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COMPARISON BETWEEN MICROLUMBAR DISCECTOMY VERSUS OPEN LAMINECTOMY AND DISCECTOMY IN LUMBAR INTERVERTEBRAL DISC PROLAPSE .

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ABSTRACT

Back pain as a presenting complain may account for 2% of patients seen by general practitioners, but 60% for orthopedic outpatient department. Among which Disc Prolapse in lumbar region is commonest. Intevertebral disc prolapse was found to be most important cause for loss of working hours in Young and middle aged people.Surgical goal is to decompressing involved nerve roots. We have studied the two operative procedures and compared.That is microlumbar discectomy [MILD] vs open laminectomy and discectomy [L+D] in lumbar intervertebral disc prolapse. Here we have studied prospective and retrospective patients of lumbar ivdp taken up for surgery randomly and found that there is a significant advantage of the following factors in microlumbar discectomy patients over open laminectomy and discectomy group; Duration of surgery, length of incision, amount of blood loss, post operative stay in hospital, early return to activities of daily life, and early return to work. However other post operative signs, symptomatic improvement remained same in both the groups at later part of the period.

KEY WORDS: Back ache, lumbar IVDP, microlumbar discectomy, laminectomy and discectomy

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INTRODUCTION

Back pain as a presenting complaint may account for only 2% of patients seen by general practitioners, but sixty percent of outpatients in an Orthopaedic outpatient department are of low back ache[56]. Among them the commonest cause of back pain is intervertebral disc prolapse. In intervertebral disc prolapse, lumbar intervertebral disc prolapse is the most common. Lumbar vertebral disc prolapse is probably the most common ailment that takes away valuable working hours. Anderson noted 40% of patients complain of back pain also reported sciatica. In women 38 to 64 years of age the life time incidence of LBA was 66%.

The modalities of treatment in lumbar intervertebral disc prolapse are:

CONSERVATIVE – Conservative line of Management as first option ranges from simple bed rest to expensive traction apparatus. The Natural History of disc disease is characterized by exacerbations and remissions with improvement on rest. Biomechanical studies indicate that lying in semi fowlers' position or on the side with the hip and knees flexed with pillow between the legs will relieve most of pressure on the disc and Nerve roots. Most of acute pain relief is achieved by NSAIDS. As pain decreases patient should be encouraged to begin Isometric abdominal and lower extremity exercise. Walking within the limit of comfort is also encouraged. Sitting especially in riding car and motor cycle is discouraged; any exercise that increases pain is discontinued. Education of proper posture and body mechanics is helpful in bringing patient to usual level of activity after an acute exacerbation is relieved. Other modalities include oral steroids, muscle relaxants, TENS (Transcutaneous electrical Nerve Stimulation), traction, USG, diathermy.

(I) The Operative procedures adopted are

1. LAMINECTOMY

Here Total Removal of the whole of adjacent laminae is done. The standard technique consist of mid vertical incision made over the affected disc level and lamina is removed along with spinous process, inter spinous ligaments, and the whole ligamentum flavum to extract prolapsed disc.

2. HEMI LAMINECTOMY

The lamina and ligamentum flavum on one side is removed.

3. FENESTRATION

Removal of part of Laminae, Mainly the inferior part of superior laminae and ligamentum flavum excised.

(II) Minimally invasive procedures for lumbar disc disease include following[57]

1. **Chemonucleolysis**, introduced by lyman smith in 1964. Chemonucleolysis can be done by various substances to dissolve / shrink the Nucleus-pulposus and thus relieve compression on the nerves. These include:
Chymopapain, Collagenase,Aprotienin, Chondroitinase.
2. Percutaneous manual nucleotomy, introduced by Hijikata in 1975.
3. Microdiscectomy first performed by Yasargil in 1968.
4. Automated percutaneous lumbar discectomy introduced by Onik in 1984.
5. Laser discectomy, first performed by Ascherahd Choy in 1987.
6. Endoscopic discectomy first used by Swzawaheiber and swzawa in 1986 and improved by Mayer, Brock and Mathews Endoscopic lumbar discectomy is done using image guidance.
Fibreoptic endoscopes introduced through the lateral aspect of disc.
7. Micro endoscopic discectomy introduced by Smith and Foley in 1995 and
8. Intradiscal electrothermy first reported by Saal and Saal in 2000.

