““PROSPECTIVE STUDY OF FUNCTIONAL OUTCOME OF THERAPEUTIC AND DIAGNOSTIC SELECTIVE NERVE ROOT BLOCK IN MANAGEMENT OF PATIENTS WITH LUMBAR RADICULOPATHY”

By

Dr. Surve Amit Balasaheb

Dissertation submitted to BLDE (Deemed to be University), Vijayapura.

In partial fulfilment of the requirements for the award of the degree of

DOCTOR OF MEDICINE

IN

ORTHOPAEDICS

Under the guidance of

Dr. Dayanand B B

Associate Professor Department of Orthopaedics

BLDE (DEEMED TO BE UNIVERSITY)

SHRI B.M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA, KARNATAKA.

2019

“PROSPECTIVE STUDY OF FUNCTIONAL OUTCOME OF THERAPEUTIC AND DIAGNOSTIC SELECTIVE NERVE ROOT BLOCK IN MANAGEMENT OF PATIENTS WITH LUMBAR RADICULOPATHY”

BLDE (DEEMED TO BE UNIVERSITY) Vijayapura, Karnataka.

M. S

IN

ORTHOPAEDICS

ABBEVATIONS

AKA	-	Adamkiewicz Artery
VAS	-	Visual Analog Score
TNF	-	Tumor Necrosis Factor
SLRT	-	Straight Leg Raising Test
POD	-	Post Operative Day
IVDP	-	Intervertebral Disc Prolapse
ODI	-	Owestry disability index
TLC	-	Total leucocyte count
DLC	-	Differential leucocyte count
IFT	-	Interferential therapy
ILT	-	Intermittent lumbar traction
SWD	-	Short wave diathermy

ABSTRACT

Introduction: Lumbar radiculopathy or sciatica is pain radiating from the lumbar region to buttocks the leg or further down along the nerve dermatomal course. Selective nerve root block (SNRB) is used to treat radicular discomfort caused by a single damaged nerve root. Although it has a low diagnostic specificity, its therapeutic efficacy is still debatable. It's always used for those who have significant surgical spinal lesions, whether or not they have them. Other lesions that cause nerve root irritation include disc prolapse at various stages, ligamentum flavum enlargement, facet hypertrophy, and foraminal stenosis caused by degenerative osteophytes.

Aims and objective: To study the outcome of therapeutic and diagnostic selective nerve root block injection in management of patients with lumbar radiculopathy.

Materials and methods: It is a prospective study. Conducted in patients admitted to Department of Orthopedics' at BLDEU'S Shri B.M.Patil's Medical College, Hospital and Research Centre, Vijayapura with diagnosis of lumbar radiculopathy. The patients were informed about study in all respects and informed written consent was obtained. Period of study was between November 2019 to May 2021. Follow up period was for 3 months. Data was analysed by friedman test and was statistically significant.

Result: 56 patients were given injection. There were 37 males and 19 females among the 56 patients. The patient's age spans from 23 to 69, with an average of 45; nevertheless, age has no bearing on the result. In this research, 19 individuals had sciatica on their right side, 20 on their left, and 17 on both sides. The pre-injection mean VAS score was 7, while the post-operative VAS score was 2.4 (P=0.639) in our study. It shows that selective nerve root block improved the result of lumbar radiculopathy

patients.

The Friedman Test, which compared preoperative and postoperative owestry disability scores at 1 week and 3 months, revealed statistically significant improvement in the quality, with a drop in owestry disability score postoperatively, indicating significant improvement in quality of life.

Conclusion: The patient's first response to the transforaminal selective nerve root steroid injection was positive, and he was able to live pain-free for three months. In the coming days, the long-term pain alleviation outcome will be evaluated.

Selective Nerve Root Block is a rather safe surgery for providing short-term pain relief for lumbar radiculopathy, according to our findings.

Keywords: Selective nerve root block (SNRB), Sciatica, transforaminal, subpedicular, triamcinolone, owestry disability index.

List of tables

List of figures

INTRODUCTION

Lumbar radiculopathy or sciatica is pain radiating from the lumbar region to buttocks to the leg or further down along the nerve dermatomal course. In both the cervical and lumbar areas. Selective nerve root block (SNRB) is used to treat radicular discomfort caused by a single damaged nerve root.

Although it has a low diagnostic specificity, its therapeutic efficacy is still debatable. It's always used for those who have significant surgical spinal lesions, whether or not they have them. Other lesions that cause nerve root irritation include disc prolapse at various stages, ligamentum flavum enlargement, facet hypertrophy, and foraminal stenosis caused by degenerative osteophytes. An inflammatory response to an exposed nucleus pulposus is assumed to be the source of nerve root irritation.

Prolapse of the lumbar disc or also known as herniation of lumbar disc which causes sciatica is a cause of pain. It will affect both males and females in majority in their lifetime prevalence of 5% in males and females 4%. [1]

This method involves injecting a steroid into the selected nerve root to reduce inflammation and, as a result, pain intensity. By steroid injection into the nerve root to treat radicular pain caused by canal stenosis, helps to reduce inflammation and edema around the selected nerve root, by reduction of prostaglandin production and reducing conduction of pain fibers, nociceptive c fibers.

Unlike other intraspinal steroid injection various procedures such as transforaminal, interlaminar, and caudal steroid injections, SNRB is especially more specific to the condition with relatively good result in patients with herniated disc and related conditions. Usually in these procedures steroids are injected directly near the affected nerve root or injected near the extradural area, nerve dorsal root ganglion. [3,4]

The Kambin's triangle was defined as the site to approach the intervertebral disc by Kambin et al, who pioneered endoscopic intervertebral discectomy via a posterolateral approach. This triangle is a dorsolateral disc-shaped right angled triangle. The exiting nerve root is represented by the hypotenuse, the base by the upper border of the caudal vertebra, and the vertical side is the dura traversing nerve root. This method reduces complications like edema of nerve, hemorrhage, scarring of epidural and protects epidural and spinal nerve roots. Less chances of complications by this route. In clinical practice, the sub pedicular method is currently the most extensively employed. To locate the superolateral spinal nerve associated with symptoms, the injection needle is progressed towards the safe triangle below the pedicle. Because medicines are injected in the anterior extradural space, which is the inflammatory region between the back of the herniated disc and the nerve root dural sleeve, hence it is preferred. [5] less chances of injuring the dura because the needle passes through the lateral upper intervertebral foramen's border.

The purpose of this study was to investigate at the short-term effects of transforaminal epidural block using the subpedicular route in patients with lumbar radicular pain, as well as the potential complications.

When combined with a careful history taking, clinical examination, and quality radiography, SNRB can be used in the diagnostic management of patients with lumbar radiculopathy. Proper clinical examination can be used to locate the pain with location of nerve root , helpful when electrodiagnostic studies are not available.

AIMS AND OBJECTIVE OF STUDY

To study the outcome of therapeutic and diagnostic selective nerve root block injection in management of patients with lumbar radiculopathy.

REVIEW OF LITERATURE

Rishi M. Kanna *et al.* did a prospective observational cohort research was conducted to determine the factors that influence the effectiveness of selective nerve root block for acute lumbar disc herniation. SNRB was performed on a total of 91 individuals. Sixty-nine people experienced good pain alleviation that lasted for a year (75.8 percent success). After failing NRB for an average of 6.3 weeks, 22 patients had surgery. Patients with sensory symptoms (P 14.005), a higher mean pre injection Oswestry Disability Index (ODI) score (P 14.002), a higher mean pos injection ODI score at 3 weeks (P 14.004), a nonmanual job (P 14.001), a lumbosacral transitional segment (P 14.00 005), and a splash pattern on the radiculogram (P 14.005) were all predictive of a failed NRB. According to the results of the logistic regression analysis, the lumbosacral transitional segment at the level of disc herniation is the most significant component predicting poor outcome, and SNRB is an effective method for providing consistent symptom relief in patients with acute LDH for at least one year. Several characteristics were discovered in the study that indicated poor SNRB results, and such patients can be informed of the need for further surgery.

J**ae-Yoon Chung *et al.*** published The Efficacy and Persistence of Selective Nerve Root Block under Fluoroscopic Guidance for Cervical Radiculopathy: A Retrospective Study. This study looked at 28 patients who were suffering from radicular discomfort caused by cervical disc disease or spondylosis. Myelopathy was ruled out. Cervical nerve root blocks were given up to three times every two weeks. VAS scores, patient satisfaction, and medication use were compared before, during, and after the procedure at one week, three months, six months, and twelve months. Furthermore, complications associated with the procedure were assessed, as well as the need for additional treatments, and it was concluded that while selective nerve root block for cervical radiculopathy is confined as a definitive treatment, it appears to be helpful in providing relief from radicular pain in about half of patients at 12 months.

Rebecca Beynon *et al.* did study on efficacy of diagnostic SNRB in the management of patients with radiculopathy: a systematic review. This review comprised 6 trials with a total of 341 patients. All of the studies were found to have a significant risk of bias. The estimates of sensitivity (57 percent –100 percent) and specificity (10 percent –86 percent) were highly variable between investigations. Four investigations employed intraoperative observations during surgery as the reference standard (pooled sensitivity: 93.5 percent [95 percent CI 84.0 to 97.6]; specificity: 50.0 percent [16.8 to 83.2]) or 'outcome following surgery' as the reference standard (pooled sensitivity: 90.9 percent [83.1 to 95.3]; specificity 22.0 percent [7.4 to 49.9]). The results of two trials that used a within-patient case-control design were not pooled because different types of control injections were used. Conclusion: The diagnostic accuracy of SNRB is questionable, and specificity in particular may be low, based on limited evidence of low methodological quality. Although SNRB is a safe test with a low risk of clinically significant consequences, it is uncertain whether the cost of the test is justified by the additional diagnostic information it gives.

Jafar Mobaleghi *et al.* did a prospective trial comparing the effects of epidural methylprednisolone acetate administered in patients with pain related to lumbar spinal stenosis or ruptured discs 60 patients with radicular discomfort because to HD (n = 32) or LSS (n = 28) were participated in a prospective, single-blind, uncontrolled study over a 9-month period. Methylprednisolone acetate 80 mg and 0.5 percent bupivacaine 10 mg were diluted in normal saline and injected into the spinal space in a total volume of 10 mL. Patients reported the degree of pain based on a quantitative pain score, level of activity, and subjective improvement over the phone after 2 and 6 months. The chi-square test was used to assess demographic data. The t-test was used to look at the differences in numeric pain scale scores between the two groups at different periods. And they came to the conclusion that epidural methylprednisolone injection has a lower analgesic impact in patients with LSS than in those with HD, as well as a shorter-term effect.

Arun-Kumar K *et al.* mentioned results of selective nerve root block for disc caused lumbar radiculopathy were studied in a group of 40 patients, 9 men and 31 women. Our patients ranged in age from 23 to 61 years old, with a mean age of 42.6 years. Right-sided radiculopathy affected 23 cases, while left-sided radiculopathy affected 17 people. Before the operation, all patients were administered the Roland Morris Disability Questionnaire (RMDQ) for back pain, and their scores were recorded. The impact is often short acting in the majority of patients, but it acquires a valuable interval time of reduced pain in those patients with mild and moderate pathology, according to the Numeric Rating Scale (NRS) for pain used to grade pre operation pain on conducting SLR. In patients with unclear radiological indications for surgery, this treatment can be employed as a bridge between procedures before surgery. It has little effect on the prognosis in patients with severe illness who would benefit from surgery.

Suhayl Tafazal *et al.* did a randomised double blind controlled trial on corticosteroids in peri-radicular infiltration for radicular pain 150 patients were randomly assigned to receive a single injection of either bupivacaine alone or bupivacaine + methylprednisolone after a year of data and subgroup analysis. Standard outcome measures such as the Oswestry Disability Index were used to examine patients 6 weeks and 3 months following the injection (ODI), The patient's subjective appraisal of the outcome and the visual analogue score for leg discomfort. At a one-year follow-up, we assessed the outcome in terms of the requirement for additional root blocks or surgery, and found that peri-radicular corticosteroid infiltration for sciatica does not provide any additional benefit when compared to local anaesthetic injection alone. Patients with a prolapsed disc as well as those with foraminal stenosis benefit from the surgery in terms of pain alleviation, however the latter group appears to have a less pronounced reaction.

Noor M, Gajraj *et al.* mentioned SNRB is a significant tool in the evaluation and therapy of patients with radicular pain, according to a review study on low back pain and radiculopathy. Depending on the underlying cause of nerve root pathology, the operation will have varying degrees of success.

Donna G & Blankenbaker *et al.* did treatment with Selective Lumbar Nerve Blocks—Comparison of Effectiveness of Triamcinolone and Betamethasone Injectable Suspensions was the subject of a retrospective study on Lumbar Radiculopathy. From 1997 to 2003, 114 patients (56 men, 58 women; age range, 36–84 years; mean age, 60 years) treated for radiculopathy with 130 selective lumbar nerve blocks with triamcinolone or betamethasone had their charts and self-reported pain score evaluations examined retrospectively. Fluoroscopic guidance was used to confirm the perineural placement. A mixture of 1 mL triamcinolone 40 mg/mL and 1 mL 0.5 percent bupivacaine hydrochloride was given to 49 patients. A mixture of 1 mL betamethasone, 6 mg/mL, and 1 mL 0.5 percent bupivacaine hydrochloride was given to 81 individuals. During the 14 days following injection, patients filled out standardised pain evaluation sheets and compared their discomfort to baseline levels. The data was analysed using the Fisher exact test. And they found that selective nerve root blocks with betamethasone and triamcinolone reduced low back pain and lower extremities discomfort, with no significant difference in effectiveness.

Beynon *et al*. published a thorough analysis and economic model on the diagnostic value and low cost of SNRB in patients considering lumbar decompression surgery. The accuracy of SNRB or adverse events in patients with pain and symptoms in a lower limb for the diagnosis of lumbar radiculopathy was investigated in a systematic review (SR). The quality of the study was determined using the QUADAS-2 (Quality Assessment of Diagnostic Accuracy Studies) checklist. To pool diagnostic accuracy data, we employed random-effects meta-analysis. Combining SR results with data on the costs and outcomes of

surgery and non-surgical care, decision tree and Markov models were built. They concluded that there were few studies that calculated the diagnostic accuracy of SNRB in radiculopathy patients, and all of them were hampered by the difficulties of establishing a reference standard diagnosis. Summary estimates indicate a low level of specificity, however the findings are based on a small number of research with a high risk of bias. SNRB is unlikely to be a cost-effective strategy for identifying the affected nerve root prior to lumbar spine surgery, based on present limited evidence.

ANATOMY AND PATHOLOGY

The normal anatomy of the spine is divided into three categories. The cervical, thoracic, and lumbar spines are the three components of the spine. (The sacrum, which is a component of the pelvis, is located beneath the lumbar spine.) Each segment is made up of individual bones known as vertebrae. There are seven cervical vertebrae, twelve thoracic vertebrae, and five lumbar vertebrae in the spine.

A vertebra is composed of several parts. The body is the main area of axial loading in the vertebra, as well as a resting place for the fibrous discs that separate the vertebrae. The spinal canal, which is core of the vertebra through which the spinal nerves pass, is protected by the lamina. Back muscles are attached to the paired transverse processes, which are right angle to the spinous process.

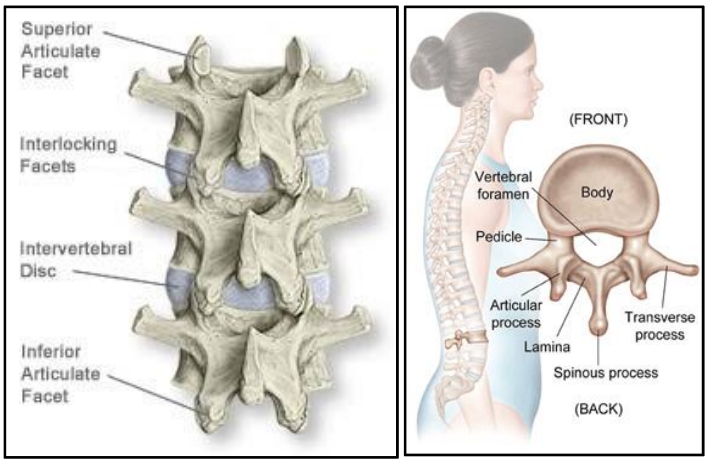


FIGURE 1: ANATOMY OF VERTEBRA

The annulus fibrosus is the outer fibrous ring of the intervertebral disc that surrounds the nucleus pulposus, the inner gel-like centre. The annulus fibrosus is made up of several layers of laminae that contain type 1 and type 2 collagen. Type 1 is located near the ring's edge, where it provides strength. Compressive forces are absorbed by the rigid laminae. The nucleus pulposus of the fibrous intervertebral disc aids in pressure distribution across the disc. This prevents the formation of stress concentrations, which could harm the underlying vertebrae and endplates. The nucleus pulposus is composed of loose fibers in a mucoprotein gel. The disc nucleus acts as absorber, absorbing the impact while keeping the vertebrae seperate.

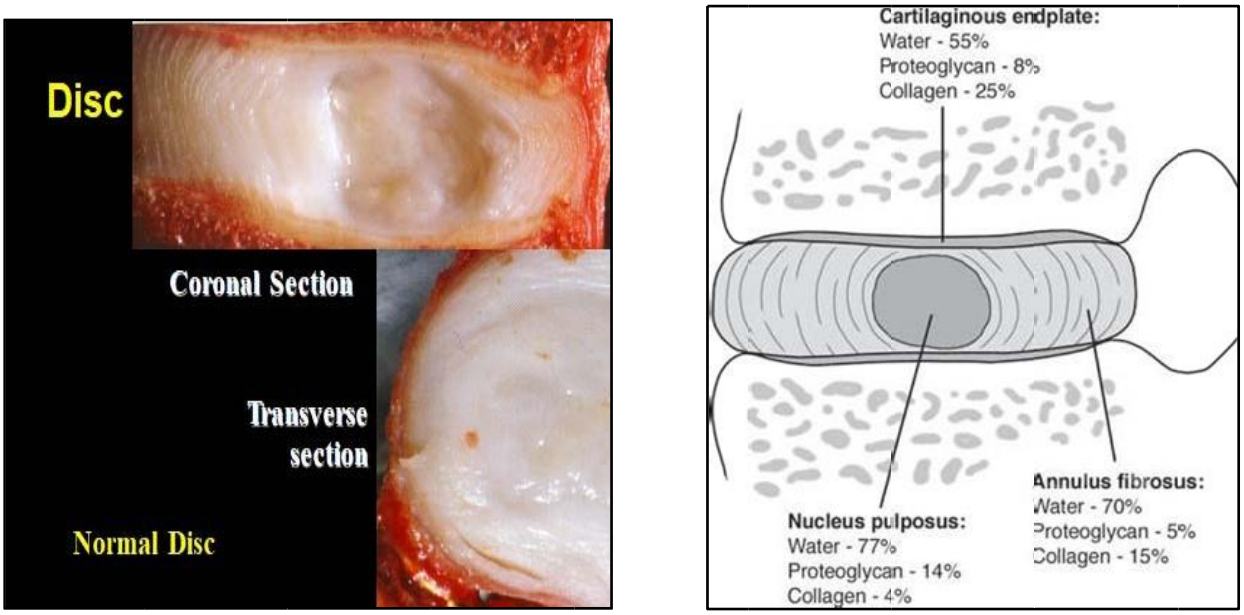


FIGURE 2&3: VERTEBRAL DISC ANATOMY

Except 1st cervical segment, the atlas, each pair of vertebrae has 1 disc between them. The atlas is a ring that wraps around the axis' roughly cone-shaped extension, (second cervical segment). The atlas is supported by the axis, allowing the neck to swivel. There are 23 discs in the human spine. There are six in the cervical region, twelve in the thoracic region, and five in the lumbar region. Names are given to the vertebral bodies above and below the discs. C5-6 disc refers to the disc between the fifth and sixth cervical vertebrae.

