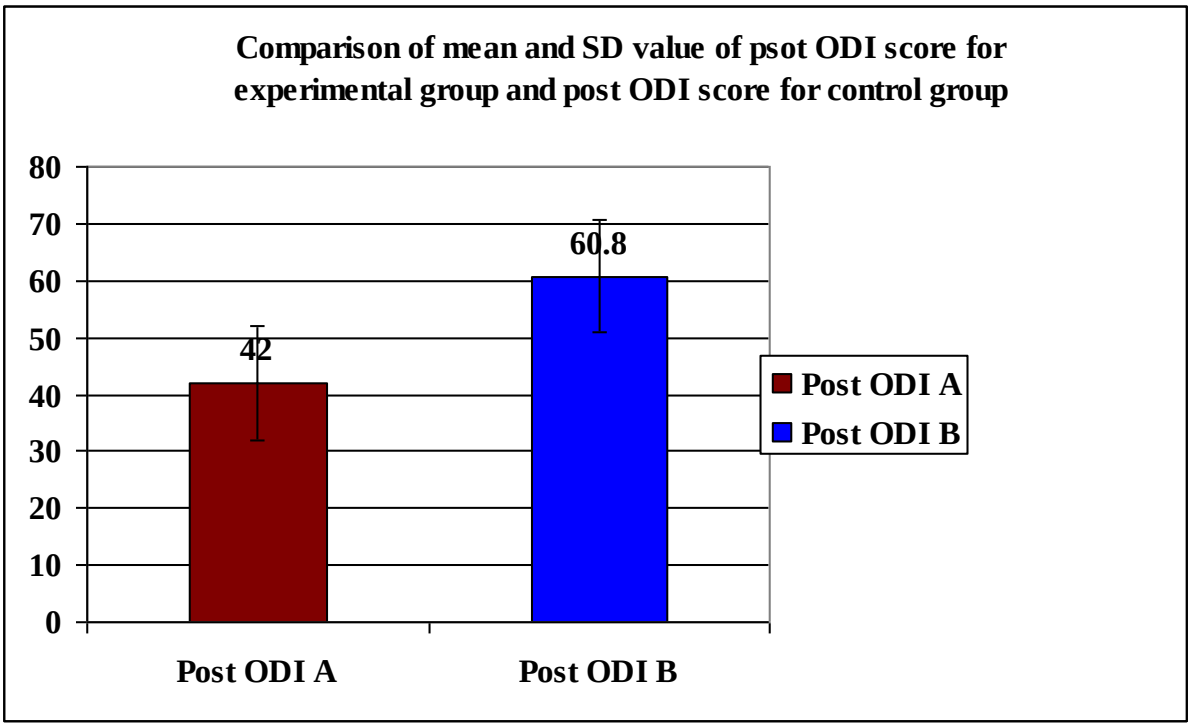
Fig 6.3: Comparison of mean and SD of pre ODI score for control group and pre ODI score of experimental group



Pre ODI A: Pre intervention Oswestry disability index score of experimental group A

Pre ODI B: Pre intervention Oswestry disability index score of control group B

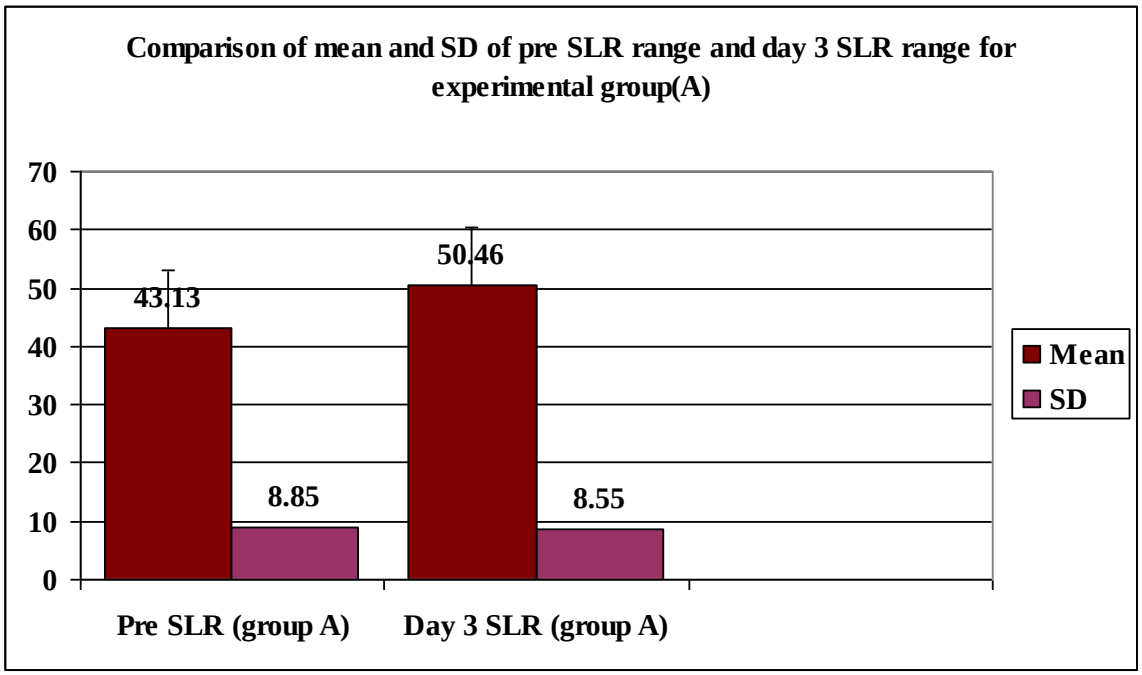
Fig 6.4: Comparison of mean and SD of post ODI score for control group and post ODI score for experimental group