MICROLUMBAR DISCECTOMY

Here Discectomy is done under microscope providing magnification and good illumination, along with an advantage of smaller incision. Principle of MLD Here microscope is used for conversion of bifocal vision to unifocal vision; magnification & illumination to minimize the path

of dissection. [56] Although all percutaneous techniques have been reported to yield high success rates, to date no studies have demonstrated any of these procedures to be superior to open surgical procedure. Hence the present study is undertaken to compare an open procedure to that of minimally invasive procedure.

MATERIALS AND METHODS

1. TYPE OF STUDY

A prospective and retrospective study of patients having lumbar intervertebral disc prolapse treated by Microlumbar discectomy or laminectomy & discectomy in our Hospital from January 2000 to December 2004 with a minimum period of follow up one year.

2. NUMBER OF CASES

Total of 122 patients were registered for operation for lumbar inter vertebral disc prolapse. Among them 15 patients were lost from follow up, hence excluded from analysis. Among 107 patients 52(48.5%) underwent micro lumbar discectomy (M) and 55(51.4%) patients underwent Open laminetomy and discectomy (L).

INCLUSION CRITERIA

1) All patients with failed conservative line of treatment – the study population consist of 107 patients with evidence of disc prolapse that were managed by either Microlumbar discectomy or open laminectomy & discectomy by a single surgeon.
2) Gross Neurological deficit.
3) Cauda Equina syndrome.

EXCLUSION CRITERIA

1) More than two level of involvement (In which other procedure like fusion was needed).
2) Failed back syndrome (In which fusion warned).
3) Less than 18 years of age.
4) Associated spinal canal stenosis.
5) Patient with other spinal problems like:

Spondylolysis.
Spondylolisthesis.
Scoliosis.
Infective arthritis.
Metabolic bone disease etc.

6) History of previous low back operation.
7) Inability to undergo full sequenced lumbar magnetic resonance imaging.
8) Foraminal & Extraforaminal disc Herniation.
9) Disc prolapse coexisting with spinal malignancies.
10) Spinal infection.
11) Patients who have lost regular follow up for minimum of 1 year are excluded from study.

4. PRE OPERATIVE EVALUATION

A proforma is made to evaluate and analyze, all relevant details including history, events during period of pre op, intraop, post op and follow up reviews. The patients were with minimum of 18 and maximum age of 80years of age. Patient's occupation taken as moderate, heavy or sedentary work is taken into consideration. Patients having symptoms low back ache, leg pain (right/left), symptomatic neurological deficit (complains like decreased sensation, weakness in lower limbs, and difficulty in holding footwear strap between toes) bowel and bladder dysfunction are noted. On examination tenderness, straight leg raising test, sensory and motor impairment and reflexes are evaluated.

5. INVESTIGATIONS

MRI is the imaging procedure of choice. Plain radiograph are helpful in ruling out concurrent diagnoses such as spondylolysis and spondylolisthesis. In some cases flexion and extension radiograph are needed to rule out instability. Routine investigation prior to surgery such as haemoglobin percentage, blood sugar, ECG, chest radiograph, HIV, HbsAg antigen detection test are also done.

6. SURGERY AND POST OPERATIVE EVALUATION

Whether the patient is undergoing micro lumbar discectomy or open laminectomy and discectomy were noted. Date of surgery, duration of time taken from skin incision to closure in minutes, Length of incision in millimeter is recorded, amount of blood loss in milliliter, preoperative and post operative

complications noted. In subsequent visits low back ache, sciatica, neurological deficit, bowel and bladder symptoms and there degree of improvement,and onset of any complications are noted and compared with others using standard scales which are described below. Time taken for Return to activities of daily life, return to work, type of work resumed are noted.

7. Operative Procedure

Operating Microscope: - The Microscope provides Superb Magnification Lens (we used 300 mm lens) and illumination for performing a Micro discectomy. Using this Microscope the first assistant and the operating surgeon had identical view in operative field, which facilitated co-ordination in Surgical Technique.