FUNCTION OF DISC

The intervertebral disc separates the vertebrae and serves as a surface for the nucleus pulposus' shock-absorbing gel. Under compressive forces, the nucleus pulposus of the disc spreads the hydraulic pressure throughout each intervertebral disc. The nucleus pulposus composed of vacuolated notochord cells, chondrocyte-like cells, collagen fibrils, and the proteoglycan aggrecan. Each aggrecan molecule is linked to chondroitin, sulphate, and keratan sulphate glycosaminoglycan chains. Increasing the number of negatively charged aggrecan in the nucleus pulposus causes extracellular fluid to shift from the outside to the inside of the nucleus pulposus, increasing oncotic pressure.

With age, the amount of glycosaminoglycans decreases, resulting in degeneration. The intervertebral discs provide a strong connection between the vertebral bodies. They are required for movement between adjacent vertebrae, but their bouncy deformability also absorbs shock.

EPIDEMIOLOGY

Despite the fact that lower back pain is seen commonly in the population, lumbar radiculopathy has only been observed in 3 to 5% of cases. The annual prevalence of disc -related sciatica in the general population is estimated to be 2.2 percent. Lumbar radiculopathy is a common condition with serious socioeconomic consequences. The prevalence of lumbar radiculopathy due to a discal etiology is approximately 2%. Low back problems account for 12.9% of all low back complaints in the working population, with lumbar on radiculopathy accounting for 11%. The prevalence of sciatica range from 9.9% - 25%.

DISC HERNIATION

A herniated disc, also known as a bulged, slipped, or ruptured disc, is a disc nucleus fragment that has been pressed out of the annulus then into the spinal canal as a result of an annular tear /rupture.

The spinal canal does not have enough space to accommodate the spinal nerve and the displaced herniated disc fragment. The disc presses on spinal neurons as a result of this displacement, creating chemical inflammatory mediators such as Phospholipase A2, Interleukin 1 & 6, TNF alpha, Nitric oxide, and stimulation of nociceptive c fibers, all of which leads to pain.

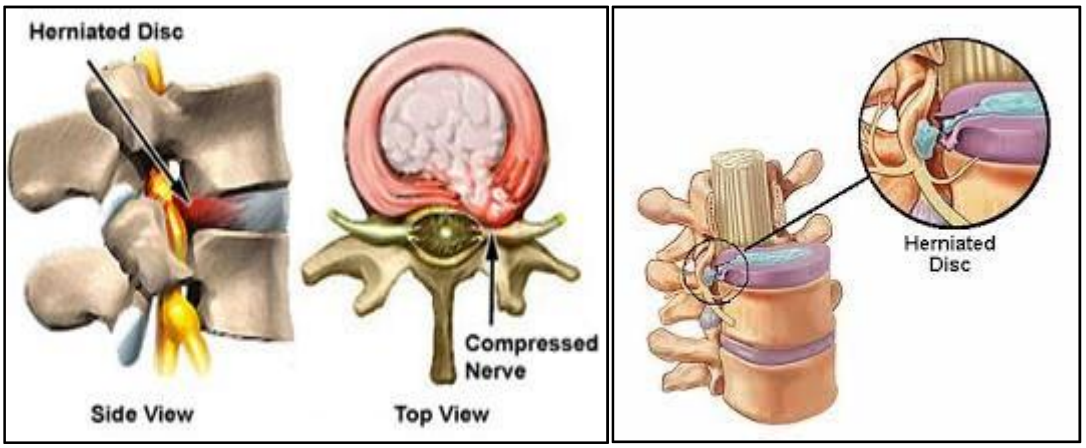
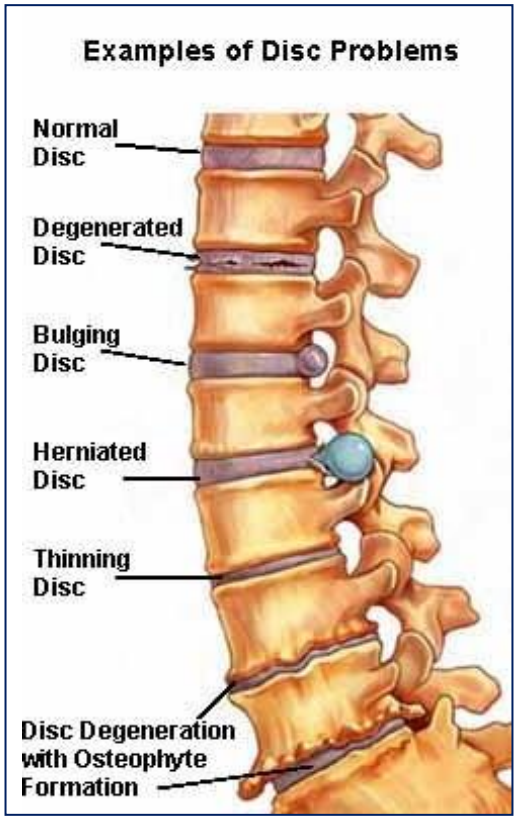


FIGURE 4: HERNIATED DISC

A herniated spinal disc, known as a slipped disc, occurs when uneven mechanical stresses significantly change shape of annulus fibrosus, causing its protrusion. These occurrences, which are often accompanied by bad posture, can occur during heavy physical exercises, trauma, or as a result of deterioration. They've also been linked to a Propionobacterium acnes infection. The gel-like material of the malformed annulus and the nucleus pulposus can be pressed laterally or posteriorly, distorting local muscle function and putting pressure on a nearby nerve. Can cause nerve root entrapment symptoms.

These symptoms include paresthesia, numbness, chronic and acute pain, muscle tone loss, and decreased homeostatic performance, which can occur locally or along the dermatome served by the entrapped nerve. The disc does not physically shift; rather, it bulges in one direction.

DISC PROTUSION STAGES



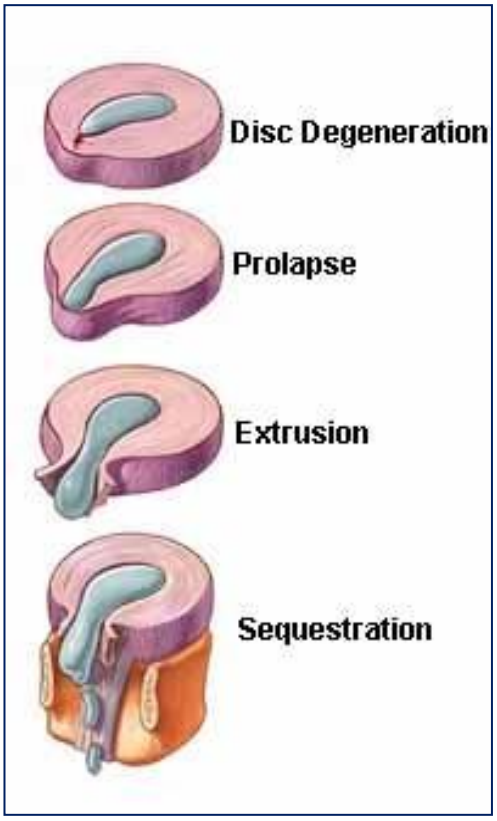


FIGURE 5: DISC ASSOCIATED PATHOLOGY **FIGURE 6: STAGES OF DISC PROTRUSION**

RADICULOPATHY

Radiculopathy is a condition that occurs when nerves are compressed / irritated, resulting in pain &weakness, and/or sensory impairment in the affected nerve root. This can occur as a result of direct trauma, or as a result of chemical irritation. This can be caused by a disc herniation, osteoarthritis-related bone spurs, or thickening of the surrounding ligaments compressing the nerve. As people get older, their spines degenerate, which can lead to herniated discs and other issues like spinal stenosis and lumbar radiculopathy.

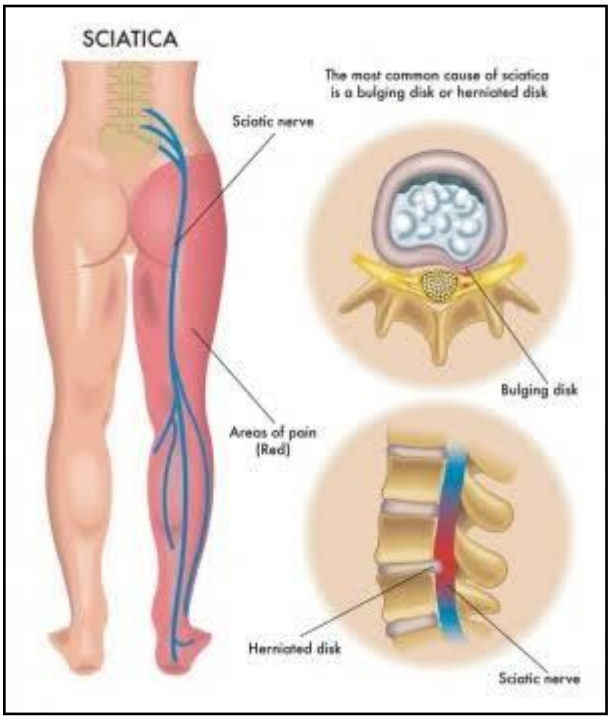


FIGURE 7: PATHOLOGY OF SCIATICA

CAUSE OF RADICULOPATHY

• disc herniation resulting in nerve root compression in maximum cases

• Lumbar canal stenosis

• less commonly tumours

• infections

• Radiculitis and lateral recess stenosis

ASSOCIATED FACTORS

- Age-group of 40-60 yrs
- Alcohol, long term smoking
- Stress
- Heavy weight lifting
- Vibrating body during driving

INDICATIONS

• Lower limb pain with back pain following dermatomal pattern

• Lower limb radiating pain

• Radiating pain area same region paresthesia

• A positive SLRT.

The clinical manifestation of radiculopathy is determined by the source of the radiculopathy and the nerve roots that have been damaged. The intensity (sharp, dull, piercing, throbbing, stabbing, shooting, searing) and location of the pain are also important considerations. Aside from radicular leg pain, some patients experience neurological symptoms such as paresis, sensory loss, or loss of reflexes.

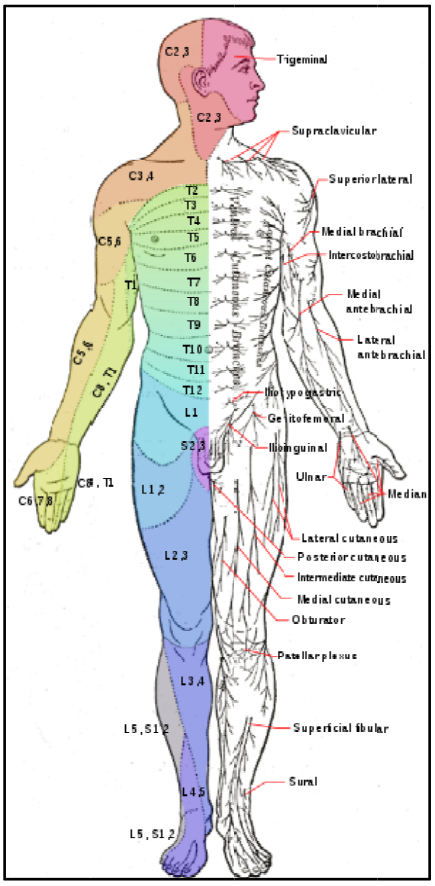


FIGURE 8: DERMATOMAL DISTRIBUTION

Nerve Root	Dermatomal area	Myotomal area	Reflexive changes
L1	Inguinal region	Hip flexors	
L2	Anterior mid-thigh	Hip flexors	
L3	Distal anterior thigh	Hip flexors and knee extensors	Diminished or absent patellar reflex
L4	Medial lower leg/foot	Knee extensors and ankle dorsiflexors	Diminished or absent patellar reflex
L5	Lateral leg/foot	Hallux extension and ankle plantar flexors	Diminished or absent achilles reflex
S1	Lateral side of foot	Ankle plantar flexors and evertors	Diminished or absent achilles reflex

TABLE 1: NERVE ROOT ASSOCIATED DERMATOME AND REFLE

CLINICAL TEST

FIGURE 8: SLRT

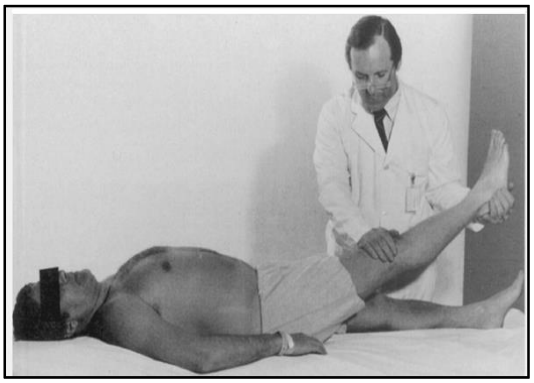


FIGURE 9: LASUEGE TEST

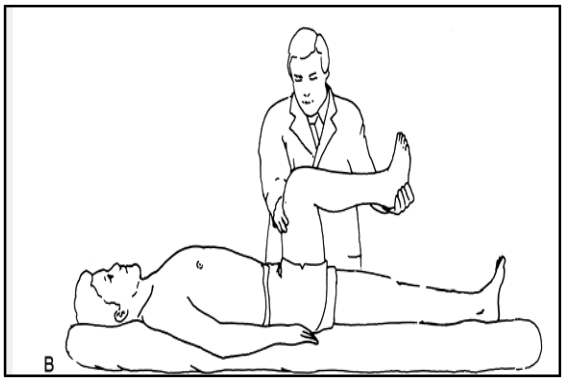


FIGURE 10: CROSSED SLR

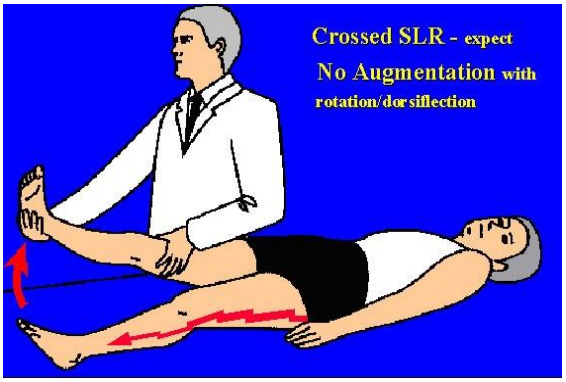


FIGURE 11: FEMORAL NERVE STRETCH TEST

FIGURE 12: BOW STRING SIGN

INVESTIGATIONS

PLAIN RADIOGRAPHS

The most basic and widely available radiograph is the plain radiograph. Views from AP and Lateral are required. A vacuum indication can be seen on an x-ray of a herniated lumbar disc. lumbar lordosis loss, a radiolucent flaw The existence of nitrogen gas deposition in annular and nuclear degenerative fissures, as well as the central vacuum phenomenon and gas accumulation that fills enormous cavities occupying both the nucleus and annulus, are all signs of disc degeneration.

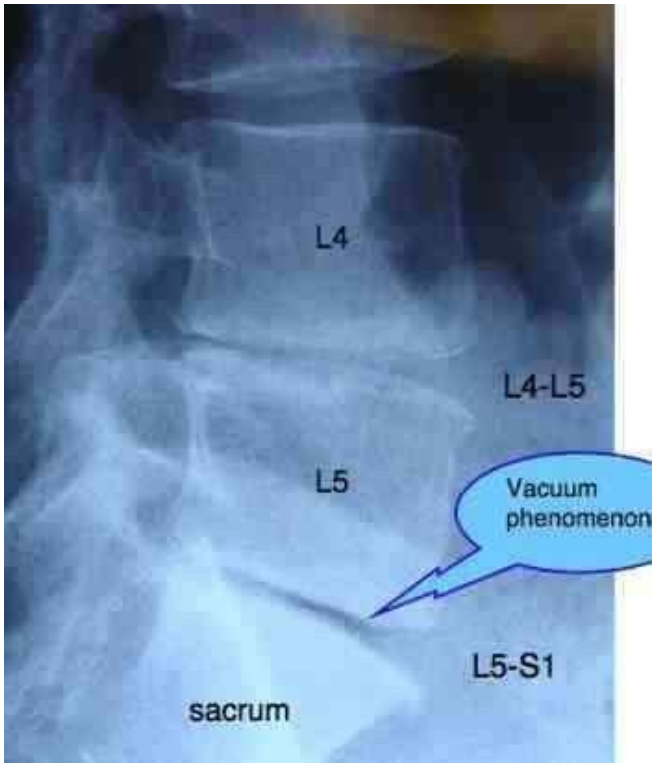


FIGURE 12: VACCUM PHENOMENON

Oblique X-rays the foramina for Lysis, spondylolisthesis and hypertrophic change in vertebra.

Flexion extension view to detect instability

- The "far out syndrome" is seen in the AP 20 degrees caudocephalic view, which is caused by a large transverse process of the fifth lumbar vertebra pressing against the sacral ala, compressing the L5 nerve root. To look for facet and lamina, angle the caudal.

- Indirect Signs
  - Disc space reduction
  - End-plate sclerosis -end plates of the body become damaged
  - Degenerative changes
  - Sign of Vacuum
  - On dynamic films, there are direct signs of translational anomalies

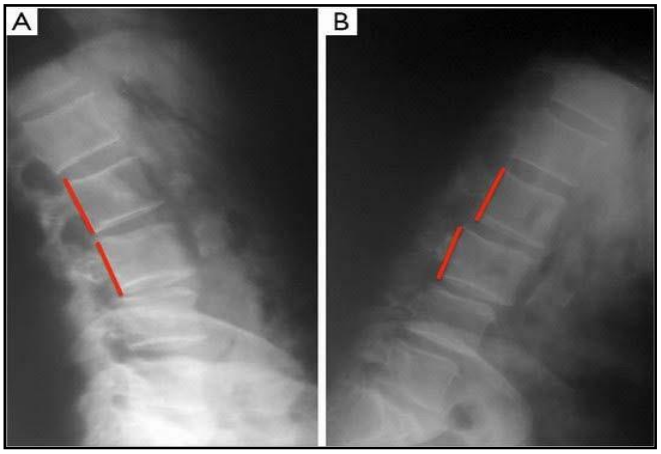


Figure 13: Xray showing signs of instability

Element	Point Value
Anterior elements destroyed or unable to function	**2**
Posterior elements destroyed or unable to function	**2**
Disruption of costovertebral articulations	**1**
Radiographic criteria	
Saggital plane displacement >2.5mm	**2**
Relative sagittal plane angulation >5 degrees	**2**
Spinal cord or cauda equina damage	**2**
Dangerous loading anticipated	**1**
***Total of 5 or more unstable**	

TABLE 2: CLASSIFICATION FOR LUMBO-SACRAL INSTABILITY

COMPUTED TOMOGRAPHY

Useful for diagnosis of spondylolisthesis, fracture , pre op and post op assessment of patient

Advantages

- In the evaluation of spinal disease, this technique is extremely useful, high accuracy, and non-invasive.
- superior images of cortical and trabecular bone
- Use for detection of facet hypertrophy , lamina and disc herniation
- Helps to tell difference between disc and osteophytes.
- It aids in the diagnosis of foraminal intrusion of disc material owing to its capacity to see beyond the limits of the dural sac and root sleeves.

Limitations

- It can't tell the difference between scar tissue and a fresh disc herniation, and
- it doesn't have enough soft tissue resolution to tell the difference between the annulus and the nucleus.