Post ODI A: Post intervention Oswestry disability index score of experimental group A

Post ODI B: Post intervention Oswestry disability index score of control group B

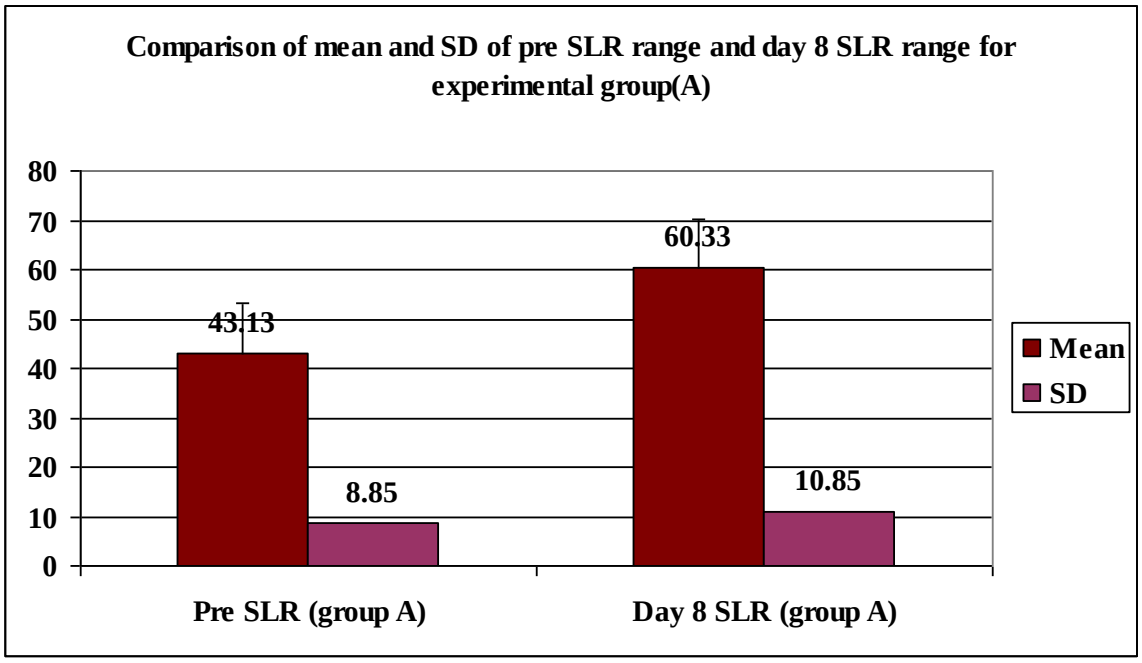
Fig 6.5: Comparison of mean and SD of pre SLR range and day 3 SLR range for experimental group



Pre SLR (group A): Pre intervention SLR range for experimental group A

Day 3 SLR (group A): Day 3 SLR range for experimental group A

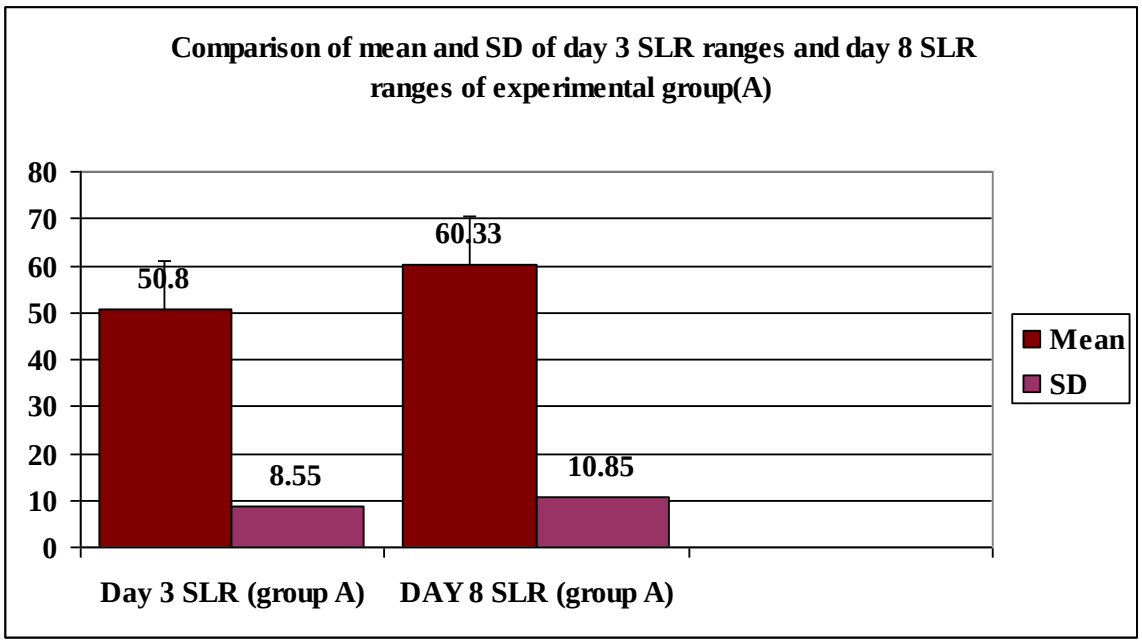
Fig 6.6: Comparison of mean and SD of pre SLR range and day 8 SLR range for experimental group