Preparation and positioning is same for both (R –35)

After (General Anaesthesia) patient is positioned prone with two longitudinal bolsters along the lateral side of body and abdomen hanging down free. This position lowers the central venous pressure and inferior venacava pressure. So epidural veins are prevented from engorgement thus diminishing operative blood loss/obtain a clear field for surgery. Ceftriaxon sodium IV 1g given & continue till 48 hours post op. The positioning has to be done after padding all pressure points. The facial structures particularly eyes should be free of pressure. Bladder catheterization should be employed before to relieve increased abdominal pressure & to asses urinary output. Placement of needle followed by lateral Radiograph as seen in photo is helpful to asses' correct level in Microlumbar discectomy. In open laminectomy & discectomy the level can be calculated. Visually from below upwards since last ligamentum flavus is between L5 – S1.

Blood loss – amount of blood collected in suction bottle + increase in weight of gauze.

MICROLUMBAR DISCECTOMY

Surgical Incision, Approach

Diluted solution of Adrenaline (1: 400 000) is injected around area of dissection before suction level is marked & 2 Gauze mops are weighed.

STANDARD MIDLINE INCISION from spinous process of upper vertebra to spinous process of lower vertebra at the involved level. (Approximately 2.5 –3 cm) Incise fat & fascia inline till spinous processes are seen. Detach the paraspinal muscles subperiosteally as one unit from bone using dissector on side of lesion. Attain Haemostasis using bipolar electro-cautery. The space is packed with gauze for Hemostasis & once the interlaminar space is exposed and Haemostasis achieved with electrocautery the operating microscope with 300/400mm lens is brought into field and focused. Using the operative scope ligamentum flavum is excised from midline towards the lateral part. With the dural retractor and nerve retractor along dura spinal nerve retracted medically. Now the surgeon can incise the disc dorsally to allow for entry of pituitary Rounger into disc space for the removal of Herniated portion of disc. All the loose fragments of disc are removed under vision. The fragments in the midline and across to other side are removed with curved pituitary Rounger. Finally the root is pulled gently to confirm its mobility and freedom. A Gel foam / fat pad is used to cover the area of ligamentum flavum. Closure is done in layers. Time taken from incision to closure is noted was 52 minutes. Average loss of blood was ~ 45 – 60 minimum (<100 ml).

Post Operative Regimen.

Patient is allowed to turn in bed at will. Pain is controlled with analgesics. Usually ambulated next day except in cauda – equine patient.suture removal – 8th day

Isotonic strengthening excercises started at 3- 4 weeks.

OPEN LAMINECTOMY & DISCECTOMY

Surgical incision, approach

Diluted solution of Adrenaline (1: 400 000) Is injected in & around area of dissection. STANDARD MIDLINE INCISION from centering the pathological interspinous space. (Approximately 7 – 8 cm).

Incise fat & fascia till spinous processes are seen. Detach the paraspinal muscles subperiosteally as one unit from bone using cobbs elevator on side of lesion. Attain

haemostasis using unipolar/bipolar electrocautery. The paraspinal gutter is packed with gauze sponge for Haemostasis and further bleeding points cauterized & relatively blood less field achieved. The standard Laminectomy includes removal of Spinous process process then interspinous ligament mainly superior laminae and ligamentum flavum. Once we exposed adequately removal of herniated disc is done. When putting instruments into the disc space we were careful not to go beyond anterior longitudinal ligament to avoid injury to abdominal viscera and vessels. Gelfoam is covered at site and closure done in layers.
Time taken from incision to closure noted ~ 90 – 120 minutes. Average amount of blood loss calculated ~ 350 – 800 ml.

Post operative regimen
Patient is allowed to turn to bed at will. Pain is controlled with analgesics. Usually patient is ambulated once pain free / 5th day. Sutures removed usually on 10th day.
Isotonic strengthening exercise started at 3 – 4 weeks.

8. COMPLICATIONS. Per operative: 1. Dural tear, 2. Nerve root injury.
Post operative complications: 3. Superficial Wound infection, 4. Discitis.5.Urinary retention.6. Spondylolisthesis.