Magnetic resonance imaging (MRI)

Magnetic resonance imaging (MRI) is the preferred test for detecting minor spinal illnesses because it is both reliable and sensitive. Direct visualisation of herniated disc contents as well as their relationship to neural tissue and intrathecal fluids is possible.

Its advantages over CT

- Good visualization of disc

- Imaging of neurological structures
- Whole spine scanning
- Good visualization of nerve in formina
- Identify disc protrusion zone

Limitations

- Chances of showing defects in normal spine
- Should be related to clinical findings

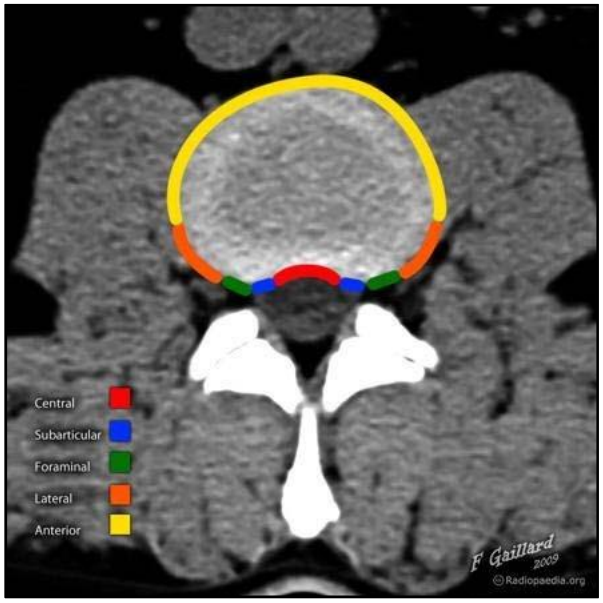


FIGURE 14: DISC PRORUSION ZONES

IMAGE SEQUENCE	T1 weighted image	T2 weighted image
FAT	Bright	Less bright
FLUID	Dark	Bright
USES	Study the anatomy of cord and nerve roots and spinal cord	Study the pathologic changes in spine Differentiate the nucleus from annulus fibrosus

FIGURE 15: T1 weighted image

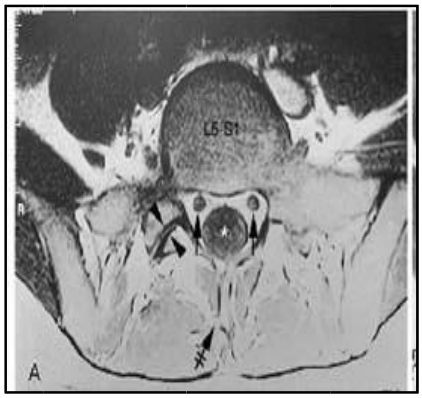


FIGURE 16: T2 weighted image

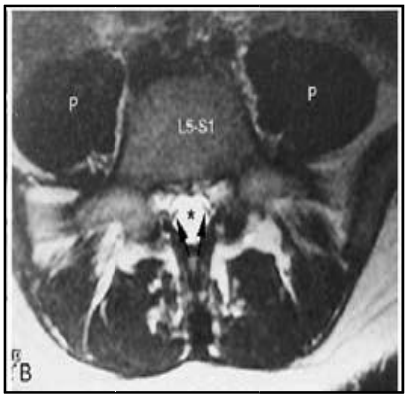
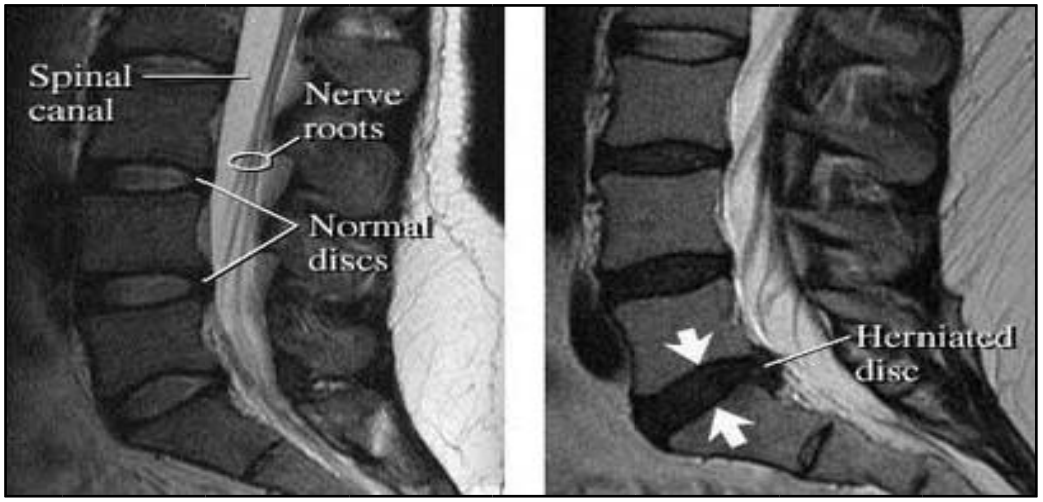
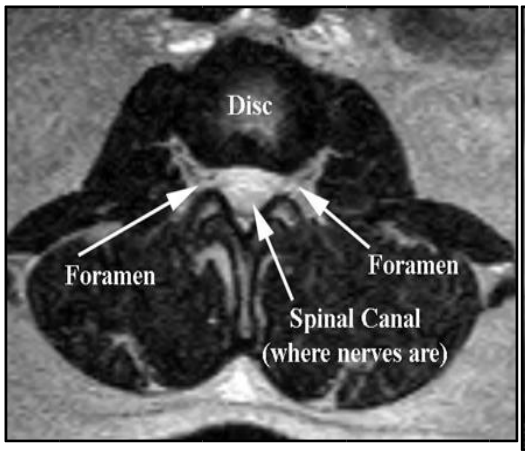


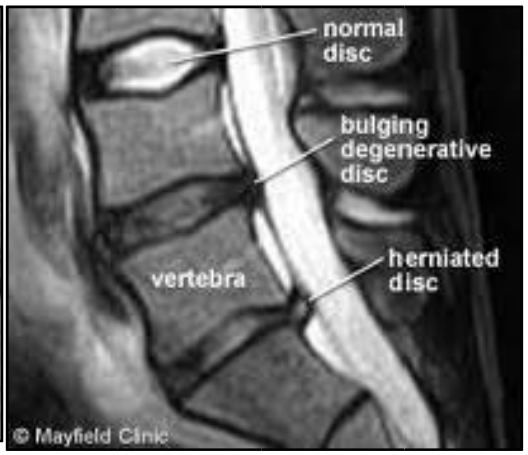
FIGURE 17: Normal Lumbar MRI

Vs

FIGURE 18: Lumbar MRI showing herniated disc







TREATMENT

The treatment options are used in together combined.

Conservative

- Rest
- Medicine
- Physiotherapy
- Lifestyle changes
- Exercises
- Orthosis
- Injections

(i) Rest

There is no data that bed rest improves or affects the trajectory of lumbar disc herniations. Despite the fact that no proven hypothesis has been accepted, it is advised that you sleep in semi-fowlers or lateral position for 2 days.

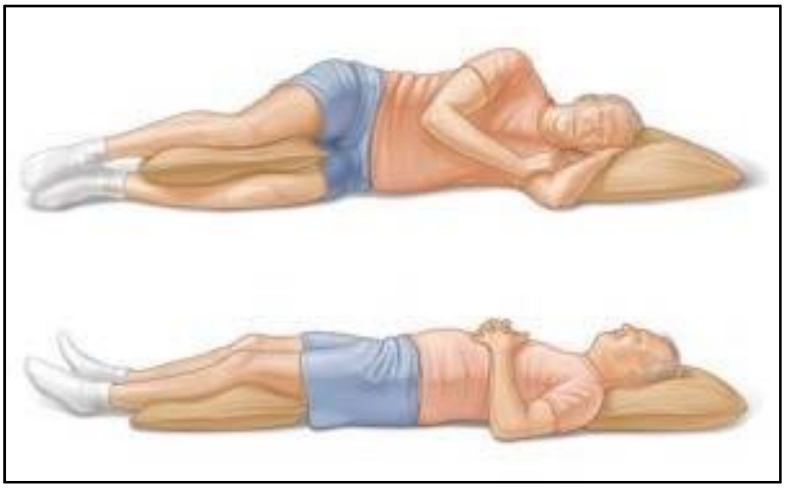


FIGURE 19: BED REST LATERAL POSITION

(ii) Medications

Drugs used most commonly are

COX inhibitors – type 2

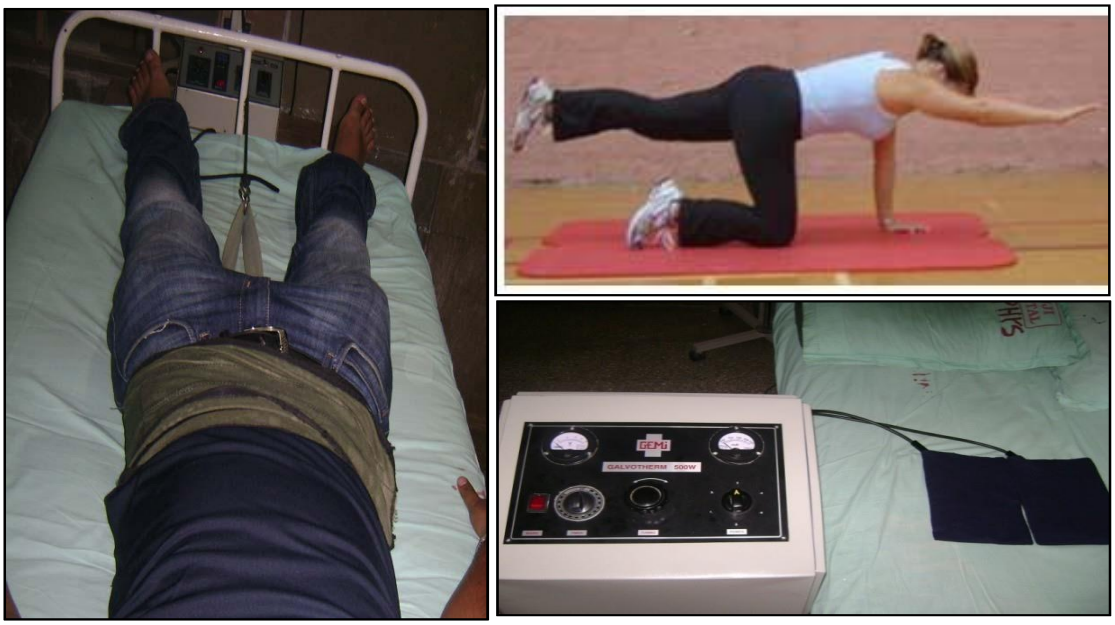
Along with,

- Opioids
- Steroids
- Muscle relaxants
- Antidepressants
- Antiseizure drugs

(iii) Physiotherapy

Include various exercises back school, other important physiotherapy used in early disease are ILT, IFT, SWD and lumbar traction with medications

FIGURE 20: PHYSIOTHERAPY EXERCISES



(iv) Physical Exercises

Exercises have been shown to be more efficient than regular medical assistance. Isometric workouts that concentrate on flexion tend to have the most research backing. They aid in the alleviation of local muscle spasm as well as the spine's stability. You must, however, begin when the severe soreness has subsided.

POINTS TO REMEMBER

• Hold the workout position for a steady count of 5

• Begin with 5 rounds and work your way up to 10

• Take a deep breath and relax completely among each round.

• Do the exercise 2 times daily for Ten minutes each time.

• Workouts that are unpleasant should be approached with caution.

• A little discomfort when exercise isn't always a bad thing.

• If the pain is severe or refers to the lower limb, the patient may have gone too far.

• Perform the exercises on a daily basis without miss.

FIGURE 21 & 22: PHYSICAL EXERCISES

(V) TENS

Transcutaneous electrical nerve stimulation causes the release of endogenous analgesic endorphin. TENS is a pain-limiting nervous system process that affects a control centre., TENS is similar as placebo according to Deyo RA et al's work.

(VI) Intermittent Pelvic Traction

By displacing the lumbar vertebrae and widening the intervertebral foramen, which causes a vacuum, intermittent pelvic traction minimises ruptured discs. By putting the posterior longitudinal ligament under tension and reducing spasm, it also aids in the reduction of ruptured discs. It also helps to disentangle knotted nerve roots. It has minimal effect on the disease's typical course, though.

(VII) Back School Exercise

The study of proper body biomechanics and posture is known as back schooling.

It assists the patient in returning to their prior level of physical activity. It is delivered through individual or group training. The volume and accuracy of information can differ greatly.

(VIII) Orthosis

The lumbar spine is immobilised and stabilised with a lumbar sacral orthosis/brace. It is helpful for lumbosacral disorders such as vertebral fractures, spondylolysis with spondylolisthesis, and surgical support. Their efficacy in managing low back pain, though, is questionable.

Not advisable when

- no compliance from patient side
- Dependence psychologically
- No change in disability
- Further weakness of back muscle
- Change of posture

- No change in course of disease

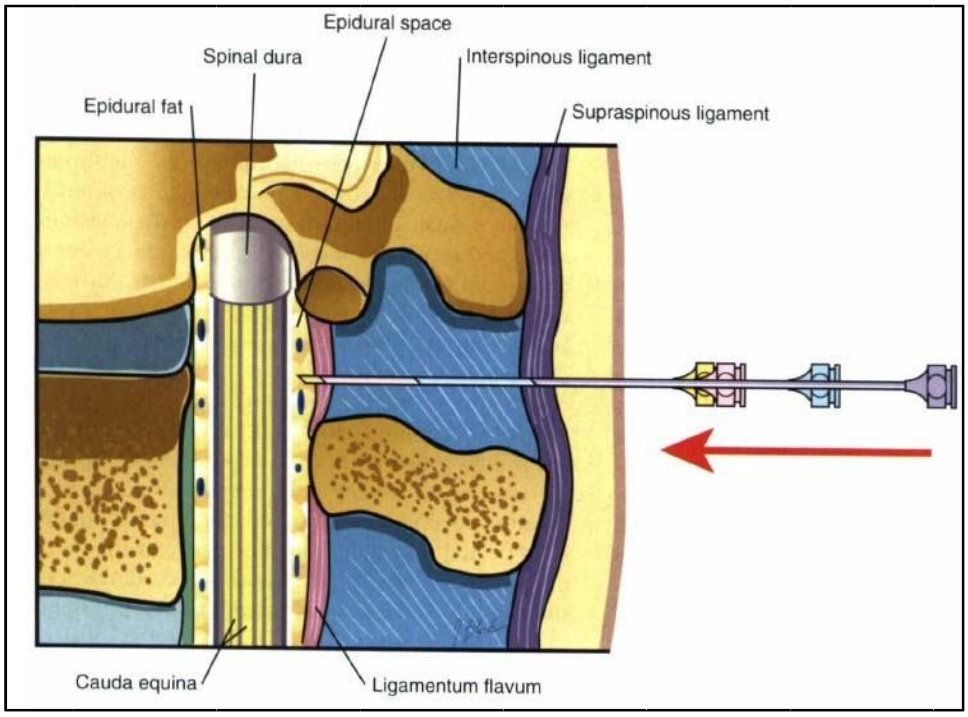
SELECTIVE INJECTIONS

Epidural Block

An epidural steroid injection can reduce the pain and irritation caused by nerve root compression. A disc herniation, canal stenosis, or osteophytes, spurs can all compress nerve roots. Nerve root irritation is treated with an epidural steroid injection. Above the outermost layer that covers the spinal cord and nerves lies the epidural space. Steroid injections into the epidural space right above compressed nerve roots are known as epidural steroid injections.

Interlaminar epidural steroid injections are the most common type of epidural steroid injection. The lamina is made up of shingles-like bone portions on the back side of the spine. The needle is pointing upwards and passes through 2 neighbouring laminae in the skull. A transforaminal steroid injection is another sort of injection. The needle follows nerve's path and, reaches the spine at a angle.

FIGURE 23: Interlaminar Epidural Steroid



Epidural Steroids

Steroid injection helps to reduce edema and inflammation around the nerve root and decreases the pain by blocking pain receptors and hence radiculopathy is relieved.

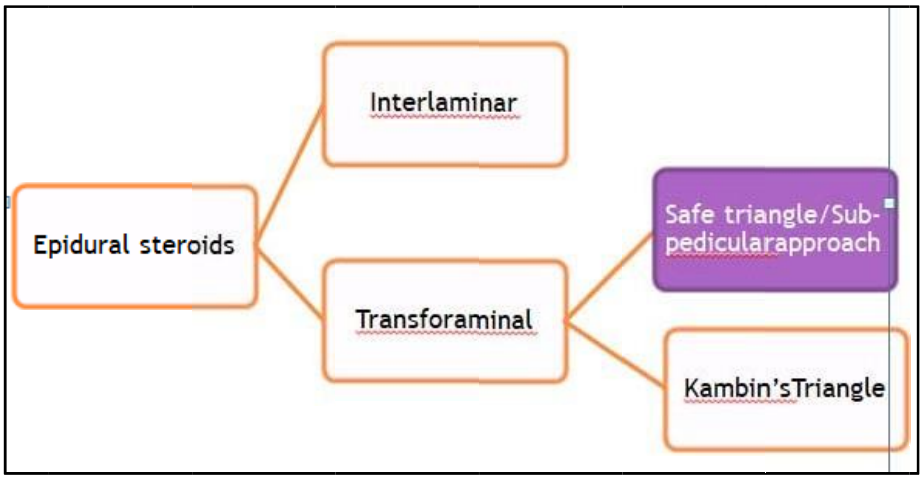


TABLE 4: APPROACHES FOR STEROID INJECTIONS

Reason for interlaminar failure

The tissue, fat, areolar tissue, lymphatic supply of spine, arteries surrounding and plexus of veins present in epidural space does not allow the steroid drug to reach the desired nerve root, results in less efficacy of this route of injection.