Pre SLR (group A): Pre intervention SLR range for experimental group A

Day 8 SLR (group A): Day 8 SLR range for experimental group A

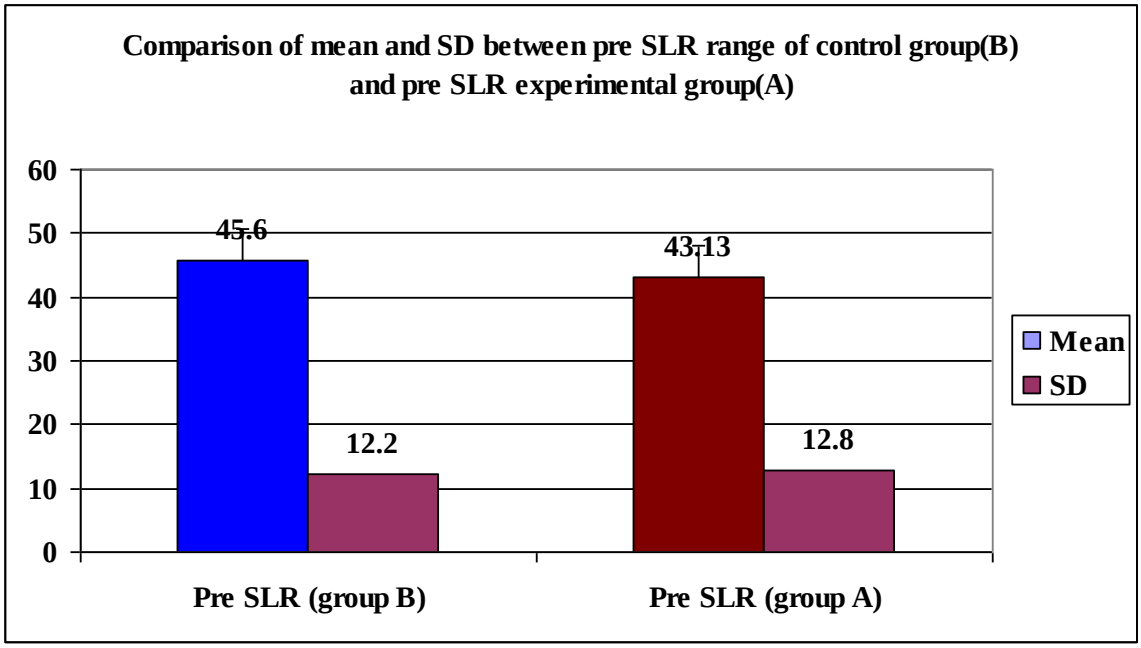
Fig 6.7: Comparison of mean and SD of day 3 SLR range and day 8 SLR range for experimental group



Day 3 SLR (group A): Day 3 SLR range for experimental group A

Day 8 SLR (group A): Day 8 SLR range for experimental group A

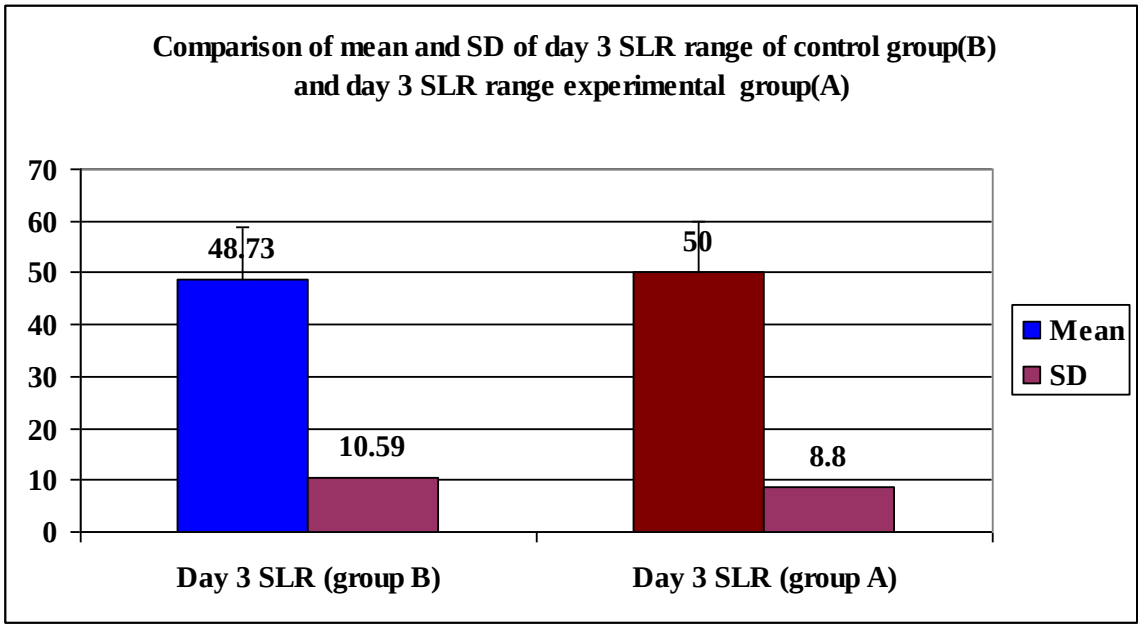
Fig 6.8: Comparison of mean and SD between pre SLR range of control group and pre SLR range experimental group