9. SCALES USED
The outcome of lumbar disc surgery depends on multiple factors starting from socio economic status, psychiatric factors, nature of work the patient doing before and after surgery. Surgical technique experience of surgeon - complications and post operative care, lastly long term follow up.
Some commonly used scales for comparison are:

'O'CANALE SUBJECTIVE SCALE OF ASSESMENT OF LOW BACK ACHE INCLUDES (Ref33)
SYMPTOMATIC SCORE;
Score1. Complete pain free
2. Pain on strenuous activity
3. Persistent pain &sciatica
4. Not improved
We have assessed low back pain at 1month, 3month, 6month, and12 months in 'O'Canale scale
We have assessed leg pain at 1month, 3months, 6 months and 1 year,
Score
1. indicates →complete recovery of leg pain → considered success
2. indicates →marked decrease in leg pain → considered success
3. indicates → leg pain unchanged → considered failure
4. indicates→ leg pain is Worse → considered failure

prolo economic functional scale. (Ref.48)
The functional economic outcome rating scale or prolo scale used based on modification of rating scale by URIST&DAWSON is considered[48]this simple rating is intended to provide surgeons with a common means by which to evaluate and express the outcome of lumbar spine procedure and to compare the economic and functional status of population. The scale can also be used as a common standard to compare the status of population undergoing different treatment and their effectiveness. The advantage of such a system like the prolo scale is obvious. A simple rating scale can be used to compare patients with group and patients of other institution unless a standard scale for rating patient's outcome the problem of evaluation will continue. The prolo scale for assessing functional economic outcome is explained below;
ECONOMIC STATUS;
E1 –invalid completely
E2 -No gainful occupation, including ability to do house work /continue retirement activities.
E3 -Able to work but, not at previous occupation.
E4 -working at previous occupation part time
E5 -Able to work at previous occupation with no restriction of activities to any kind.

FUNCTIONAL STATUS
F1 –worse before operation
F2 –mild to moderate amount of LBA

F3 –low level pain and able to perform all activities except sports where applicable
F4 –no pain but had one /more episode of recurrent LBA
F5 –complete recovery, no recurrence of LBA.
The prognostic outcome is the sum of all economic and functional scale.
Up to 5 =poor
6 - 7 =moderate
8 – 10 =good

JAPANESE ORTHOPAEDICASSOCIATION SCORE (JOAS)
KEY POINTS
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the oswestry disability index and Roland Morris disability questionnaire were cross culturally translated into JOAS without losing the psychometric properties of the original versionthere was significant correlation among JOAS, Oswestry disability index, and Roland Morris disability Questionnaire.
**the JOAS had acceptable reproducibility and construct validity suggesting that this series is reliable and valid.
JOAS consist of 4 sections subjective symptoms, clinical signs, activities of daily life and bladder function which scores minus points. Minimum score will be 6; maximum score will be 29 the scoring system is as follows;

A) SUBJECTIVE SYMP-9 POINTS
1) LBA;

*none	-3
*occasional	-2
*frequent	-1
*continues	-0

2) Leg pain and tingling sensation

*none	-3
*occasional	-2
*frequent	-1
*continues	-0

3) Gait;*normal gait -3
*able to walk further than 500mt although pain tingling / muscle weakness-2
*unable to walk >500 meters although pain tingling / muscle weakness may be present -1
*unable to walk >100 meters although pain tingling / muscle weakness may be present-0
B) Objective findings -6 points
1) SLR; Normal = 2, 30-70 deg = 1 <30deg = 0

2) Motor disturbance; normal = 2, 4/5=1 3/5=0

3) Sensory; normal =2, slight=1 marked=0

4) Activities of daily life; total of 14points
** JOAS ranges from minimum of 6 to maximum of 29.here at 12 months it ranges from 12 to 29.

10.ETHICAL ISSUES; All patients undergoing microlumbar discectomy and open laminectomy, discectomy were explained about type of surgery and its benefits and chances of complications. Preinformed consent is obtained for the same. Among the patients registered for follow up in our study, all are explained the reason, course and type of study for which they are selected.

OBSERVATION (RESULTS)

Total of 122 patients registered for lumbar inter vertebral disc prolapse surgery. Among them 15 patients were lost from follow up, hence excluded from analysis. Among 107 patients, 52(48.5%) patients underwent micro lumbar discectomy (M) and 55(51.4%) patients underwent Open laminectomy and discectomy (L).