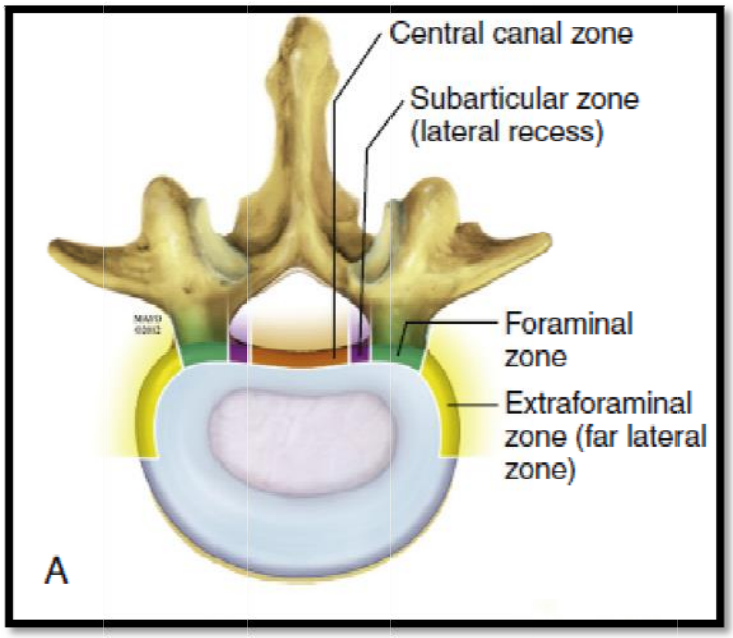
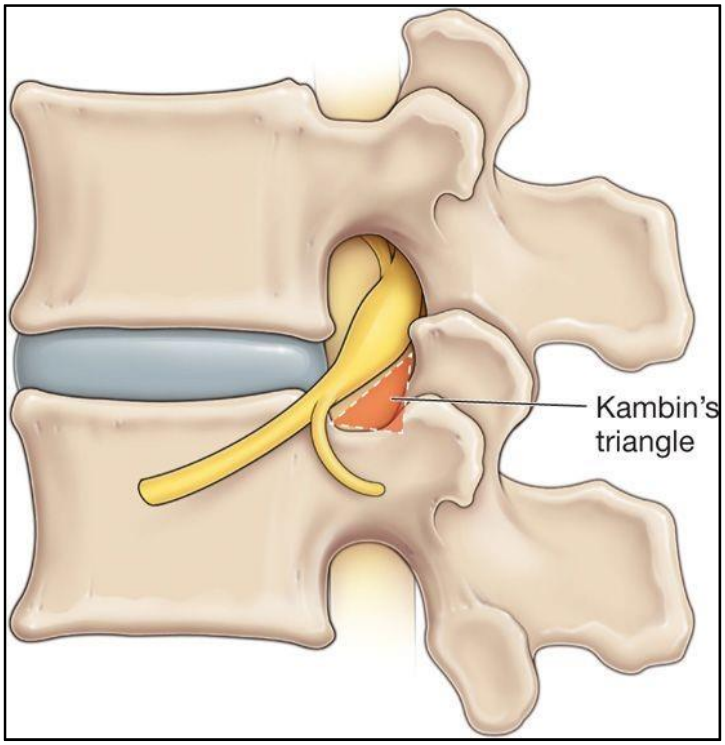


FIGURE 25: ZONES OF INDIVIDUAL VERTEBRA

TRANSFORAMINAL APPROACH

The Kambin's triangle approach

A right triangle over the dorsolateral disc is known as Kambin's triangle. The departing nerve root is the hypotenuse, the superior border of the caudal vertebra is the base (width), and the dura/traversing nerve root is the height. The nerve root canal is the space between where the nerve root is visible and where it exits the intervertebral foramen. The canal is separated into three zones: the entry, the centre, and the exit. The far lateral zone, which is outside the exit zone and where we target in transforaminal block, is the space inhabited by the spinal nerve outside the exit zone.



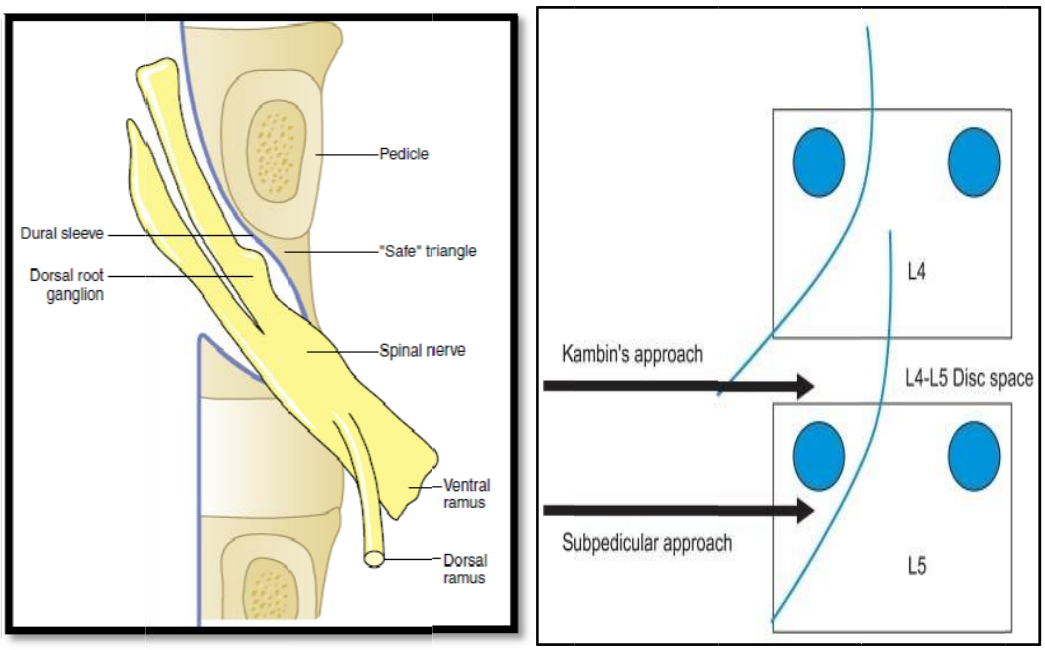
Subpedicular approach

The injection is given at exit zone, which is the distal site of the nerve root canal, in this procedure.

Safe zone in this technique - triangle

- Inferior pedicle border above.
- Side by outer foraminal border.

- Exiting root of the nerve form the diagonal.
- Less chances of penetration of the duramatter
- Aka artery is close in upper limb



The AKA artery is the most risky radiculomedullary artery in lumbar transforaminal injection. When penetrating the spinal canal, the artery penetrates the intervertebral foramen between the left 9th thoracic vertebra and L1 in maximum people.

However, in approximately 20percent of cases, when it reaches the intervertebral foramen between L2 and L4, caution is required. The AKA trunk enters the medial spinal canal via the foramen medialis in the mid or rostral section. It passes through to the ventral root complex and the dorsal root ganglion's anterior section.

DRUGS.

Drugs used

- Kenocort or Triamcinolone injection

Mechanism of Action

Steroids reduces inflammation and edema near the concerned nerve root by inhibiting production of prostaglandins and blocking pain receptors.

Drug concentration

- Kenocort (Triamcinolone) 40 mg

Anesthetics

- Upto 4.0% preservative-free ligocaine OR
- Upto 0.75% bupivacaine.

LIGNOCAINE

It's a flexible LA that works well for both surface and injection applications and comes in a range of shapes. When injected around a nerve, it stops conduction in 3 minutes, whereas procaine might take up to 15 minutes; also, anesthesia is more more effective longer lasting. Vasodilates the area. Nerve block, epidural block , spinal block, and local block are other uses . No identified cross drug reaction

Side Effects

- Drowsy, mental clouding, dysphoria, changed taste, and tinnitus are common initial central reactions of lidocaine.
- An overload of LA leads to muscle twitch, seizures, irregular heartbeats, a can lead to hypotension, unconsciousness, and respiratory failure, much as it does with other LAs.
- IV injection can lead to cardiac arrest.

RISK OF TRANSFORAMINAL INJECTION

- In case of direct nerve injection causes severe pain and leads to nerve damage
- Can be involvement of artery or vein
- Headache resulting due to spinal cord injury
- Resulting numbness in bilateral lower limb
- Increased back pain

OPERATIVE TREATMENT

Should fulfill following criterias

- Accurate diagnosis of condition.
- No pain relief and patient debilitating condition.
- Making patient understand that pathological process will not be discontinued and disc original condition will not be restored.
- Surgery might just cause symptomatically relief.
- Restriction of activities and physical therapy needed post op.
- Proper history with follow-up of the patient to be operated
- Symptomatic for more than 2 months
- Pain and radiculopathy not decreased by conservative treatment.
- Returned to the initial stage after a six to eight weeks of conservative methods.
- Neurological deficit present with SLRT is positive
- Correct imaging to get a exact level for preop preparation.

Indications

Absolute

- Involvement of bladder and bowel.
- Patient with cauda equina syndrome.
- Worsening neurological conditions.

Relative

- Symptoms not relieved by conservative methods
- Persistent radiculopathy.
- Neurological deficit increasing with positive SLRT
- Rupture of disc.

Surgical metods.

- Standard discectomy.
- Limited-Discectomy.
- Micro-surgical Lumbar discectomy & Endoscopic discectomy.
- Additional Exposure.
    - Hemi -laminectomy.
    - Total- Laminectomy.
    - Facetectomy
- Percutaneous Discectomy.
- Arthrodesis.
- Disc replacement

.

STANDARD DISECTOMY

Positioning

- Keep patient in prone
- Attach bolsters
- Knee to chest position
- Abdomen should be hanging free
- Affected side upside wit patient in lateral position

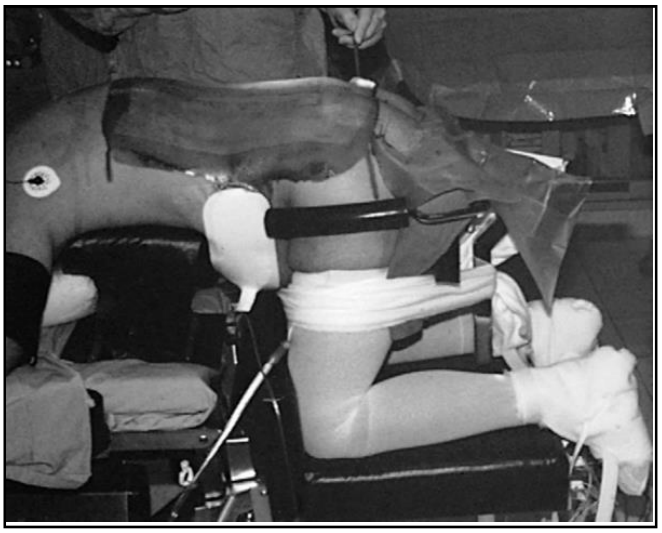
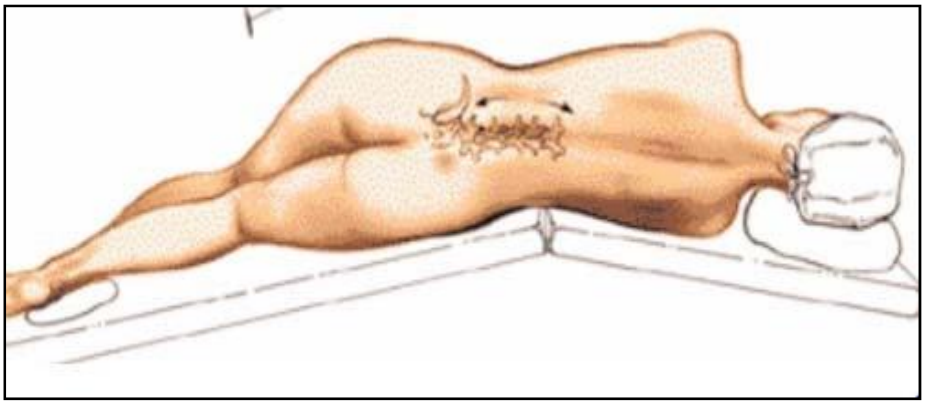
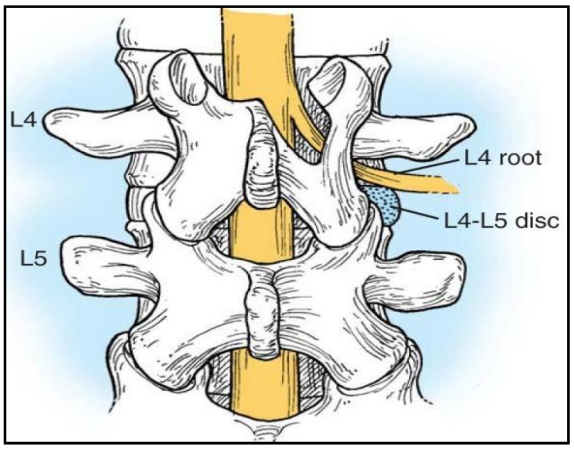


FIGURE 26: PATIENT POSITIONING IN DISCECTOMY





COMPLICATIONS

- Infection at the operated site
- Thrombosis of the deep veins of lowerlimb
- Embollism- pulmonary
- Injury to duramater resulting into CSF leakage, meningitis.
- Post op cauda equina
- Injury to nerve
- Retention of urine

MICROSURGICAL DISCECTOMY

- The technique of preference for lumbar disc herniations.
- First described by Williams in 1978.
- Decompression of the affected nerve root with minimal harm to the neighbouring tissues.

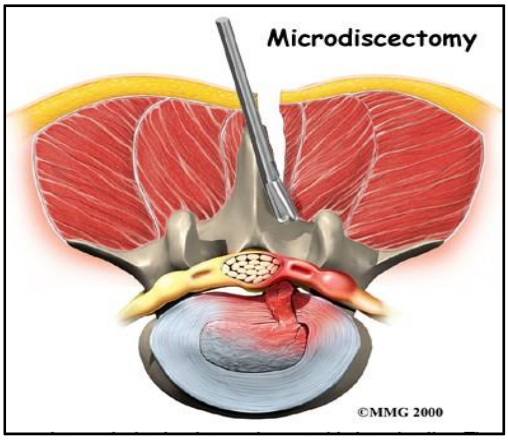


FIGURE 27: MICRODISECTOMY

Advantages

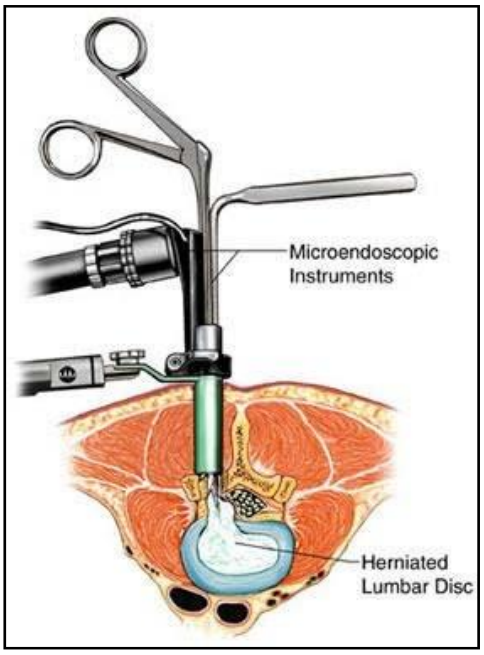
- Relatively quick procedure
- Less morbidity ratio
- Minimal operative blood loss
- Early patient discharge from hospital
- Return to work time is less

- **Drawbacks**
  - Relatively no adequate exposure
  - Not satisfactory decompression
  - Expensive.
- **Contraindications**
  - Previous surgery
  - Lumbar canal stenosed

ENDOSCOPIC DISCECTOMY

Endoscopic procedures help the patient to shorter hospital stays and quick return to daily activities. These are mainly endoscope-assisted microdiscectomy procedures that use multiple kinds of retractors instead of a microscope. Another option is to use this strategy. Each system is distinct, and the reader is directed to the various manufacturers' technique guides for more information. The essential principles of microdiscectomy apply here as well. Less invasive tubular retractors have also been employed trans muscularly, allowing disc excision with less soft-tissue damage due to more accurate exposure.

FIGURE 28: ENDOSCOPIC DISCECTOMY



MATERIALS AND METHODS

Patients admitted in Department of Orthopaedics in B.L.D.E. (DEEMED TO BE UNIVERSITY) Shri B.M.Patil Medical College, Hospital and Research Centre, Vijayapura with complaints of low back ache diagnosed with lumbar radiculopathy.

INCLUSION CRITERIA

- Age 20-70 years
- All patients with complaint of low backache with sciatica , unilateral, or bilateral
- Not relieved by analgesics or physiotherapy
- Positive SLRT test
- radiculopathy with IVDP or LCS
- Failure of conservative treatment for more than six weeks
- ODI score < 40%

EXCLUSION CRITERIA

- Infection- either systemic or local
- Bleeding disorders or fully anticoagulated with anticoagulant medications.
- Cauda equina syndrome
- Patient with neurological deficit
- Uncontrolled Diabetes mellitus
- History of immunosuppression
- Congestive cardiac failure
- Recurrent lumbar disc herniation
- Repeat injections.
- previous spine surgery

RED FLAG SIGNS

1. Progressing neurological deficit.
2. Bowel / bladder incontinence.
3. Thoracic involvement
4. Fever with weight loss
5. Carcinomatous tumors
6. Age above 70 years

DRUGS USED

- Drugs of choice
    - Triamcinolone/kenocort suspension 40 mg (1 ml)
- Anaesthetic used
    - Upto 4.0% preservative-free ligocaine (2 ml) OR
    - Upto 0.75% bupivacaine (2 ml)
- Total - 2-3ml injected

RATIONALE

- STEROID – Steroids reduces inflammation and edema near the concerned nerve root by inhibiting production of prostaglandins and blocking pain receptors
- Local anaesthethics – block the nociceptive pain C fibers and decreases the pain

METHOD OF STUDY

Study Design	:	prospective study.
Study Period	:	November 2019 to May 2021.
Study Centre	:	Department of Orthopaedics, Shri B.M.Patil Medical College, Hospital and Research Centre, Vijayapura
Follow Up	:	POD-1week, 2 month, 3 month.

PATIENT ASSESSMENT

Patients were evaluated using a VAS and then a questionnaire (Oswestry Low Back Pain Disability Index) following the initial procedure to establish the distribution and intensity of their symptoms. The pre-interventional VAS values of all patients were matched to their post-procedure VAS ratings. A pre-ODI score questionnaire was given to all patients, and their profiles were matched to their post-procedure outcomes. A complete neurological assessment was performed prior to the intervention. To rule out any spinal instability, dynamic radiographs were done.

SAMPLING

With anticipated Success rate of pain relief by SNRB 75 .8% (ref) the minimum sample size is 56 patients with 5% level of significance and 10% absolute error.

Formula used

- $$n=\frac{z^2\ p*q}{d^2}$$

Where Z= Z statistic at α level of significance

d 2 = Absolute error

P= Proportion rate

q= 100-p

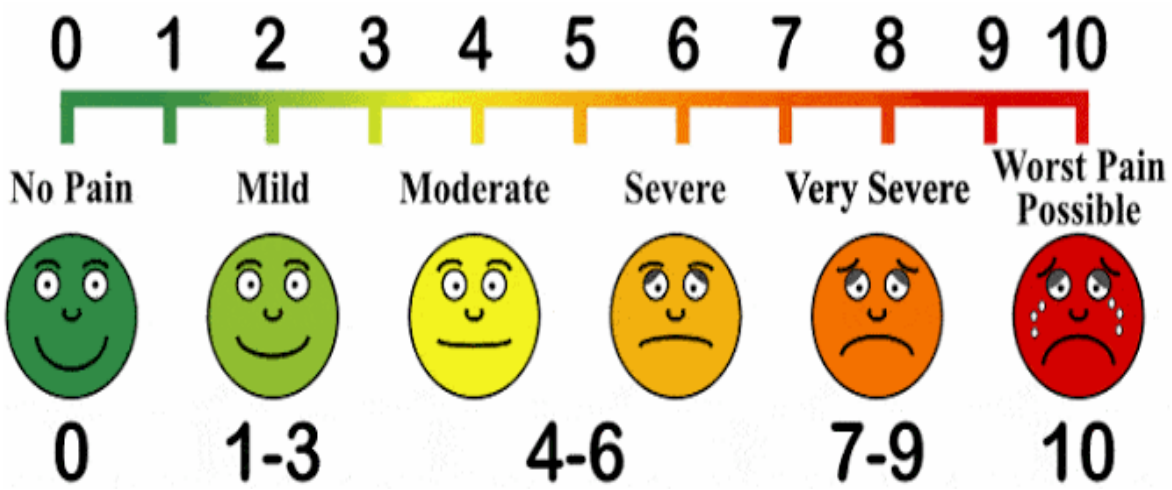
Statistical analysis:

- Numerical variables will be presented as Mean ±SD, and categorical variables will be presented as frequency (%) and diagrams
- Association between categorical variables will be found using Friedman test (If necessary)

OUTCOME

1. VAS SCORE
2. ODI SCORE

FIGURE 29: VISUAL ANALOG SCORE



Owestry disability index (ODI) is a report questionnaire that needs to be filled by the patient; it is a functional outcome measure. It has 10 sections with each section having 6 possible answers rating from 0 to 5 points. The total points that can be attained in this questionnaire are 50, which will be equivalent to 100% or if one section is omitted, then total points would be 45 and the percentage will be measured accordingly.