Pre SLR (group B): Pre intervention SLR range for control group B

Pre SLR (group A): Pre intervention SLR range for experimental group A

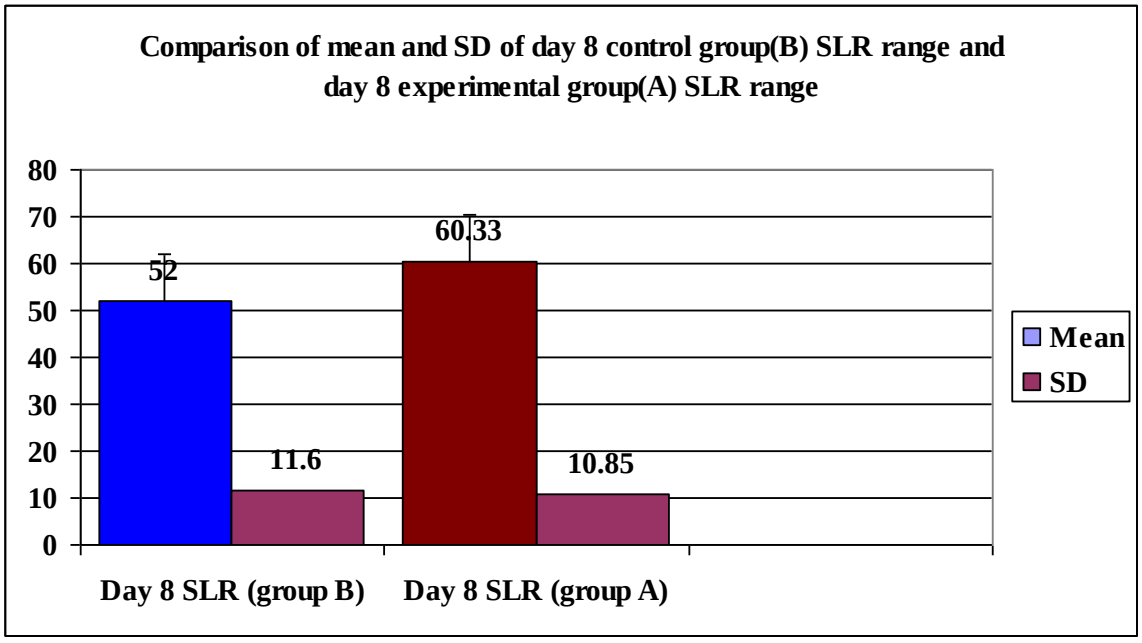
Fig 6.9: Comparison of mean and SD of day 3 SLR range of control group and day 3 SLR range of experimental group



Day 3 SLR (group B): Day 3 SLR range for control group B

Day 3 SLR (group A): Day 3 SLR range for experimental group A

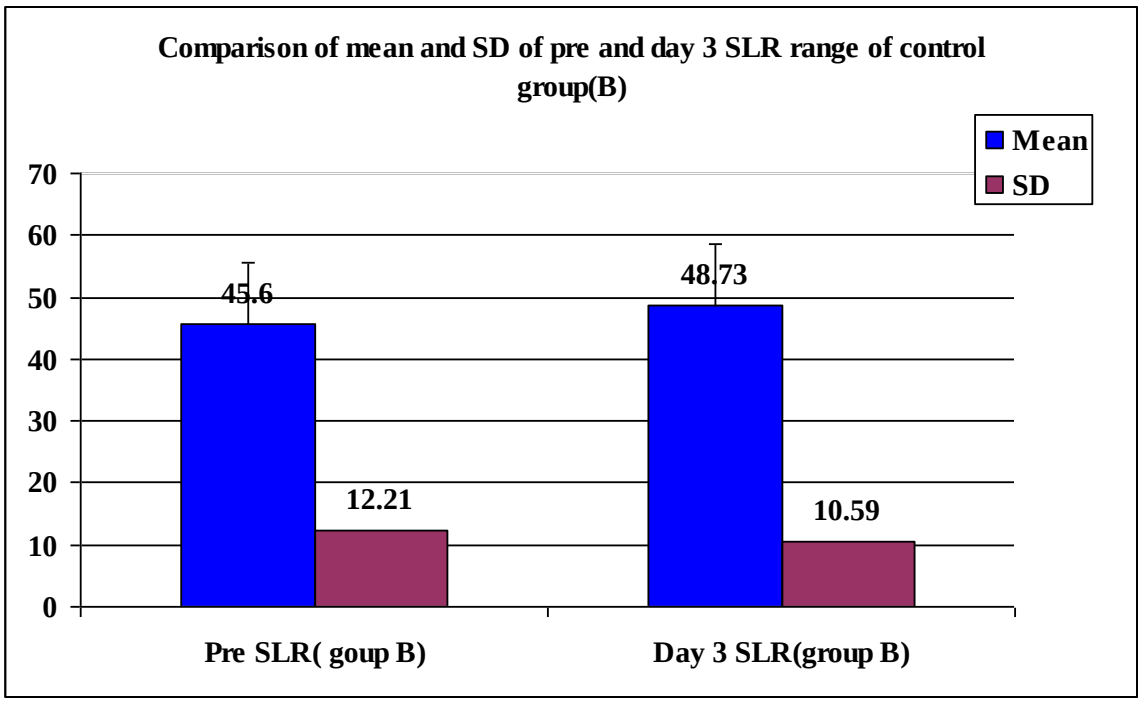
Fig 6.10: Comparison of mean and SD of day 8 control group SLR ranges and day 8 exp group SLR range