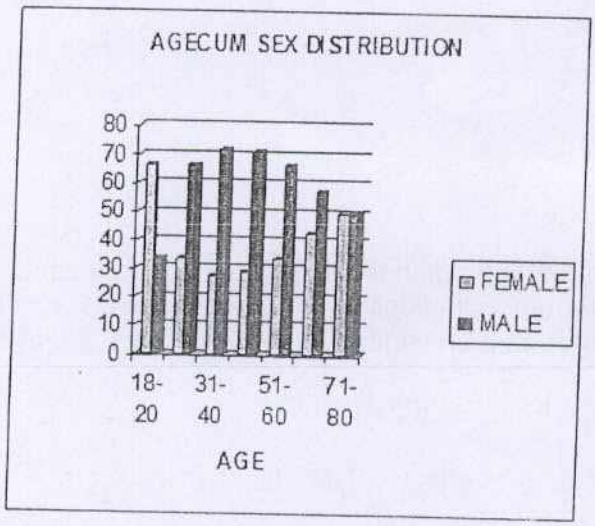
Table1

Table showing age cum sex distribution in total number of patients.

Age in years	Female	Male	number of pts
0-20	2(66.7%)	1(33.3%)	3 (100%)
21-30	6(33.3%)	12(66.7%)	18 (100%)
31-40	11(29.0%)	29(72.5%)	40 (100%)
41-50	9(29%)	22(71.0%)	31 (100%)
51-60	2(33.3%)	4(66.7%)	6 (100%)
61-70	3(42.9%)	4(57.1%)	7 (100%)
71-80	1(50%)	1(50.0%)	2 (100%)
total	34(31.8%)	73(68.2%)	107(100%)

figure 1

Figure showing age cum sex distribution.

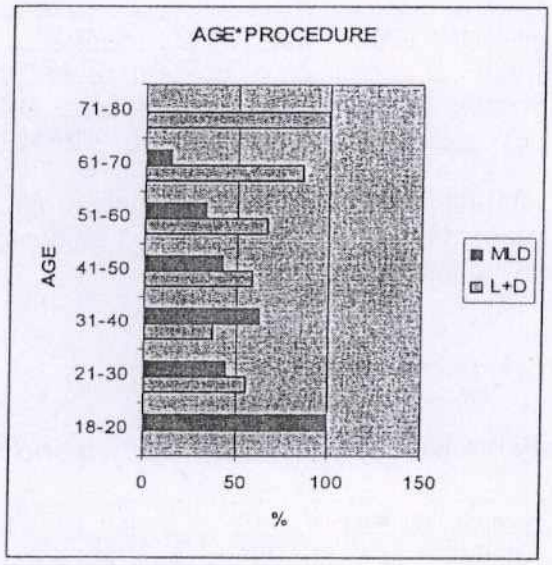


Age incidence

Among 107 patients, 73(68.2%) were male and 34 (31.8%) were female .The patients age was between 18 to 80 years. Most 40(37%) of the patients were between age group 31-40 years, followed by 41-50 years i.e.31 (28%) Most 68% of the patients were male.

Distribution of patients according to age versus type of surgery

Figure 2
Figure showing age cum type of surgery.



Among micro lumbar discectomy patients most 25 (48%) patients were between the age group 31-40 years. Among open laminectomy and discectomy patients most 18 (32.7%) patients were between the age 41-50 followed by 15(27.27%) between the age group of 31-40 years. The mean value of micro lumbar discectomy patients age was 37.06 years (SD=9.87).The mean value of open laminectomy and discectomy patients age was 43.13 years (SD=12.68).

Sex and type of surgery

Table2
Table showing sex distribution and type of surgery.

	L+D	MLD	TOTAL
Female	13(38.2%)	21(61.8%)	34(100%)
Male	42(57.5%)	31(42.5%)	73(100%)
total	55(51.4%)	52(48.6%)	107(100%)

Among open laminectomy and discectomy patients 42 (52%) men underwent the surgery; whereas 31(42%) male patients underwent micro lumbar discectomy. Among open laminectomy and discectomy patients 13(38%) female underwent the surgery; where as 21(61%) female patients underwent micro lumbar discectomy

Occupation

Patients are grouped according to Preoperative occupation under sedentary (s), moderate (m) and hard manual laborers (H).Total of 19 patients were hard manual workers, 58 were moderate workers and 30 were sedentary workers.