The interpretation of the disability scores is as follows:

0%-20%-Minimal disability: Most of the activities of daily living can be performed without much difficulty. In these patients no treatment is indicated. Suggestion regarding lifting weights, back care, fitness and diet is all that is necessary.

20%-40%- Moderate disability: These patients will experience more pain on lifting weights, sitting and standing postures. Usually their social life and travelling are not affected. Some of them may be off work. Their personal activities, sexual activity and sleeping are usually not affected. Conservative treatment is usually enough.

40%-60% -Severe disability: Primary problem in these patients is pain. Significant problem may be faced with personal care, sleeping, sexual activity and travel. They need a detailed evaluation.

60%-80% -Crippled: Back pain impacts almost all the aspects of the living in these patients and they need an active treatment.

80%-100%- Bed bound

ROUTINE INVESTIGATION

Some of the tests that conducted are hb level, TLC, DLC, platelet, RBS, serum urea, creatinine, uric acid, BT, and CT.

RADIOLOGY INVESTIGATIONS

- X ray Anteroposterior & Lateral view.
- Dynamic radiographs (Flexion and Extension views) for checking spine stability
- MRI Lumbosacral spine with whole spine screening.

INSIDE OT

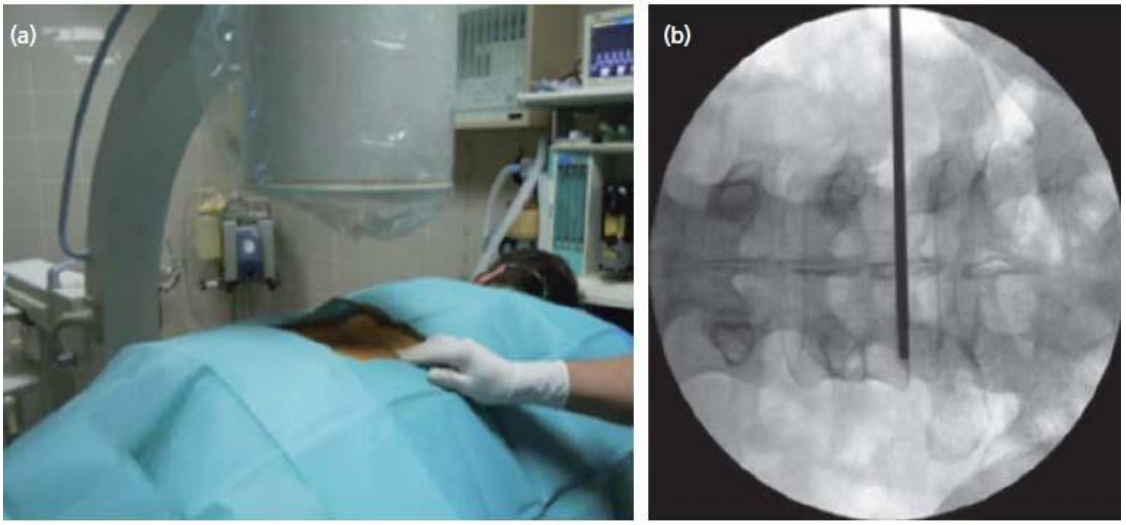
Routine monitors such as noninvasive blood pressure, ECG, and pulse oximetry were employed when the patient came in the operating room after a 6-hour fast for substantial meals. After peripheral intravascular cannulation, Ringer's lactate solution injected. Each patient was administered the antibiotic ceftriaxone 1 g after the proper test dose and resuscitation equipment were checked.

PROCEDURE

- Patient put in prone position and level marked
- Use the c arm as shown below
- Determine the intervertebral space's midway at the desired levels. Orient the lower endplate of the desired vertebral body by sliding the C-arm in a cephalocaudal manner.

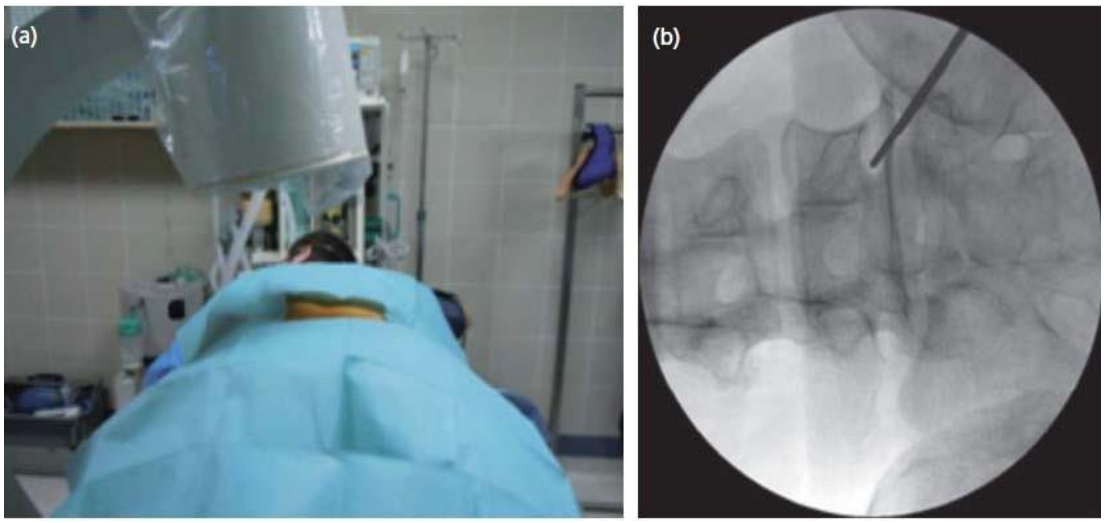
FIGUE 30: PATIENT POSITIONING

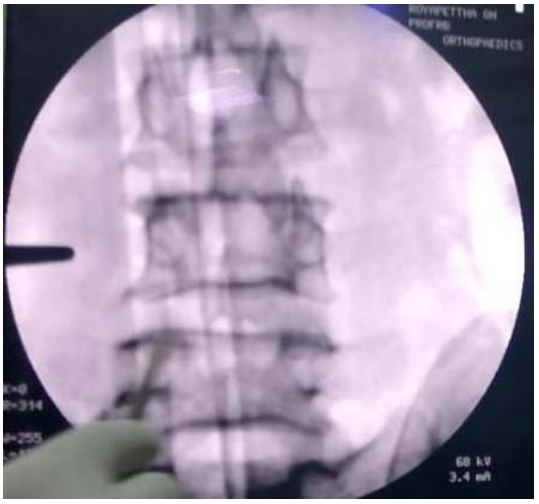
FIGURE 31: INITIAL AP VIEW



Coordinate the vertebral end plates in AP view. The image intensifier is cephalad tilted to place the spinous process in the center.

FIGURE 32: END PLATE ALIGNMENT





- Using an oblique image intensifier, the pedicle of the matched vertebra was identified as the Scottish dog's eye.
- Spinal nerve root reached by subpedicular approach.
- A 23 G spinal needle was used to reach the transforaminal region following local xylocaine infiltration.

- End of the needle is view on C-arm and pedicle is reached at 6 o clock position
- Scottish dog appearance seen after tilt in ipsilateral direction.

The next stage is to obliquely tilt the C arm by 20 to 30 degrees to see the foramina. The pedicle of the relevant vertebra was identified as the eye of the Scottish dog.

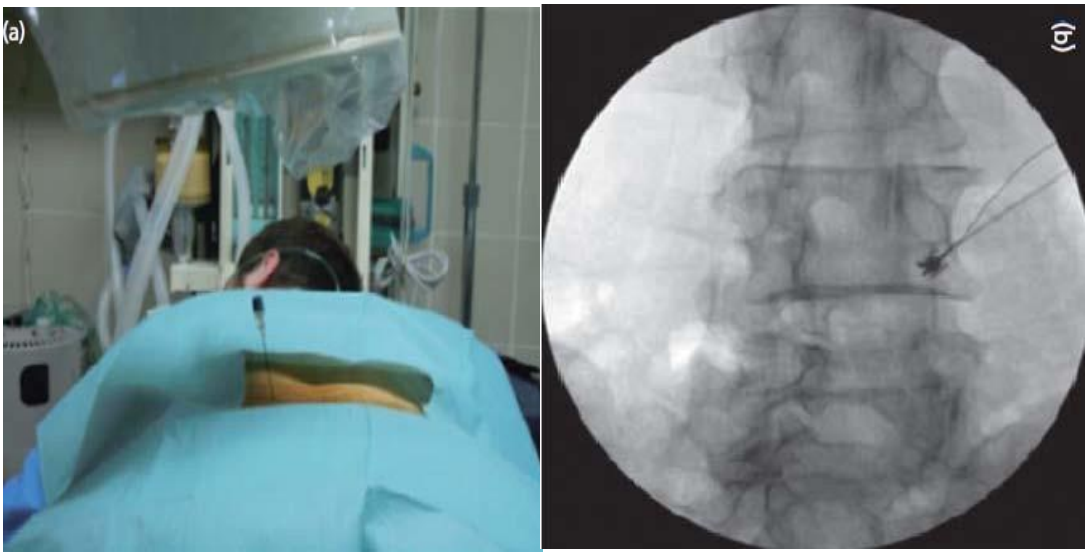
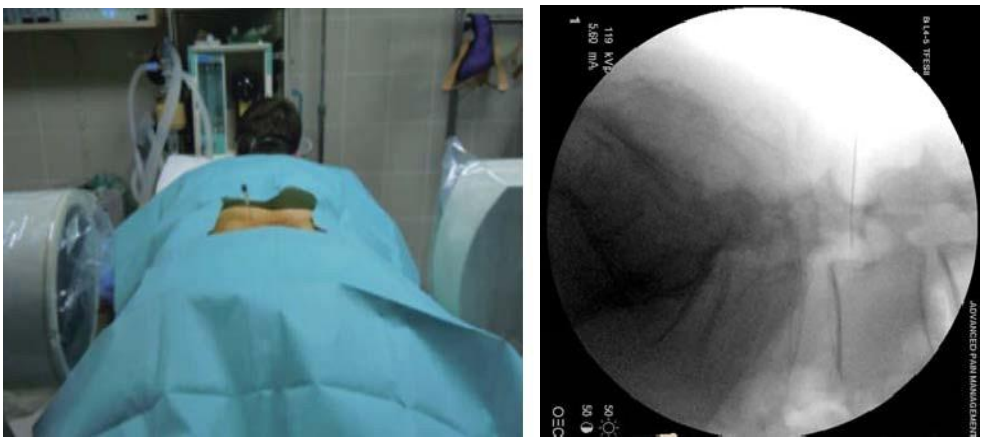


FIGURE 33: LATERAL VIEW



An equivolume combination of steroid (kenocort) with lignocaine is delivered, with no preservative. The steroid will flocculate after the medicine is administered.

POST OP PROTOCOL

- Mobilization from POD 2.
- Analgesics and oral antibiotics till POD 2.
- Lumbar strengthening exercises to be started from POD 6.
- Patient can begin with weight lifting and sports activities from 2 months.
- Few patients reported an increase in discomfort following the procedure.attributed to the drug's bulk effect when administered at the foraminal level.It was relieved by analgesics after 2 days
- Follow -up- VAS & ODI on POD-1 and on next follow ups at 1 week, 2 months, 3 months.

RISKS

- Risk of direct injury to nearby nerve resulting in pain and damage of respective nerve.
- Risk of injecting steroid in blood vessel
- Infection
- Injury to dramatter, CSF leakage.
- Excessive pain.
- Exposure to radiation

DATA ANALYSIS

The pain (VAS Score) and ODI score were measured at the follow-up. Patients' clinical improvement was assessed using follow-up VAS and ODI ratings

OBSERVATION & RESULTS

AGE DISTRIBUTION

The age range of the participants is depicted in the tables and graphs below. The patient's age spans from 23 to 69 years old, with a mean age of 45. The mid-age demographic (36 individuals) revealed a higher incidence among the 56 patients tested.

Table 4: Age Distribution

Age(Years)	No. of patients
< 30	2
30 – 39	12
40 – 49	24
50 – 59	12
60+	6
Total	56

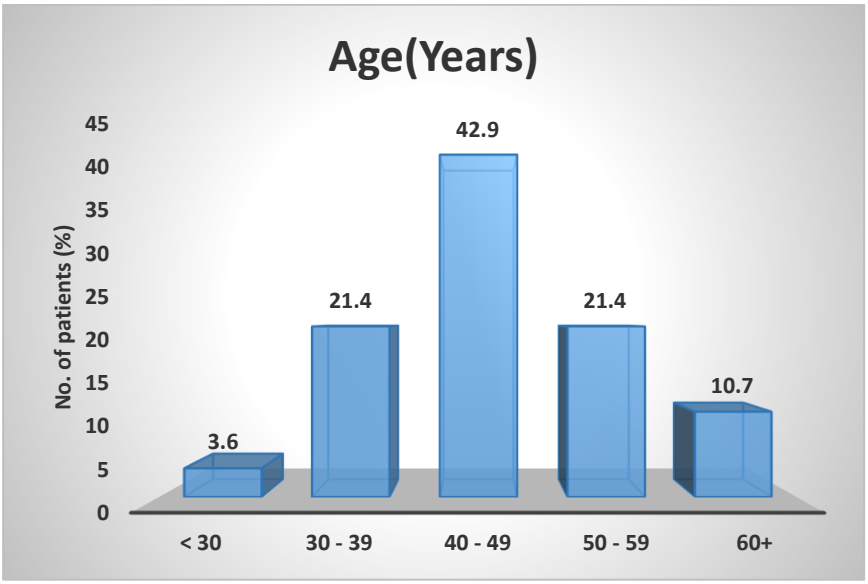


FIGURE 1: AGE DISTRIBUTION

Sex distribution

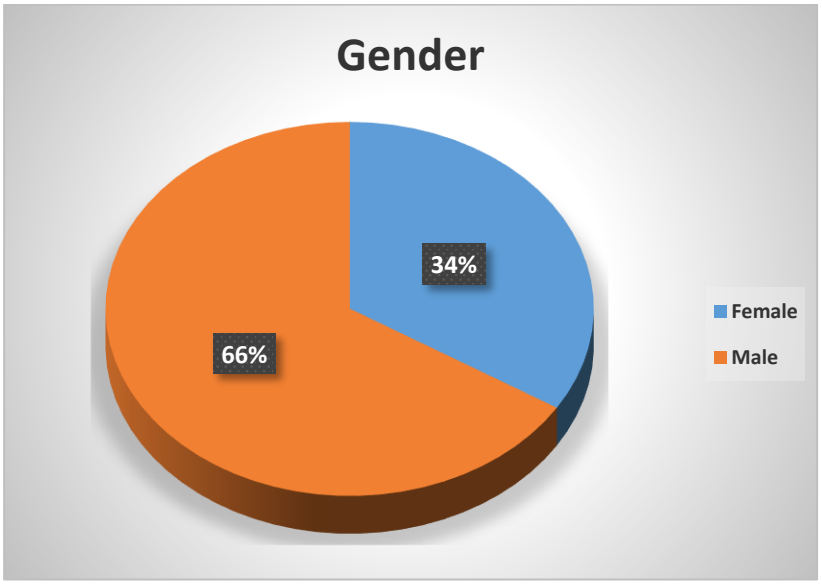
The sex distribution of participants is depicted in the chart and figure below.

Our study included 56 cases, 19 of which were girls and 37 of which were males.

TABLE 5: SEX DISTRIBUTION

Gender	No. of patients
Female	19
Male	37
Total	56

FIGURE 2: SEX DISTRIBUTION



Side distribution

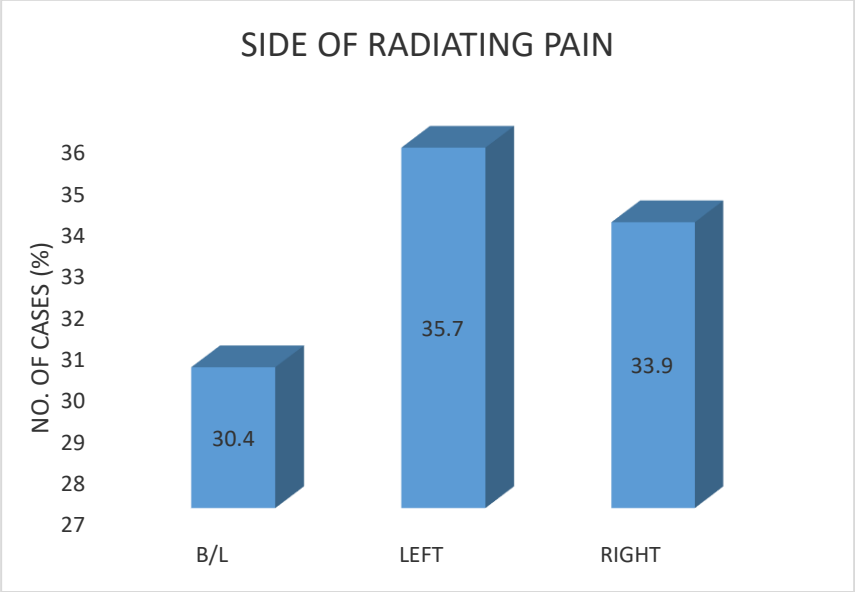
The graphs and figures below depict the side distribution of radiculopathy.

Twenty of the 56 patients felt radiating pain on the left side, 19 on the right side, and 17 on both sides.

Table 6: side distribution

SIDE OF RADIATING PAIN	NO. OF CASES
B/L	17
LEFT	20
RIGHT	19
TOTAL	56

Figure 3: side distribution



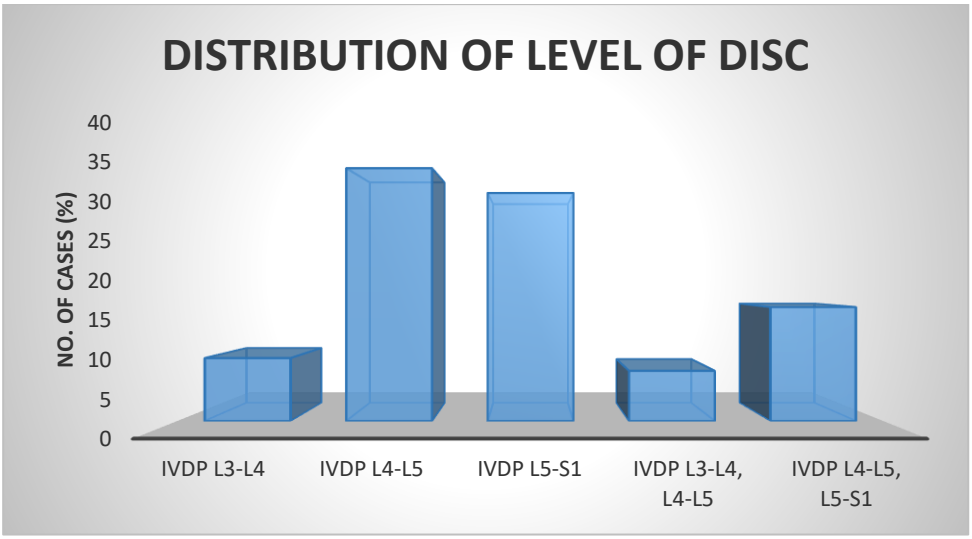
DISTRIBUTION – BASED ON DISC LEVEL

The distribution of cases by level of disc is shown in the tables and graphs below. Five patients had L3L4 disc herniation, 20 had L4L5 disc herniation, and 18 had L5S1 disc herniation, out of a total of 56. At the L3L4 and L4L5 levels, 4 patients had disc herniation, whereas at the L4L5 and L5S1 levels, 9 patients had disc herniation.