Day 8 SLR (group B): Day 8 SLR range for control group B

Day 8 SLR (group A): Day 8 SLR range for experimental group A

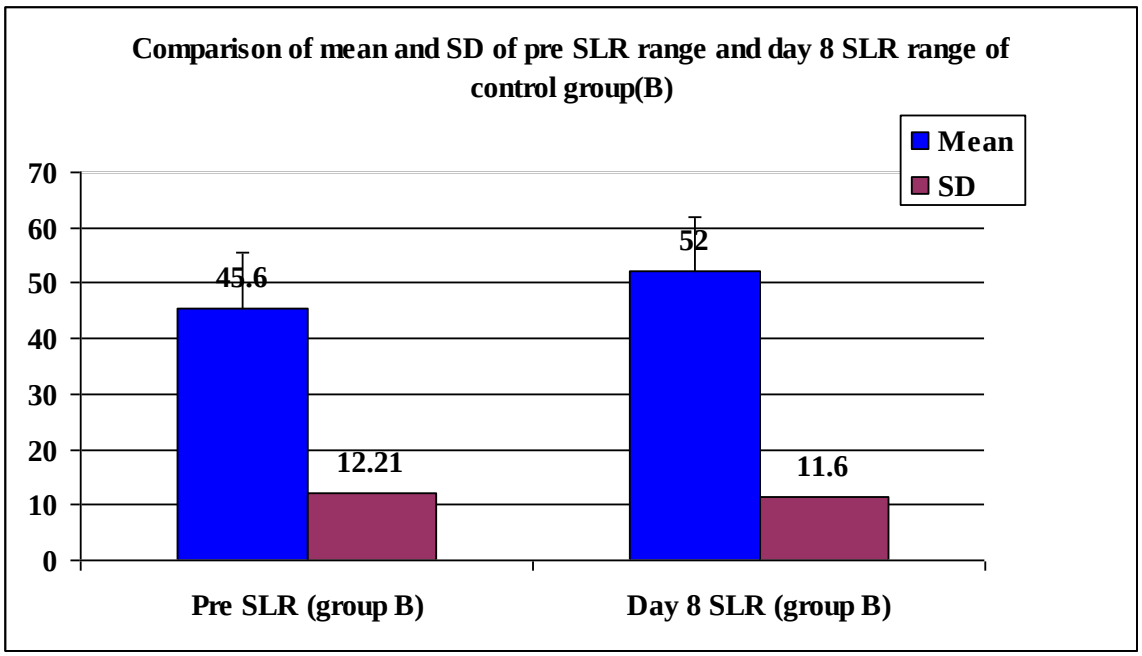
Fig 6.11: Comparison of mean and SD of pre SLR and day3 SLR range for control group



Pre SLR (group B): Pre intervention SLR range for control group B

Day 3 SLR (group B): Day 3 SLR range for control group B

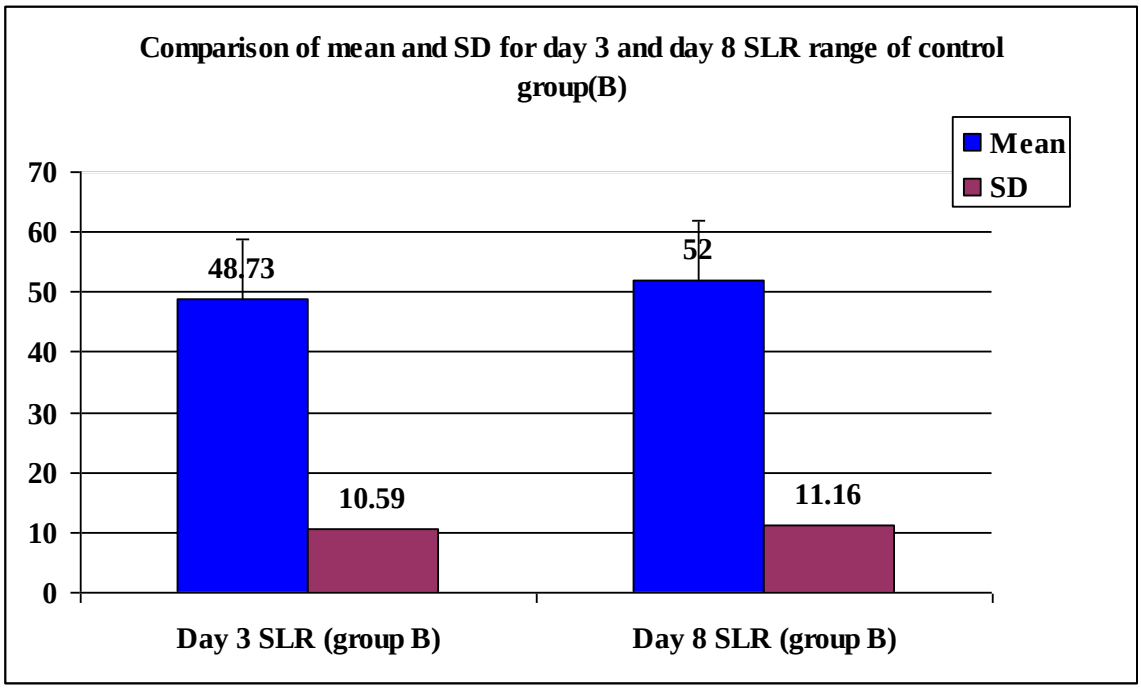
Fig 6.12: Comparison of mean and SD of pre SLR range and day 8 SLR range for control group