Symptomatic LBA

table3

Table showing patients with symptomatic LBA and type of surgery.

symptomatic low back ache	L+D	MLD
ABSENT	10(33.3%)	20(66.7%)
PRESENT	45(58.4%)	32(41.6%)
TOTAL	55(51.4%)	52(48.6%)

Even though only LBA was not an absolute indication for surgery most 77 (71%) of the patients were having low back ache. 45(82%) patients of open laminectomy & discectomy, and 32 (61%) patients of Microlumbar discectomy were having low back ache.

Symptomatic leg pain

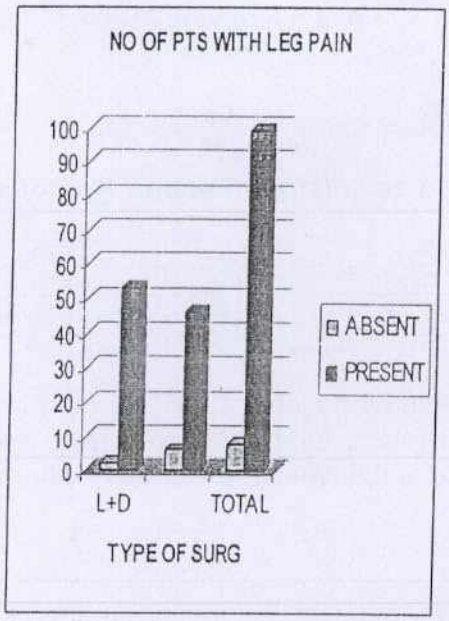
table4

Table showing patients with symptomatic leg pain and type of surgery.

symptomatic leg pain	L+D	MLD
ABSENT	2(25%)	6(75%)
PRESENT	53(53.5%)	46(46.5%)

Figure 3

Figure showing number of patients with leg pain and type of surgery.



Among107 patients, 99 (92%) patients were having leg pain (chief complaint). 96% of open laminectomy and discectomy patients were having leg pain, where as 88 % of micro lumbar discectomy patients were having leg pain.

Bladder dysfunction

Among 107, 11(10%) Patients had symptoms of bladder dysfunction. 3(27.3%) open laminectomy and discectomy patients and 8(15%) micro lumbar discectomy patients had Bladder dysfunction, perianal paraesthesia as presenting complaint.

Table5

Table showing patients with bladder dysfunction and type of surgery.

Bladder dysfunction	L+D	MLD
ABSENT	52(54.2%)	44(45.8%)
PRESENT	03(27.3%)	8(72.7%)
TOTAL	55(51.4%)	52(48.6%)

Incidence according to SLR test

On examination of 107 patients, straight leg raising test which is considered to be positive if <70 degrees was present in 51 (93%) patients undergoing open laminectomy and discectomy and 40 (76%) patients undergoing micro lumbar discectomy.

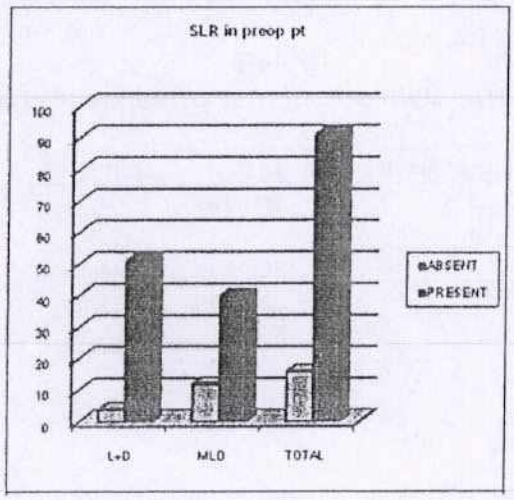
Table6

Table showing patients with straight leg raising test and type of surgery.

straight leg raising test	L+D	MLD
ABSENT	4(25%)	12(75%)
PRESENT	51(56%)	40(44%)
TOTAL	55(51.4%)	52(48.6%)

Figure 4

Figure showing patients with straight leg raising test and type of surgery.



Sensory signs

In 107 patients 41(38.3%) patients had sensory deficit. 14(34%) were laminectomy discectomy patients and 27 (65%) were micro lumbar discectomy patients.