Table 7: Distribution of disc level

Disc Level	No. of patients
L3-L4	5
L4-L5	20
L5-S1	18
L3-L4, L4-L5	4
L4-L5, L5-S1	9
Total	56

Figure 4: distribution of disc level

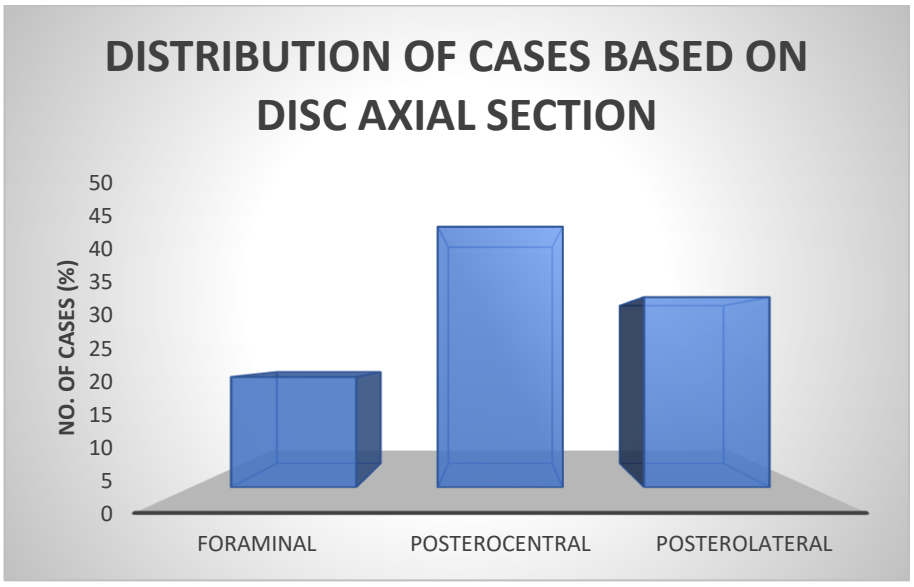


DISTRIBUTION - BASED ON TYPE OF DISC-AXIAL SECTION

In axial section, 19 patients had posterolateral disc herniations, 26 had posterocentral disc herniations, and 11 have foraminal disc herniations.

The following graph and graphic depict the same.

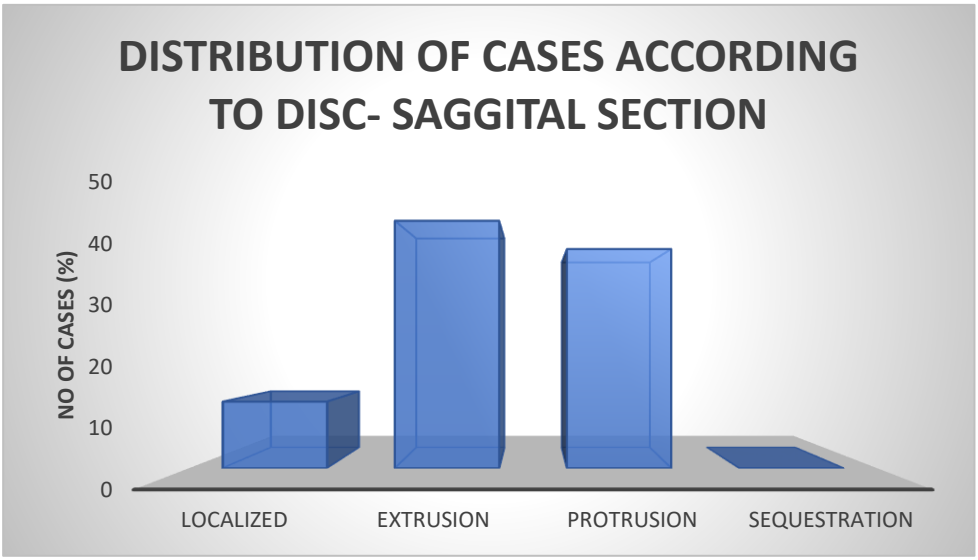
DISC TYPE	NO. OF CASES
FORAMINAL	11
POSTEROCENTRAL	26
POSTEROLATERAL	19
TOTAL	56



DISTRIBUTION - BASED ON TYPE OF DISC-SAGITTAL SECTION

Seven patients had localised disc herniation, 26 had extrusion type herniation of disc, and 23 had protrusion type

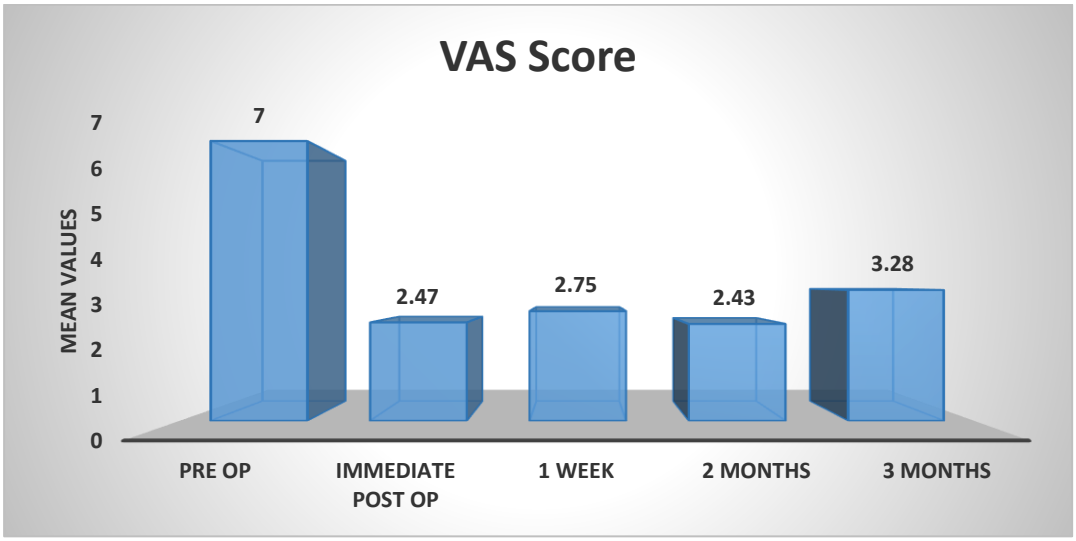
SAGGITAL SECTION	NO. OF CASES
LOCALISED	7
EXTRUSION	26
PROTRUSION	23
SEQUESTRATION	0
TOTAL	56



ANALYSIS OF VAS SCORE

The pre-injection VAS score was 7 among 60 patients. The VAS score immediately after injection dropped to 2.47. There was a somewhat rising tendency in VAS score with subsequent follow up at 1 week, 2 months, and 3 months, with patients reporting relapse of pain. VAS score was statistically significant.

	VAS SCORE		Friedman Test	P value
	Mean	±SD		
PRE -OP	7.00	0.832	F=133.744	P=0.0001*
IMMEDIATE POST OP	2.47	0.639		
1 WEEK	2.75	0.998		
2 MONTHS	2.43	0.636		
3 MONTHS	3.28	5.044		
*: STATISCTICALLY SIGNIFICANT.				

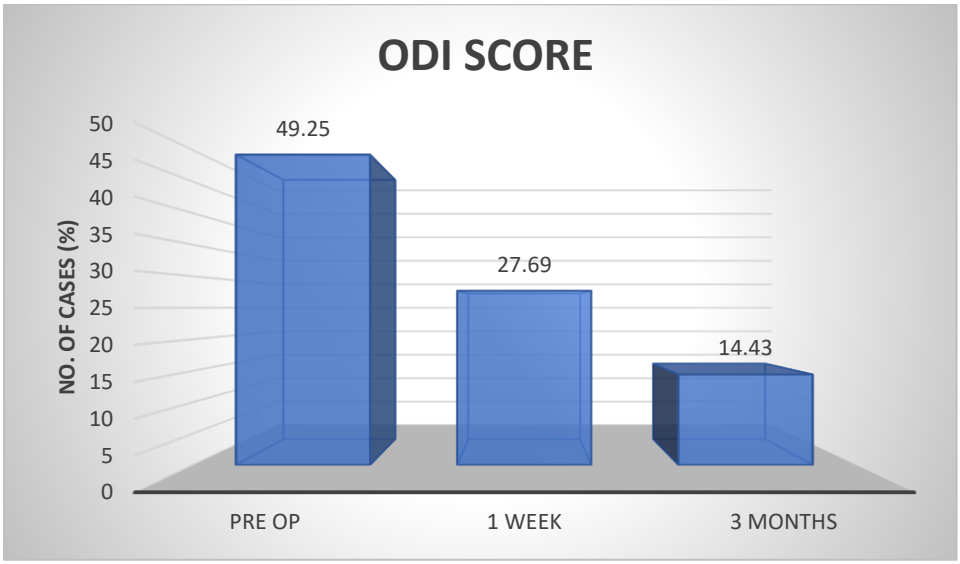


ANALYSIS OF ODI SCORE

The pre-injection VAS score was 49.25 amongst 56 patients. One week after injection, the VAS score dropped to 27.69. After a three-month follow-up, it had dropped to 14.43.

Statistically significant ODI score indicating significant improvement in quality of life

	ODI		Friedman Test	P value
	Mean	±SD		
PRE-OP	49.25	6.939	F=102.00	P=0.0001*
1 WEEK	27.69	7.171		
3 MONTHS	14.43	5.977		
*: STATISTICALLY SIGNIFICANT				



RESULT

The study consisted of 56 individuals who underwent SNRB during the study period. As previously indicated, all of them received SNRB by qualified surgeons.

There were 37 males and 19 females among the 56 patients. The patient's age spans from 23 to 69, with an average of 45; nevertheless, age has no bearing on the result. In this research, 19 individuals had sciatica on their right side, 20 on their left, and 17 on both sides.

The degree of disc herniation was not considered in this investigation. The most cases, 38, were found at the L4-L5 and L5-S1 levels.

The procedure for post-operative physiotherapy was followed. All of the patients were accessible for regular follow-up until 3 months, during which time the VAS and ODI scores were assessed and recorded to determine the functional result. The patient's pain assessment system, which included a Visual analogue score and an owestry disability score, was used to determine the functional result.

The pre-injection mean VAS score was 7, while the post-operative VAS score was 2.4 (P=0.639) in our study. It shows that selective nerve root block improved the result of lumbar radiculopathy patients.

The Friedman Test, which compared preoperative and postoperative owestry disability scores at 1 week and 3 months, revealed statistically significant improvement in the quality, with a drop in owestry disability score postoperatively, indicating significant improvement in quality of life.

Patients experienced good pain alleviation during the follow-up period, which lasted for three months. In further serial follow-up at 3 months, 10 patients

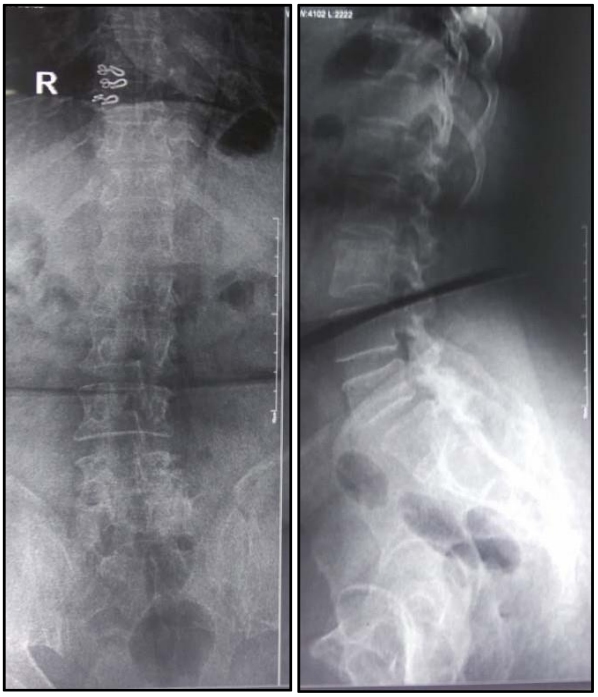
experienced pain recurrence. Three patients, out of ten, required surgery three months after the SNRB failed. A second injection was given to one of the failed patients, who improved.

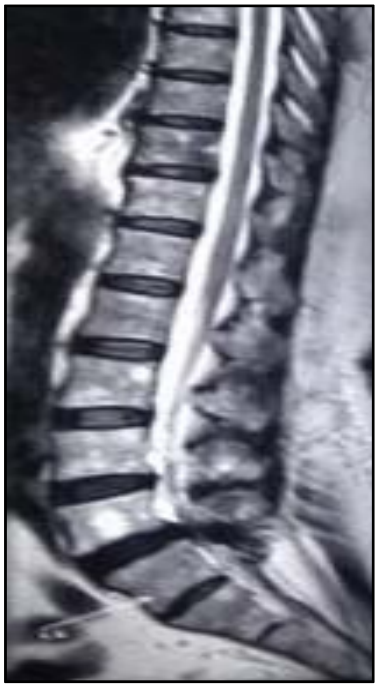
Patients who experienced dizziness or brief muscular weakness were transferred to the recovery area for observation, and all symptoms had subsided by the time they were discharged. Many of the variables studied, such as injection type, age, gender, and main time, had no effect on the success rate.