Pre SLR(group B): Pre intervention SLR range for control group B

Day 8 SLR(group B): Day 8 SLR range for control group B

Fig 6.13: Comparison of mean and SD for day 3 and day 8 SLR ranges for control group



Day 3 SLR (group B): Day 3 SLR range for control group B

Day 8 SLR (group B): Day 8 SLR range for control group B

CHAPTER 6

RESULTS

The results obtained revealed that although both the groups improved significantly in SLR ranges and Oswestry disability score but Group A (experimental group)showed more significant improvement as compared to group B (control group). The possible explanation for more significant improvement in group A could be the addressing of the problem of perineural fibrosis.

Group B i.e. conventional physiotherapy group showed significant changes in SLR ranges on day eight but no significant improvement was observed on day three. Functional outcome score although improved significantly on day eight in group B. The improvement noted signifies the effectiveness of surgical correction and post surgical physiotherapy management. However still six subjects out of fifteen in control group reported residual radiating pain of less intensity on eighth day i.e. on the day of suture removal.

Group A subjects showed significant improvement in SLR ranges on day three as well as day eight. Functional disability score also showed more significant improvement than group B.

The possible explanation for more significant improvement in Group A which received Sciatic nerve mobilization could be maintenance of nerve mobility and mobilization of roots which were kept mobile enough to prevent any chance of formation of scarring. Only two subjects in group A reported persistence of residual pain in lower extremity.

Therefore as proposed by McGill, [23] the neural mobilization techniques have an important role in effectively relieving pressure caused by intraneural and extraneural fibrosis, increasing vascular and axoplasmic flow, and restoring tissue mobility.[6, 7]

It was proved that neural mobilization techniques have a role in treatment of chronic low back pain and radiculopathy. This comes in agreement with Cleland et al [21], Gladson[22] et al, who mentioned that when the nerve root are compressed and microcirculation is compromised; then the pressure received by the nerve will affect the edema and the demyelization, neural mobilization techniques effectively disperse the edema, thus alleviating the hypoxia and reducing the associated symptoms. Therefore, sciatic nerve mobilization when given in combination to conventional physiotherapy treatment can significantly improves the functional outcome in post surgical PIVD subjects.

CHAPTER 7

DISCUSSION

Clinical implications

SLR stretching in addition to conventional physical therapy was proven beneficial in improving pain, reducing functional disability and promoting centralization of symptoms in post surgical PIVD subjects.

The neural mobilization technique therefore should be widely accepted and introduced in the post surgical rehabilitation protocol for PIVD patients.

Future research

The study can be done on a large sample size with long intervention duration. Effect of different protocols with different hold timings for sciatic nerve mobilization can also be studied and compared. Microdiscectomy can also be compared with hemi-laminectomy procedure for recovery in PIVD patients.

Limitations of the study

The small sample size of the study was a major limitation along with the short tenure of the intervention that was planned due to the inability of the subjects to stay in the hospital for a desired duration.

CHAPTER 8

CONCLUSION

Sciatic nerve mobilization group showed more significant improvement in functional disability scores and SLR ranges as compared to the control group. Significantly improved pain free SLR ranges suggest reduced perineural fibrosis in experimental group i.e. Group A

CHAPTER 9

SUMMARY

The objective of this study was to determine the effect of sciatic nerve mobilization on post surgical PIVD subjects and thereby the difference it makes in their functional independence, which was assessed by oswestry disability questionnaire. A comparative experimental approach was chosen for conducting the study and thirty subjects were randomly divided into two groups.

Pre test functional disability score was recorded by ODI questionnaire and the SLR range was also recorded. After assessing the initial ranges and disability scores, Group A received sciatic nerve mobilization in pain free SLR range along with conventional therapy whereas Group B received conventional physiotherapy alone. Both the groups were treated two times in a day for three days followed by four day home programme. SLR ranges were recorded on the third and eighth post-op day whereas the Oswestry disability score was taken on the eighth post-op day for both the groups.

The data collected was analyzed using paired and unpaired t test which shows that there are significant improvements in both the groups. On comparing both the groups, group A (sciatic nerve mobilization along with the conventional physiotherapy treatment) revealed better results than group B (conventional physiotherapy treatment).

Thus the study concluded that sciatic nerve mobilization when added to conventional physiotherapy treatment yields better functional outcome in post surgical PIVD subjects.