Table7

Table showing patients with sensory symptoms and type of surgery.

sign sensory	L+D	MLD
ABSENT	41(62.1%)	25(37.9%)
PRESENT	14(34.1%)	27(65.9%)
TOTAL	55(51.4%)	52(48.6%)

Motor signs

Among 107 patients, 43(40.5%) patients had motor deficit. In open laminectomy and discectomy patients 16(29%) patients had motor deficit. Among microlambar discectomy patients 27 (51%) had motor deficit.

Table 8

Table showing patients with motor symptoms and type of surgery.

sign motor	L+D	MLD
ABSENT	39(60.9%)	25(37.9%)
PRESENT	16(37.2%)	27(62.8%)
TOTAL	55(51.4%)	52(48.6%)

Level of disc prolapse

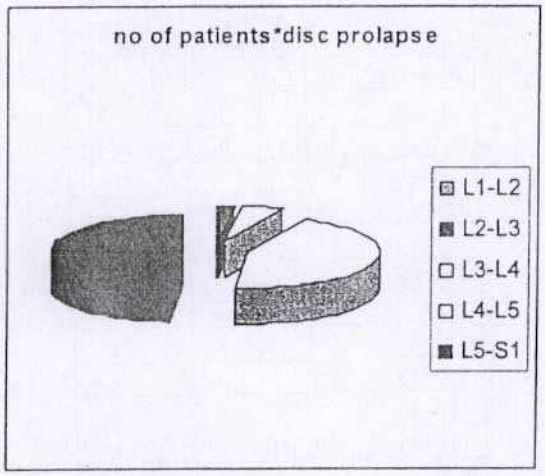
Among 107 patients Majority 53(49.5%) were having disc prolapse between L4-L5 level, and L5-S1 (n=47) (44%), then L3-L4 (n=5), and L2-L3 (n=2). None (0%) of the patients had L1-L2 level disc prolapse.Among laminectomy and discectomy patients majority 30(55%) were having disc prolapse at L4-L5 level, followed by 23(41%) at L5-S1 level disc prolapse. Among microlumbar discectomy patients majority 24(46%) were having disc prolapse at L5-S1.followed by 23(44%) patients at L4-L5 level disc prolapse. For easy tabulation L1-L2 level of disc prolapse is coined A, L2-L3=B, L3-L4=C, L4-L5=D.

Table 9

Table showing patients with site of disc prolapse and type of surgery.

site 0f involvement	L+D	MLD
L2-L3	2(100%)	
L3-L4		5(100%)
L4-L5	30(56.6%)	23(43.4%)
L5-S1	23(48.9%)	24(51.1%)
Total	55(51.4%)	52(48.6%)

Figure 5
Figure showing incidence of site of disc prolapse in our patients.



Length of skin incision

Table 10
Table showing patients with length of skin incision and type of surgery.

NOTE; here we are performinificant only if

Type of surgery	mean incision	STD deviation
L+D	68.91mm	14
MLD	29.90mm	8.19
Total	49.95mm	22.71

The mean length of incision for open laminectomy is 68.91cm. The mean length of incision for micro lumbar discectomy is 29.9 cm. (p value is <0.001).

Duration of surgery

The duration of surgery is noted in minutes; it is the time taken from incision to the closure of skin. The least time taken is 20 min and the max time taken is 2 hours. The mean time taken is 51.92minutes (SD=11.85) in case of micro lumbar discectomy.

Table 11
Table showing patients with duration of time taken for surgery.

type of surgery	mean time taken	Std deviation
L+D	103.45 Minutes	25.92
MLD	51.92 Minutes	11.85

The mean time taken for open laminectomy and discectomy was 103.45 minutes (SD=25.92). (P value is <0.001.)