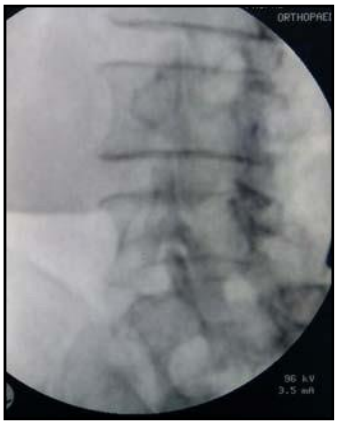
CASE ILLUSTRATIONS

1. NAME – TIPPANA
AGE/SEX – 43/M
DIAGNOSIS -L5-S1 IVDP WITH FLAVUM HYPERTROPHY

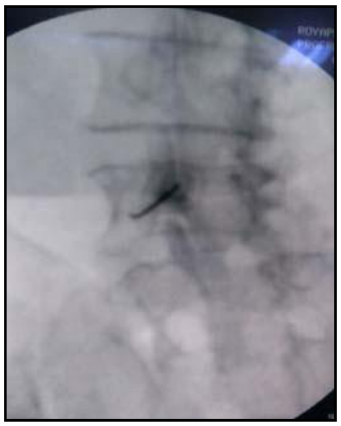
PREOP XRAY AND MRI







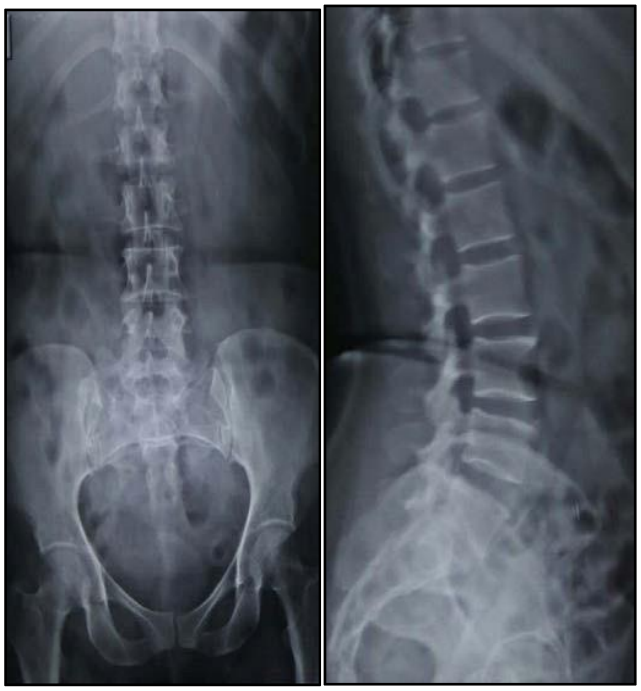
Scottish Dog- Appearance

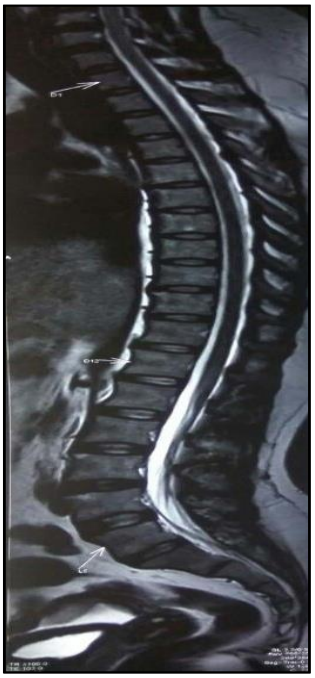


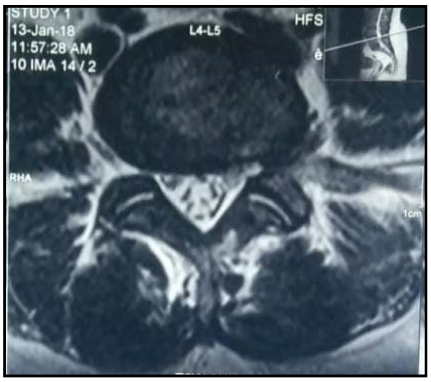
Needle at L5 Pedicle

2.NAME –SHATAPPA
AGE/SEX-59/M
DIAGNOSIS-L4-L5 IVDP

PREOP XRAY & MRI

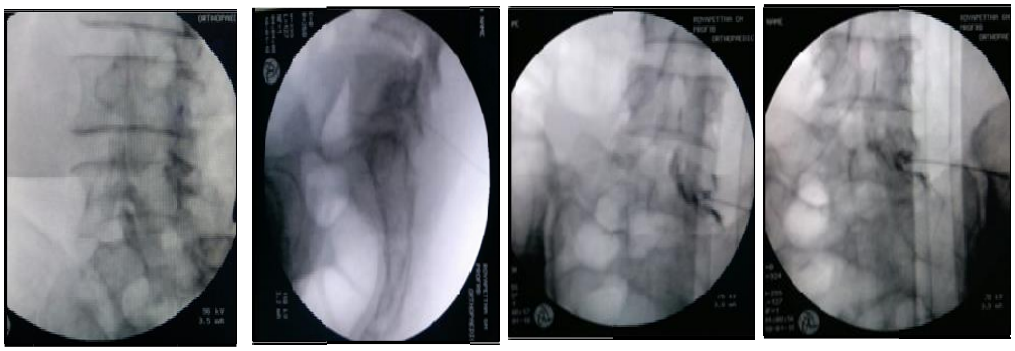






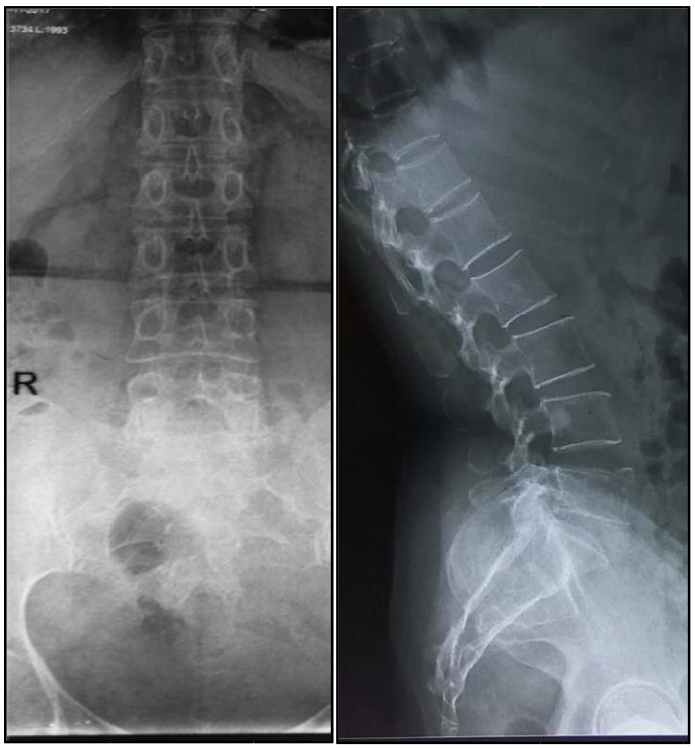
L5 SNRB

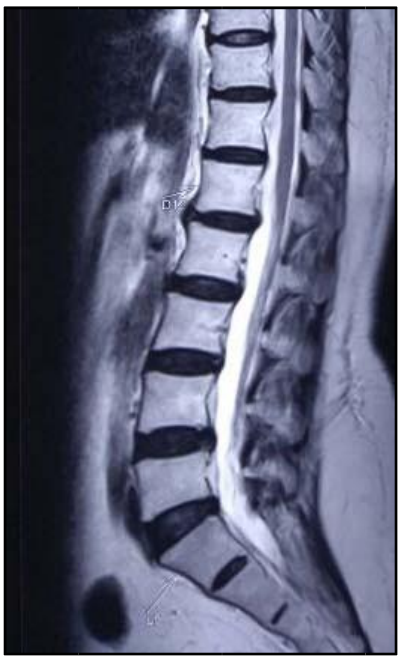
C-ARM PICTURES

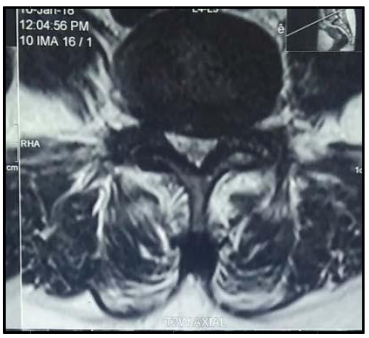


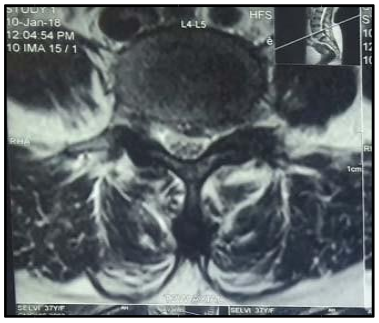
3.NAME- SANGAMMA
AGE/SEX – 48/F
DIAGNOSIS-IVDP L3-L4, L4-L5

PREOP XRAY
& MRI

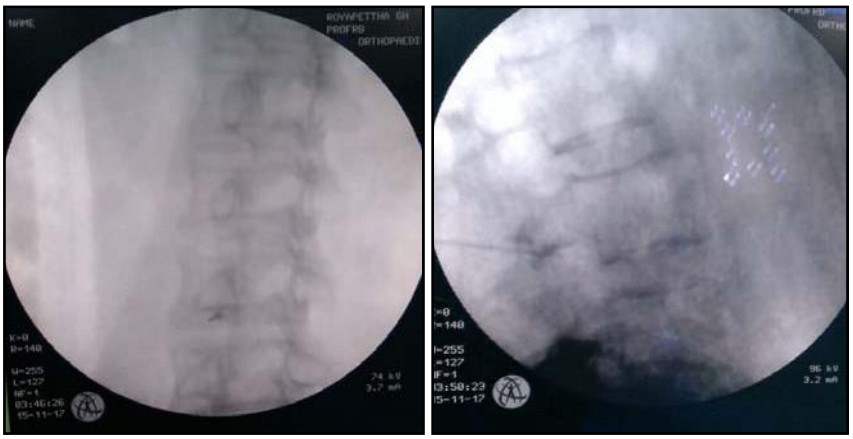








INTRAOP C-ARM PICTURES



DISCUSSION

In individuals with intractable radicular pain, SNRB is a conventional first-line treatment. Lumbosciatic discomfort caused by an intervertebral disc herniation is a common and serious medical condition with significant socioeconomic consequences. Cauda equina syndrome symptoms, abrupt, significant motor impairment, and persistent pain are all definite criteria for prolapsed intervertebral disc surgery. After two months of conservative therapy, there has been no significant progress, which is a relative indication for surgery. The frequency of sciatic symptoms in the general population ranges from 1.7 percent to % in a specialised working population, as per research. Despite the fact that the vast majority of patients have favourable prognosis, a significant part of them (up to 30%) suffer from pain for a year or more. A herniated disc compresses the nerve roots in around 90% of cases, resulting in sciatica. [(10)] Other concerns include stenosis of the lumbar canal or foramen, as well as tumors or cysts.

Lumbosacral radiculopathy leg pain, which spreads in a dermatomal pattern below the knee and into the foot and toes, is the most common symptom of sciatica. As a result of coughing, patients may experience sensory complaints, limited forward flexion of lumbar spine, gait deformity, and unilateral paraspinal muscular spasm.

The majority of patients, on the other hand, have a more hazy clinical picture. Only if there are evidence of underlying disease (infection, malignancy) other than disc herniation should diagnostic imaging be used in acute sciatica. Patients with chronic and severe symptoms who do not resolve after 6–8 weeks of medical therapy may benefit from imaging to tell the involvement of a LDH with nerve root compression.

Conventional therapy appears to produce the same long-term results as surgery in all other cases. According to reviewed prospective randomised trials, only 7 days

of bed rest and proper pain meds are effective in the acute phase of sciatica. Epidural corticosteroid injections in radiculopathy management are widely employed as a strategy to speed up healing, while data on their usefulness differ. [12,13]

The efficacy of epidural corticosteroid injections in the conservative treatment of lumbosciatic pain caused by nucleus pulposus prolapse is still up for dispute. Experiments suggest that suppressing a number of inflammatory mediators, including phospholipase, is responsible for the anti-inflammatory impact and reduced local edema that occurs after corticosteroid injections. Increased levels of phospholipase A2 have been discovered after disc herniation. Corticosteroids block pain from being produced by suppressing the creation of these inflammatory mediators.

Low back pain with and without radicular symptoms, post nucleotomy syndrome, spinal stenosis, and older patients with back pain who haven't ruled out degenerative changes have all been treated with epidural corticosteroids injections as a viable therapy. The usefulness of corticosteroids in these settings is debatable, especially in cases when there is no sciatica or radicular pain. It's controversial, for example, whether the physiologic impact of corticosteroids can help with lumbosciatic discomfort induced by osseous and degenerative changes.

When compared to other techniques, Because the drugs could easily reach the targeted nerve root, dorsal root ganglion, and anterior epidural area, the transforaminal method proved more effective in lowering symptoms with less agents. Transforaminal technique, on the other hand, may result in steroid injection into vessels, vascular convulsion produced by direct needle damage, and ischemic spinal nerve damage caused by embolism are all possible complications during the surgery. [14,15,16] There have been 12 recorded occurrences of lumbar, dorsal, and

transforaminal steroid epidural injections causing substantial neurological damage. Some studies noted paralysis due to ischemic spinal damage after lumbar, dorsal, and intervertebral foramen steroid epidural injection, even when the needle was positioned in the safe triangle through the subpedicular approach.

The lumbar spinal nerve has a triangular part where it exits the intervertebral foramen slant to form hypotenuse, the bottom end is attached to the lower half of the pedicle, and vertical plate is line that forms a right angle to the pedicle exterior. Because the compartment primarily contains only the spinal nerve and vessel[18], it is known as "the safe triangle." The anatomical structure of the artery is excluded by the triangle's form. In lumbar transforaminal injection, the AKA artery is the most important radiculomedullary artery. When accessing the spinal canal, the artery reaches the intervertebral foramen between the left ninth thoracic vertebra and L1 in 80 percent of healthy persons. However, caution is advised because it can enter the intervertebral foramen between L2 and L4 in roughly 20% of cases. In either the mid or rostral segment, the main trunk of the AKA enters the medial spinal canal through the foramen medialis. It goes via the ventral root complex and the proximal portion of the dorsal root ganglion. [(19)] The injection needle is placed in the ant superolateral aspect of the vertebral foramen, The AKA is more likely to be damaged by the subpedicular method, as is spinal cord infarction following intravascular injection of particulate steroids. The needle is put into the front of the intervertebral foramen, crossing the nerve root, in the subpedicular approach. Because it is difficult to identify needle in the anterior epidural space through safe triangle in severe spinal stenosis, epidural fibrosis, and degenerative intervertebral disc area, the needle may prick the spinal nerve root during injection.

Meanwhile, using Kambin's triangle approach, needle is inserted inferior-posterior on lateral view, reducing the risk of pricking the spinal nerve root.[(20)]Because it is a pain-relieving interventional technique, Because it is in the

hands of a variety of medical practitioners, including spine surgeons, radiologists, anesthesiologists, and pain physicians, the inclusion criteria and patient evaluation differ widely from study to study.

The assessment was based on the severity of the pain and a comparison of the pre- and post-operative VAS and ODI scores during following outpatient visits at 1 week, 2 months, and 3 months (final follow up). The severity of pain was determined by the visual analogue score and the owestry disability score, both of which indicated considerable improvement. A single dose transforaminal block injection greatly benefited the majority of patients.

The significant maximal advantage was obtained in the immediate post-injection state. Selective nerve root block injection is a simple procedure that is safe (no reactions), inexpensive for both the patient and the institution, free of biohazard complications, minimally traumatic, avoids the regular use of NSAIDS, provides pain relief, has no complications, is effective and has a low recurrence rate, and improves functional status.

CONCLUSION

The patient's first response to the transforaminal selective nerve root steroid injection was positive, and he was able to live pain-free for three months. In the coming days, the long-term pain alleviation outcome will be evaluated.

Selective Nerve Root Block is a rather safe surgery for providing short-term pain relief for lumbar radiculopathy, according to our findings.

BIBLIOGRAPHY

1. Helio¨vaara M, Impivaara O, Sievers K, et al. Lumbar disc syndrome in Finland. J Epidemiol Community Health. 1987;41: 251-258
2. Solberg TK, Nygaard ØP, Sjaavik K, Hofoss D, Ingebrigtsen T. The risk of "getting worse" after lumbar microdiscectomy. Eur Spine J. 2005;14:49-54. doi:10.1007/s00586-004-0721-5
3. Cyteval C, Fescquet N, Thomas E, Decoux E, Blotman F, Taourel P. Predictive factors of efficacy of periradicular corticosteroid injections for lumbar radiculopathy. AJNR Am J Neuroradiol. 2006;27:978-982.
4. McLain RF, Kapural L, Mekhail NA. Epidural steroid therapy for back and leg pain: mechanisms of action and efficacy. Spine J. 2005;5:191-201.
5. Park, J. W., Nam, H. S., Cho, S. K., Jung, H. J., Lee, B. J., & Park,

   Y. (2011). Kambin's triangle approach of lumbar transforaminal epidural injection with spinal stenosis. Annals of rehabilitation medicine, 35(6), 833.
6. Jacobs WCH, van Tulder M, Arts M, et al. Surgery versus conservative management of sciatica due to a lumbar herniated disc: a systematic review. Eur Spine J. 2011;20:513-522. doi:10.1007/s00586-010-1603-7

7. Riew KD, Yin Y, Gilula L, Bridwell KH, Lenke LG, Lauryssen C, Goette K. The effect of nerve-root injections on the need for operative treatment of lumbar radicular pain. A prospective, randomized, controlled, double-blind study. J Bone Joint Surg Am. 2000;82:1589–1593.
8. Pfirrmann CW, Oberholzer PA, Zanetti M, et al. Selective nerverootblocks for the treatment of sciatica: evaluation of injectionsite and effectiveness—a study with patients and cadavers.Radiology. 2001;221:704-711.
9. Datta, S., Pai, U., &Gajraj, N. M. (2004). Selective Nerve Root Block-Is the Position of the Needle Transforaminal or Paraforaminal? Call for a Need to Reevaluate the Terminology/Reply to Dr.Datta. *Regional anesthesia and pain medicine*, *29*(6), 616.
10. Lee JW, Kim SH, Lee IS, et al. Therapeutic effect and outcome predictors of sciatica treated using transforaminal epidural steroid injection. AJR Am J Roentgenol. 2006;187:1427-1431. doi:10. 2214/AJR.05.1727
11. Cooper G, Lutz GE, Boachie-Adjei O, Lin J. Effectiveness of transforaminal epidural steroid injections in patients with degenerative lumbar scoliotic stenosis and radiculopathy. Pain Physician.

12. Vad VB, Bhat AL, Lutz GE, Cammisa F. Transforaminal epidural steroid injections in lumbosacral radiculopathy: a prospective randomized study. Spine. 2002;27:11–16.
13. Boswell MV, Hansen HC, Trescot AM, Hirsch JA. Epidural steroids in the management of chronic spinal pain and radiculopathy. Pain Physician. 2003;6:319–.
14. Kanna, R. M., Shetty, A. P., &Rajasekaran, S. (2018). Predictors of successful outcomes of selective nerve root blocks for acute lumbar disc herniation. Global Spine Journal, 2192568218800050.
15. McCormick Z, Cushman D, Casey E, Garvan C, Kennedy DJ, Plastaras C. Factors associated with pain reduction after transforaminal epidural steroid injection for lumbosacral radicular pain. Arch Phys Med Rehabil. 2014;95:2350-2356. doi:10.1016/j.apmr. 2014.07.404.
16. Slipman CW, Chow DW. Therapeutic spinal corticosteroid injections for the management of radiculopathies. Phys Med RehabilClin N Am. 2002;13:697–711.
17. Rydevik B, Brown MD, Lundborg G. Pathoanatomy and pathophysiology of nerve root compression. Spine. 1984;9:7–15.
18. Glaser SE, Shah RV. Root cause analysis of paraplegia following transforaminal epidural steroid injections: the 'unsafe' triangle. Pain Physician. 2010;13:237–244.

19. Alleyne CH, Jr, Cawley CM, Shengelaia GG, Barrow DL. Microsurgical anatomy of the artery of Adamkiewicz and its segmental artery. J Neurosurg. 1998;89:791–795.

20. Kambin P, Sampson S. Posterolateral percutaneous suction-excision of herniated lumbar intervertebral discs. Report of interim results. ClinOrthopRelat Res. 1986;207:37–43

21. Crall TS, Gilula LA, Kim YJ, Cho Y, Pilgram T, Riew KD. The diagnostic effect of various needle tip positions in selective lumbar nerve blocks: an analysis of 1202 injections. Spine. 2006;31:920– 922.

22. Tajima T, Furukawa K, Kuramochi E. Selective lumbosacral radiculography and block. Spine (Phila Pa 1976).

23. Seidler A, Bolm-Audorff U, Siol T, et al. Occupational risk factors or symptomatic lumbar disc herniation; a case-control study Occup Environ Med. 2003;60:821-830.

24. Seidler A, Bolm-Audorff U, Siol T, et al. Occupational risk factorsfor symptomatic lumbar disc herniation; a case-control study. Occup Environ Med. 2003;60:821-830.

25. McCarron, RF, Wimpee, MW, Hudkins, PG, Laros, GS1987.The inflammatory effect of nucleus pulposus: a possible element in the pathogenesis of low back pain.Spine12760764

26. Yeom JS, Lee JW, Park KW, et al. Value of diagnostic lumbar selective nerve root block: a prospective controlled study. AJNR Am J Neuroradiol. 2008;29:1017-1023. doi:10.3174/ajnr.A0955.

27. . Goupille P, Jayson MI, Valat JP, Freemont AJ. Matrix metalloproteinases: the clue to intervertebral disc degeneration. Spine (Phila Pa 1976). 1998;23:1612-1626

28. Chung JY, Yim JH , Seo HY, Kim SK , Cho KJ. The efficacy and persistence of selective nerve rooy block under fluoroscopic guidance for cervical radiculopathy . Asian spinine J. 2012; 6(4)

29. Beynon R, Elwenspoek MC , Sheppard A Higgins JN , Kolias AG,Laing RJ, ET AL. The utility of diagnostic selective nerve root block in management of patients withlumbar radiculopathy: A systematic review, BMJ Open . 2019;9(4)

30. Mobleghin J, Alahdini F Nasseri K, Ahsan B , Shami S, Faizi M , Et al. Compairing the effects ofepidural methylprednisolone acetate injected in patients eith pain due to lumbar spinal stenosis or herniated disks: A prospective study, Int J Gen med. 2011 ;4 875-8

31. Tafazal S , Ng LChaudhary N ,Sell p. Corticosteroids in peri radicular infiltration for radicular pain:A randomized double blind controlled trial . One year results and subgroup analysis Eur Spihne J . 2009;18(8):1220-5

32 .Gajaraj NM. Selecctive nerve root blocks for low back ache and radiculopathy.Reg Anesth Pain Med. 2004;29(3):243 -56

33.Blankebaker DG , De Smet AA, Stanczak JD, Fine JP. Lumbar radiculopathy: Treatment with selective lumbar nerve blocks – Comparison of effectiveness f triamcinolone and betamethasone injectable suspension . Radiology. 2005;237(2):738-41

34 Beynon r , Hawkins J ,Laing R, Higgins N , Whiting P , Jameson C et al. The diagnostic utlity and cost effectiveness of selective nerve rootb block in patients

considered for lumbar decompression surgery : A systematic review and economic model, Health Tehnol Assess(Rockv)2013;17(19)

SHRI B.M. PATIL MEDICAL COLLEGE, HOSPITAL AND RESEARCH CENTRE, VIJAYPURA- 586103

PROFORMA

CASE NO. :

NAME :

AGE/SEX :

I P NO :

DATE OF ADMISSION :

DATE OF SURGERY :

DATE OF DISCHARGE :

OCCUPATION :

RESIDENCE :

Presenting complaints with duration :

History of presenting complaints :

Family History :

Personal History :

Past History :

General Physical Examination

Pallor:	present/absent
Icterus:	present/absent
Clubbing:	present/absent
Generalized lymphadenopathy:	present/absent
Built:	poor/moderate/well
Nourishment:	poor/moderate/well

Vitals

PR: RR:

BP: TEMP:

Other Systemic Examination:

Local examination:

Inspection:

a) Attitude/ deformity

b) Abnormal swelling

- Site
- Size
- Shape
- Extent

d) Skin

e) Compound injury if any

Palpation:

a) Local tenderness

b) Bony irregularity

c) Abnormal movemet

e) Swelling

Range of Movements: Active Passive

LUMBAR SPINE : Flexion

Extension

Neurological examination

1. Tone
2. Bulk
3. Power
4. Reflexes
5. Sensory examination

Special tests

SLRT

Lasegue

Patrik

Femoral nerve stretch test

Oswestry Disability Index

Section 1 – Pain Intensity

- I have no pain at the moment.
- The pain is very mild at the moment.
- The pain is moderate at the moment.
- The pain is fairly severe at the moment.
- The pain is very severe at the moment.
- The pain is the worst imaginable at the moment.

Section 2 – Personal Care (washing, dressing, etc.)

- I can look after myself normally but it is very painful.
- I can look after myself normally but it is very painful.
- It is painful to look after myself and I am slow and careful.
- I need some help but manage most of my personal care.
- I need help every day in most aspects of my personal care.
- I need help every day in most aspects of self-care.
- I do not get dressed, wash with difficulty, and stay in bed.

Section 3 - Lifting

- I can lift heavy weights without extra pain.
- I can lift heavy weights but it gives extra pain.
- Pain prevents me from lifting heavy weights off the floor, but I can
- manage if they are conveniently positioned (i.e. 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 cannot lift or carry anything at all.

Section 4 – Walking

- Pain does not prevent me walking any distance.