CHAPTER 10

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ANNEXURE-A

MASTER CHART

GROUP A- Experimental

Subject code	Gender	Age	Pre ODI score	Post ODI score	Pre SLR range	Day 3 SLR range	Day 8 SLR range
A1	0	30	70	40	45	50	70
A2	1	32	60	32	60	65	80
A3	1	50	68	34	40	45	55
A4	1	40	70	60	50	47	60
A5	0	45	72	48	44	54	64
A6	0	52	74	34	50	50	50
A7	1	45	60	38	55	60	65
A8	1	32	64	36	40	45	50
A9	1	45	74	42	35	40	45
A10	1	37	70	30	38	60	70
A11	1	45	86	54	30	45	60
A12	1	55	54	40	45	55	70
A13	0	40	80	48	35	42	54
A14	1	35	66	36	30	37	42
A15	1	55	78	58	50	62	70

MASTER CHART

GROUP B- Control

Subject code	Gender	Age	Pre ODI score	Post ODI score	Pre SLR range	Day 3 SLR range	Day 8 SLR range
B1	0	30	76	70	44	47	51
B2	1	32	80	76	56	58	60
B3	1	50	88	80	38	44	48
B4	1	45	90	70	46	48	50
B5	0	50	60	56	43	45	46
B6	0	52	54	46	56	49	65
B7	1	45	64	60	45	50	55
B8	1	56	74	70	35	38	40
B9	1	45	84	78	32	35	38
B10	1	40	68	60	65	70	70
B11	1	55	46	50	24	35	35
B12	1	45	56	48	67	68	70
B13	0	42	70	62	45	48	50
B14	1	35	62	54	34	40	42
B15	1	30	72	32	54	56	60

ASSESSMENT PERFORMA

1. DEMOGRAPHIC DATA:

- NAME:
- AGE:
- SEX:
- OCCUPATION:
- ADDRESS:
- CHIEF COMPLAINT:

2. HISTORY OF PRESENTING ILLNESS

3. HISTORY OF PAST ILLNESS:

4. FAMILY HISTORY:

5. PRESONAL HISTORY:

6. SOCIAL HISTORY:

7. PAST MEDICAL HISTORY:

ON OBSERVATION:

GENERAL OBSERVATION:

- BUILT:
- ATTITUDE OF LIMB:
- ANY DEFORMITY
- SCAR

ON PALPATION:

- SWELLING
- TENDERNESS
- WARMTH
- TONE

GENERAL EXAMINATION:

- VITAL SIGNS
- B.P
- H.R
- P.R
- TEMPERATURE

SYSTEMIC EXAMINATION:

- PAIN ASSESMENT BY VAS SCORE
- ONSET
- DURATION
- LOCATION

- CHARACTER

- AGGRAVATING AND RELIEVING FACTOR

SPECIAL TEST:

RIGHT LEFT

Pre SLR test:

AT DAY 3 SLR test:

AT THE TIME OF SUTURE REMOVAL SLR test:

MANUAL MUSCLE TESTING:

PRE OPERATIVELY AND POST OPERATIVELY RIGHT LEFT

- ANKLE DORSIFLEXORS
- PLANTAR FLEXORS
- HIP FLEXORS
- HIP EXTENSORS
- HIP ABDUCTORS
- HIP ADDUCTORS

NEUROLOGICAL EXAMINATION:

- DEEP TENDON REFLEXES

- SUPERFICIAL REFLEXES

- MUSCLE TONE :

HYPERTONIA

HYPOTONIA

SENSORY EXAMINATION:

INVESTIGATIONS:

SURGICAL MANAGEMENT:

PHYSIOTHERAPY INTERVENTION:

ANNEXURE-C

OSWESTRY LOW BACK ACHE QUESTIONNAIRE

PRE AND POST OPERATIVE OSWESTRY LOW BACK ACHE QUESTIONNAIRE

Name:_____ Date: _____

This questionnaire has been designed to give your therapist information as to how your back pain has affected your ability to manage in everyday life. Please answer every question by circling only one letter that best describes your condition today. We realize you may feel that 2 of the statements may describe your condition, but please circle only the letter that most closely describes your current condition.

Pain Intensity

- I can tolerate the pain I have without having to use pain medication.
- The pain is bad but I can manage without having to take pain medication.
- Pain medication provides me complete relief from pain.
- Pain medication provides me with moderate relief from pain.
- Pain medication provides me with little relief from pain.
- Pain medication has no affect on my pain.

Personal Care (Washing, Dressing etc.)

- I can take care of myself normally without causing increased pain.
- I can take care of myself normally but it increases my pain.
- It is painful to take care of myself and I am slow and careful.
- I need help but I am able to manage most of my personal care
- I need help every day in most aspects of my care.
- I do not get dressed, wash with difficulty and stay in bed.

Lifting

- I can lift heavy weights without increased pain.
- I can lift heavy weights but it causes increased pain.
- Pain prevents me from lifting heavy weights off the floor, but I can manage if the weights are conveniently positioned (ex. on a table).
- Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
- I can lift only very light weights.
- I can not lift or carry anything at all.

Walking

- Pain does not prevent me from walking any distance.
- Pain prevents me from walking more than 1 mile.
- Pain prevents me from walking more than ½ mile
- Pain prevents me from walking more than ¼ mile.
- I can only walk with crutches or a cane.
- I am in bed most of the time and have to crawl to the toilet.

Sitting

- I can sit in any chair as long as I like.
- I can only sit in my favorite chair as long as I like.
- Pain prevents me from sitting for more than 1 hour.
- Pain prevents me from sitting for more than ½ hour.
- Pain prevents me from sitting for more than 10 minutes.
- Pain prevents me from sitting at all.

Standing

- I can stand as long as I want without increased pain.
- I can stand as long as I want but increases my pain.
- Pain prevents me from standing more than 1 hour.
- Pain prevents me from standing more than ½ hour.
- Pain prevents me from standing more than 10 minutes.
- Pain prevents me from standing at all.

Sleeping

- Pain does not prevent me from sleeping well.
- I can sleep well only by using pain medication.
- Even when I take pain medication, I sleep less than 6 hours.
- Even when I take pain medication, I sleep less than 4 hours.
- Evens when I take pain medication, I sleep less than 2 hours.
- Pain prevents me from sleeping at all.

Social Life

- My social life is normal and does not increase my pain.
- My social life is normal, but it increases my level of pain.
- Pain prevents me from participating in more energetic activities (ex. Sports, dancing etc.)
- Pain prevents me from going out very often.
- Pain has restricted my social life to my home.
- I have hardly any social life because of my pain.

Traveling

- I can travel anywhere without increased pain.
- I can travel anywhere but it increases my pain.
- My pain restricts travel over 2 hours.
- My pain restricts my travel over 1 hour.
- My pain restricts my travel to short necessary journeys under ½ hour.
- My pain prevents all travel except for visits to the doctor/therapist or hospital.

Employment/Homemaking

- My normal homemaking/job activities do not cause pain.
- My normal homemaking/job activities increases my pain, but I can still perform all that is required of me.
- I can perform most of my homemaking/job duties, but pain prevents me from performing more physically stressful activities (ex. lifting, vacuuming)
- Pain prevents me from doing anything but light duties.
- Pan prevents me from doing even light duties.
- □ Pain prevents me from performing any job or homemaking chores.

Interpretation:

Now, simply add up your points for each section and plug it in to the following formula in order to calculate your level of disability:

Point total / 50 X 100 = % disability ('point total' divided by '50' multiply by ' 100 = percent disability)

Example: on my last ODI I scored a 16. So, 16/50 x 100 = 32% disability:

ODI Scoring:

- 0% to 20% (minimal disability**)**: Patients can cope with most activities of daily living. No treatment may be indicated except for suggestions on lifting, posture, physical fitness and diet. Patients with sedentary occupations (ex. secretaries) may experience more problems than others.
- 21%-40% (moderate disability**)**: Patients may experience more pain and problems with sitting, lifting and standing. Travel and social life are more difficult. Patients may be off work. Personal care, sleeping and sexual activity may not be grossly affected. Conservative treatment may be sufficient.
- 41%-60% (severe disability**)**: Pain is a primary problem for these patients, but they may also be experiencing significant problems in travel, personal care, social life, sexual activity and sleep. A detailed evaluation is appropriate.
- 61%-80% (crippled**)**: Back pain has an impact on all aspects of daily living and work. Active treatment is required.
- 81%-100%: These patients may be bed bound or exaggerating their symptoms. Careful evaluation is recommended.

CONSENT

I "Rohit Joseph" doing Masters of Physiotherapy at HIHT Jolly Grant would like to invite you to participate in my study entitled. **"EFFECTIVENESS OF SCIATIC NERVE MOBILIZATION IN IMPROVING FUNCTIONAL OUTCOME IN POST SURGICAL PIVD SUBJECTS"** as a part of fulfilling the curriculum.

The purpose of the study is to evaluate and reduce the incidence of low back pain in post surgical disc prolapsed subjects. There is no risk involved in the study and you have the right to withdraw from the research at any stage if you are uncomfortable with the procedure. All the information about you will be kept confidential and limited to my research Guide Dr. Abhishek Sharma (MPT, MIAP, and LECTURER) and it will not be shared with any other persons. I request for your permission to allow me to take and use your blindfolded photograph for my research purpose.

I _____ voluntary agree to participate in the study. My entire questions have been satisfactorily answered and the risk involved (if any) has been explained to me. I reserve my right to withdraw at any point of time without assigning any reason. The researcher is compelled to answer the question that I might have about the study and about my rights as a Participant of the study if any further communication is required.

I request you to please allow me to use your concerned photograph for my research purpose and no amount is payable.

Signature of participant/care giver Name:

Signature of researcher
ROHIT POWEL JOSEPH
MPT -2nd year (neuro) Address:
HIHT University, swami ram nagar
Dehradun Date:

DATA COLLECTION FORM

EXPERIMENTAL GROUP A

NAME:

AGE:

SEX:

ADDRESS:

S.no.	Pre intervention ODI score	Post intervention ODI scores (on day 8).	Pre SLR range	Day 3 SLR range	Day 8 SLR range.

DATA COLLECTION FORM

CONTROL GROUP B

NAME:

AGE:

SEX:

ADDRESS:

S.no.	Pre intervention ODI score	Post intervention ODI scores (on day 8).	Pre SLR range	Day 3 SLR range	Day 8 SLR range.