- Pain prevents me walking more than 1mile.
- Pain prevents me walking more than ¼ of a mile.
- Pain prevents me walking more than 100 yards.
- I can only walk using a stick or crutches.
- I am in bed most of the time and have to crawl to the toilet.

Section 5 – Sitting

- I can sit in any chair as long as I like.
- I can 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.

Section 6 – Standing

- I can stand as long as I want without extra pain.
- I can stand as long as I want but it gives me extra pain.
- Pain prevents me from standing more than 1 hour.
- Pain prevents me from standing for more than ½ an hour.
- Pain prevents me from standing for more than 10 minutes.
- Pain prevents me from standing at all.

Section 7 – Sleeping

- _My sleep is never disturbed by pain.
- My sleep is occasionally disturbed by pain.
- Because of pain, I have less than 6 hours sleep.
- Because of pain, I have less than 4 hours sleep.
- Because of pain, I have less than 2 hours sleep.
- Pain prevents me from sleeping at all.

Section 8 – Sex life (if applicable)

- My sex life is normal and causes no extra pain.
- My sex life is normal but causes some extra pain.
- My sex life is nearly normal but is very painful.
- My sex life is severely restricted by pain.
- My sex life is nearly absent because of pain.
- Pain prevents any sex life at all.

Section 9 – Social Life

- My social life is normal and cause me no extra pain.
- My social life is normal but increases the degree of pain.
- Pain has no significant effect on my social life apart from limitingmy
- more energetic interests, i.e. sports.
- Pain has restricted my social life and I do not go out as often.
- Pain has restricted social life to my home.
- I have no social life because of pain.

Section 10 – Traveling

- I can travel anywhere without pain.
- I can travel anywhere but it gives extra pain.
- Pain is bad but I manage journeys of over two hours.
- Pain restricts me to short necessary journeys under 30 minutes.
- Pain prevents me from traveling except to receive treatment.

Section 11 - Previous Treatment

Over the past three months have you received treatment, tablets or medicines of any kind for your back or leg pain? Please check the appropriate box.

- No

- _ Yes (if yes, please state the type of treatment you have received)

B.L.D.E.U.'s SHRI B.M.PATIL MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTER, VIJAYAPURA -586103

INFORMED CONSENT FOR PARTICIPATION IN DISSERTATION/RESEARCH

I, the undersigned,_____ , S/O D/O W/O _____, aged ____years, ordinarily resident of _____ do hereby state/declare that Dr Amit Surve of Shri. B. M. Patil Medical College Hospital and Research Centre has examined me thoroughly on _____ at _____ (place) and it has been explained to me in my own language that I am suffering from _____ disease (condition) and this disease/condition mimic following diseases. Further Dr. Amit Surve informed me that he/she is conducting dissertation/research titled "PROSPECTIVE STUDY OF FUNCTIONAL OUTCOME OF THERAPEUTIC AND DIAGNOSTIC SELECTIVE NERVE ROOT BLOCK IN MANAGEMENT OF PATIENTS WITH LUMBAR RADICULOPATHY" under the guidance of Dr. Dayanand B.B requesting my participation in the study. Apart from routine treatment procedure, the pre-operative, operative, post-operative and follow-up observations will be utilized for the study as reference data.

Doctor has also informed me that during conduct of this procedure like adverse results may be encountered. Among the above complications most of them are treatable but are not anticipated hence there is chance of aggravation of my condition and in rare circumstances it may prove fatal in spite of anticipated diagnosis and best treatment made available. Further Doctor has informed me that my participation in this study help in evaluation of the results of the study which is useful reference to treatment of other similar cases in near future, and also I may be benefited in getting relieved of suffering or cure of the disease I am suffering.

The Doctor has also informed me that information given by me, observations made/ photographs/ video graphs taken upon me by the investigator will be kept secret and not assessed by the person other than me or my legal hirer except for academic purposes.

The Doctor did inform me that though my participation is purely voluntary, based on information given by me, I can ask any clarification during the course of treatment / study related to diagnosis, procedure of treatment, result of treatment or prognosis. At the same time I have been informed that I can withdraw from my participation in this study at any time if I want or the investigator can terminate me from the study at any time from the study but not the procedure of treatment and follow-up unless I request to be discharged.

After understanding the nature of dissertation or research, diagnosis made, mode of treatment, I the undersigned Shri/Smt _____ under my full conscious state of mind agree to participate in the said research/dissertation.

Signature of patient:

Signature of doctor:

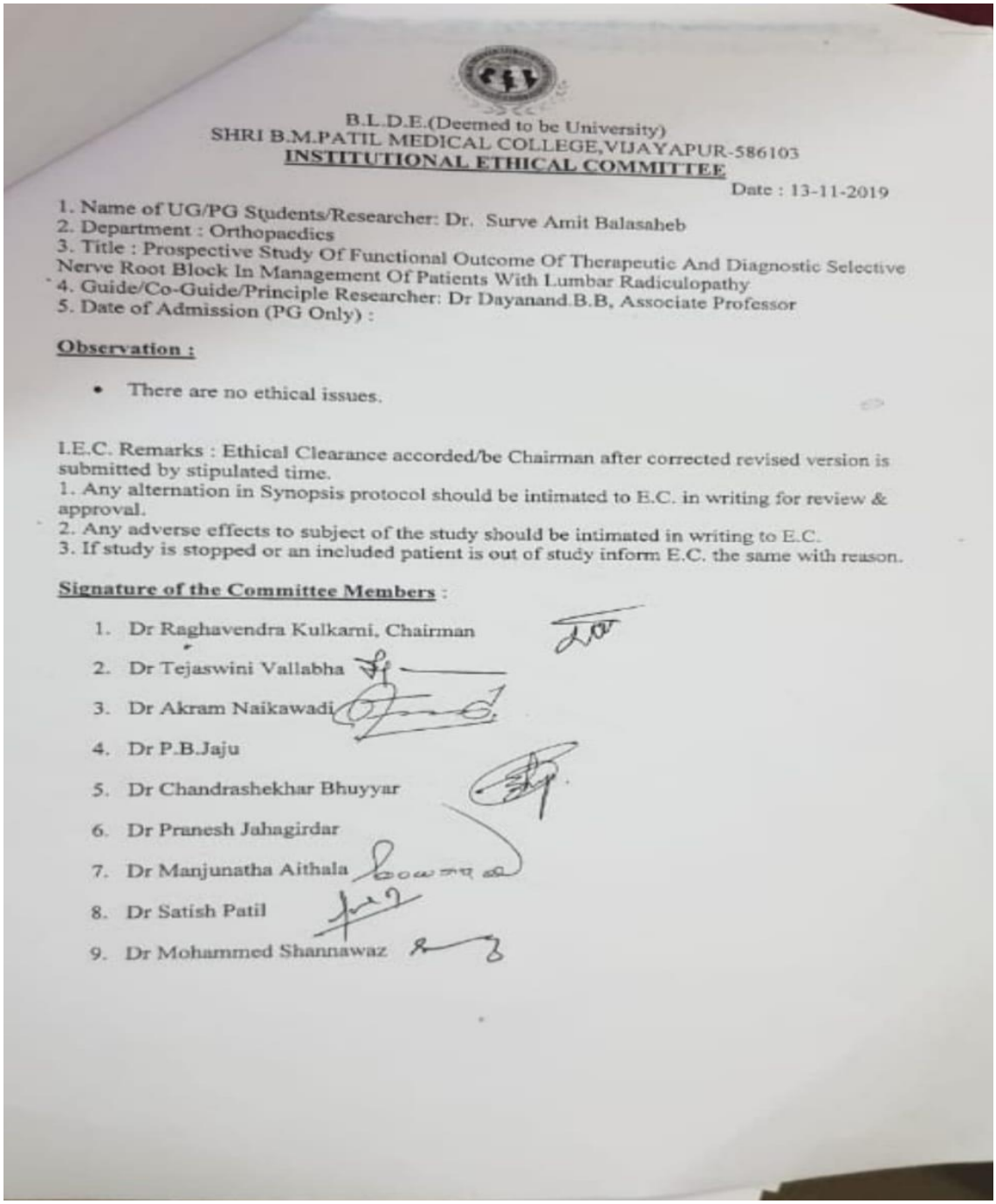
Witness: 1.

2.

Date:

Place:

ETHICAL COMMITTEE CLEARANCE



B.L.D.E.(Deemed to be University)
SHRI B.M.PATIL MEDICAL COLLEGE,VIJAYAPUR-586103
INSTITUTIONAL ETHICAL COMMITTEE

Date : 13-11-2019

1. Name of UG/PG Students/Researcher: Dr. Surve Amit Balasaheb
2. Department : Orthopaedics
3. Title : Prospective Study Of Functional Outcome Of Therapeutic And Diagnostic Selective Nerve Root Block In Management Of Patients With Lumbar Radiculopathy
4. Guide/Co-Guide/Principle Researcher: Dr Dayanand.B.B, Associate Professor
5. Date of Admission (PG Only) :

Observation :

- There are no ethical issues.

I.E.C. Remarks : Ethical Clearance accorded/be Chairman after corrected revised version is submitted by stipulated time.
1. Any alternation in Synopsis protocol should be intimated to E.C. in writing for review & approval.
2. Any adverse effects to subject of the study should be intimated in writing to E.C.
3. If study is stopped or an included patient is out of study inform E.C. the same with reason.

Signature of the Committee Members :

1. Dr Raghavendra Kulkarni, Chairman
2. Dr Tejaswini Vallabha
3. Dr Akram Naikawadi
4. Dr P.B.Jaju
5. Dr Chandrashekhar Bhuyyar
6. Dr Pranesh Jahagirdar
7. Dr Manjunatha Aithala
8. Dr Satish Patil
9. Dr Mohammed Shannawaz

MASTER CHART

S.No	NAME	Age / Sex	IP NO	DIAGNOSIS	SIDE OF RADIATING PAIN	SELECTIVE NERVE ROOT BLOCK LEVEL	ZONE (Axial Section) MRI	TYPE (SAGGITAL / AXIAL SECTION)	VISUAL ANALOG SCORE					OWESTRY DISABILITY INDEX		
									PRE OP	IMMEDIATE POST OP	1 WEEK	2 MONTHS	3 MONTHS	PRE OP ODI	POST OP 1 WEEK	3 MONTHS
1	BOURAMMA	45/F	36593	IVDP L5 S1 WITH L5 LIGAMENTUM FLAVUM HYPERTROPHY	B/L	L5 S1 NERVE ROOT	PL	PROTRUSION	8	2	2	2	2	44	26	18
2	TIPANNA	43/M	453459	IVDP L5 S1 WITH CANAL STENOSIS	RIGHT	L5 S1 NERVE ROOT	PC	EXTRUSION	6	2	2	1	1	54	36	20
3	PRATIBHA	35/F	5587	IVDP L4 L5	LEFT	L4 L5 NERVE ROOT	PL	PROTRUSION	7	2	2	2	1	56	24	16
4	RAMESH	32/M	2666	IVDP L3L4	RIGHT	L4 NERVE ROOT	PL	PROTRUSION	8	4	4	2	2	62	28	16
5	URVASHI	46/F	41676	IVDP L4L5 WITH FACET HYPERTROPHY	RIGHT	L5 NERVE ROOT	PC	PROTRUSION	8	3	3	2	2	44	20	10
6	CHANDRAPPA	69/M	3495	IVDP L4L5	LEFT	L5 NERVE ROOT	PC	EXTRUSION	8	3	4	4	4	48	32	18
7	VANI	44/F	62203	IVDP L4L5 WITH CANAL STENOSIS	B/L	L4 L5 NERVE ROOT	PC	EXTRUSION	8	2	2	2	3	56	22	12
8	LAXMIBAI	45/F	67466	IVDP L5S1	LEFT	L5 S1 NERVE ROOT	PC	EXTRUSION	6	2	2	2	3	66	40	22
9	UMESH	56/M	52032	IVDP L3L4 WITH L3 LIGAMENTUM FLAVUM HYPERTROPHY	B/L	L4 NERVE ROOT	Foraminal	PROTRUSION	8	2	3	3	1	40	22	8
10	ANITA	45/F	102877	IVDP L5S1 WITH L5 FACET HYPERTROPHY	B/L	L5 S1 NERVE ROOT	PC	LOCALIZED	7	3	3	2	2	58	30	16
11	BK PUJAR	48/M	104041	IVDP L5S1	LEFT	L5 S1 NERVE ROOT	PL	LOCALIZED	8	4	3	2	2	52	32	14
12	PRAKASH	23/M	9958	IVDP L3L4	B/L	L4 NERVE ROOT	PC	EXTRUSION	6	2	2	2	1	44	30	16
13	BHIMAPPA	48/M	20344	IVDP L4L5 WITH FACET HYPERTROPHY	RIGHT	L4 L5 NERVE ROOT	PL	EXTRUSION	7	1	1	1	1	54	34	8
14	LOKESH	30/M	22902	IVDP L4 L5 L5 S1	B/L	L5 NERVE ROOT	PL	PROTRUSION	8	3	3	2	2	44	24	16
15	AMMAPPA	60/M	34574	IVDP L3L4 L4L5	LEFT	L4, L5 NERVE ROOT	Foraminal	EXTRUSION	8	3	3	7		48	24	12
16	MALLIKARJUN	59/M	40625	IVDP L4L5 L5S1	B/L	L5 , S1 NERVE	PL	PROTRUSION	8	3	3	3	4	54	34	18
17	HARISH	26/M	48943	IVDP L4L5 L5S1 WITH FACET HYPERTROPHY	RIGHT	L5 , S1 NERVE ROOT	PC	EXTRUSION	7	2	6	4	5	56	30	14
18	SHOBHA	44/F	61220	IVDP L4L5	RIGHT	L4 L5 NERVE ROOT	Foraminal	EXTRUSION	6	3	3	3	6	42	20	16
19	PARUSAPPA	40/M	11213	IVDP L4L5 L5S1 WITH CANAL STENOSIS	LEFT	L5 S1 NERVE ROOT	PL	PROTRUSION	7	2	2	2	2	40	24	10
20	SOMAYYA	60/F	7084	IVDP L4L5 L5S1	RIGHT	L5 S1 NERVE ROOT	PL	PROTRUSION	7	2	3	2	2	50	32	10
21	SANGAMMA	48/F	84253	IVDP L3L4 L4L5 WITH L5 FLAVUM HYPERTROPHY	B/L	L5S1 NERVE ROOT	PL	EXTRUSION	8	2	3	3	4	44	22	12
22	MAHESH	40/M	18510	IVDP L4L5 L5S1	RIGHT	L4 L5 NERVE ROOT	PC	LOCALIZED	8	2	2	3	3	42	26	8
23	GURAPPA	55/M	6069	IVDP L4L5	LEFT	L5 S1 NERVE ROOT	FORAMINAL	EXTRUSION	7	3	3	6		52	32	18
24	GANAPAT	45/M	3371	IVDP L5S1 WITH FACET HYPERTROPHY	B/L	L5 S1 NERVE ROOT	PL	PROTRUSION	7	3	3	2	2	58	30	16

33	RATNA	36/F	140420	IVDP L4L5 L5S1	LEFT	L5 NERVE ROOT	PC	PROTRUSION	7	3	3	3	3	44	20	16
34	MALATI	44/F	152966	IVDP L4L5 L5S1 WITH CANAL	RIGHT	L5 NERVE ROOT	FORAMINAL	EXTRUSION	7	3	3	3	2	44	20	12
35	SARNAPPA	56/M	153643	IVDP L4L5	RIGHT	L5S1 NERVE ROOT	FORAMINAL	EXTRUSION	6	2	2	2	2	46	30	20
36	RAYAPPA	67/M	153648	IVDP L4L5 WITH CANAL STENOSIS	LEFT	L5 NERVE ROOT	PL	PROTRUSION	6	1	2	2	2	56	40	26
37	BHARAT	34/M	153642	IVDP L4L5	RIGHT	L4 L5 NERVE ROOT	PL	EXTRUSION	8	2	2	2	38	60	44	20
38	JAGADISH	38/M	100697	IVDP L4L5	LEFT	L5 NERVE ROOT	PC	PROTRUSION	6	3	3	2	2	40	20	8
39	SHATAPPA	59/M	6312	IVDP L4L5	RIGHT	L4 L5 NERVE ROOT	FORAMINAL	EXTRUSION	7	2	2	2	2	50	24	14
40	SURESH	46/M	160623	IVDP L5S1	B/L	L5 S1 NERVE ROOT	PC	PROTRUSION	8	3	3	3	7	48	28	16
41	NAYEEM	39/M	26784	IVDP L3L4	RIGHT	L4 NERVE ROOT	PL	LOCALIZED	6	2	3	3	3	50	36	20
42	MALAKAPPA	44/M	8064	IVDP L4-L5 L5- S1 WITH FACET HYPERTROPHY	B/L	L5 S1 NERVE ROOT	PC	EXTRUSION	7	3	2	3	3	56	30	12
43	SOMESH	58/M	53778	IVDP L5S1	RIGHT	L5 S1 NERVE ROOT	PC	PROTRUSION	6	3	3	3	2	60	44	28
44	PRAYEEM	42/M	33510	IVDP L5S1	LEFT	L5 S1 NERVE ROOT	PC	EXTRUSION	7	2	2	2	2	42	20	10
45	REKHA	46/F	17073	IVDP L4 L5 L5 S1 WITH CANAL STENOSIS	LEFT	L5, S1 NERVE ROOT	PC	EXTRUSION	6	3	3	3	4	54	30	8
46	SURESH	36/M	73324	IVDP L4L5	B/L	B/L L5 S1 NERVE ROOT	PC	PROTRUSION	8	2	2	2	2	48	24	10
47	RAJU	39/M	68634	IVDP L3L4 , L4L5 WITH L3 LIGAMENTUM FLAVUM	RIGHT	L4 NERVE ROOT	PC	EXTRUSION	6	2	6	2	1	56	32	8
48	LAKSHMIKANT	60/M	69183	IVDP L3L4 L4L5	B/L	B/L L4L5 NERVE ROOT	PC	LOCALIZED	6	2	2	2	2	56	30	12
49	KAILSAH	46/M	94381	IVDP L4L5	LEFT	L4 L5 NERVE ROOT	PC	EXTRUSION	8	3	3	3	6	44	16	8
50	RAYAPPA	44/M	94385	IVDP L4L5 L5S1 WITH CANAL STENOSIS	B/L	L5S1 NERVE ROOT	PL	PROTRUSION	7	3	2	2	2	66	44	36
51	ABDULBASHA	37/M	90096	IVDP L4L5	LEFT	L5 NERVE ROOT	PC	EXTRUSION	8	3	3	3	2	40	28	18
52	BANUBAI	54/F	11209	IVDP L4L5	RIGHT	L4 L5 NERVE ROOT	PC	PROTRUSION	6	3	3	3	3	50	20	8
53	NINGAPPA	60/M	9279	IVDP L3L4 WITH CQNQL STENOSIS	RIGHT	L4 NERVE ROOT	FORAMINAL	LOCALIZED	6	2	3	3	2	44	20	8
54	SHRISAIL	52/M	9777	IVDP L4L5 L5S1	B/L	L5S1 NERVE ROOT	PC	EXTRUSION	6	3	3	3	2	50	18	8
55	SOLOCHAMA	56/F	22647	IVDP L4L5 WITH L4 FACET HYPERTROPHY	RIGHT	L4 L5 NERVE ROOT	PL	EXTRUSION	7	3	2	3	3	44	22	10
56	MOHAMMAD	41/M	27908	IVDP L4-L5 L5-S1	LEFT	L5 S1 NERVE ROOT	FORAMINAL	EXTRUSION	8	3	3	3	6	56	40	20