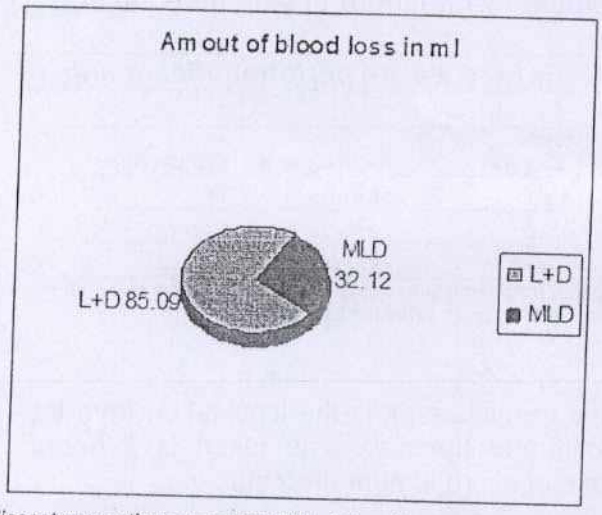
Amount of blood loss

Amount of blood loss is calculated by summing of milliliters of blood collected in suction apparatus plus increase in weight of gauze (mops).The amount of blood loss is grouped from minimum of 20ml to maximum of 130 ml in decibels of 10 ml each. Among open laminectomy and discectomy patients most 27(50%) of the patients lost around 70-90 ml of blood. The mean amount of blood loss is 85.05ml (SD=17.62).

Table 12
Table showing patients with amount of blood loss and type of surgery

	Number of pts	Number of pts
blood loss in ml	L+D	MLD
21-30	0	32
31-40	0	11
41-50	3	9
51-60	4	0
61-70	5	0
71-80	14	0
81-90	13	0
91-100	9	0
101-110	4	0
111-120	2	0
121-130	1	0
TOTAL	55	52

Figure 6
Figure showing amount of blood loss and type of surgery.



Among micro lumbar discectomy patients most 32(62%) of them lost 21-30 ml of blood.
The mean amount of blood loss was 32.12 ml (SD=9.36).(Chisq test p value is <0.001= highly significant.)

Postoperative stay in hospital

The mean time of stay in hospital was very less in case of microlumbar discectomy patients. . (P value is < 0.001).Most 40(76%) of the microlumbar discectomy patients got discharged on5&6 post operative day. The mean Is 5.63 days (SD=0.89). Most 50(91%) of open laminectomy discectomy patients got discharged on day 10 to 12 day. The mean number of days in hospital is 11.07 days (SD = 1.25.)

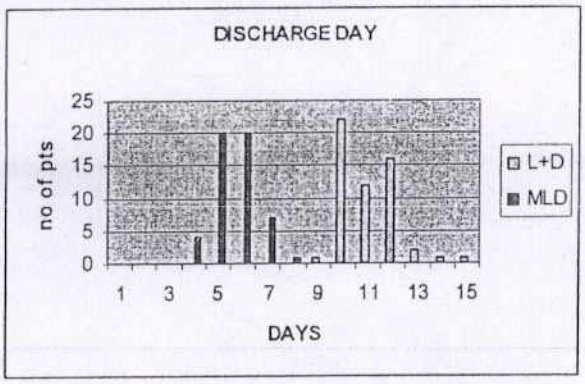
Table 13

Table showing patients with postoperative stay in hospital and type of surgery.

no of days stayed post op	No of L+D pts	No of MLD pts
4	0	4
5	0	20
6	0	20
7	0	7
8	0	1
9	1	0
10	22	0
11	12	0
12	16	0
13	2	0
14	1	0
16	1	0

Figure 7

Figure showing patients with postoperative stay in hospital and type of surgery.



Per operative complication

(1) During surgery one micro lumbar patient had a nerve root laceration. This recovered symptomatically after a month of time. (Chisq test p value is 0.228).

(2) Accidental dural tear occurred in total of seven patients. Among them 4(7.2%) were open laminectomy and discectomy patients and 3 (5.3%) were micro lumbar discectomy patients. (P value is0.753)

Post op complication

(1) One of the open laminectomy & discectomy patient developed superficial wound infection. (P value is 0.240) it was treated with antibiotics and the infection resolved.

(2) One (1.9%) of the micro lumbar discectomy patients had discitis which was managed on conservative line of treatment. (P value is 0.228).

(3) Total of 21(19.6%) patients had urinary retention at second post op day .11(20%) of them were post operative patients of open laminectomy and discectomy and10(19%) of them were micro lumbar discectomy patients .These patients needed catheterization for a short period of time, except those who had urinary disturbance from before surgery.(p value is 0.920)

(4) At 12 months follow up one open laminectomy and discectomy patient who complained of acute back ache & leg pain on x-ray Revealed spodylolisthesis. (P value is 00.1)
(5) Repeat surgery, one (1.9%) microlumbar discectomy patient underwent repeat surgery at same level. One (1.8%) open laminectomy and discectomy patient underwent repeat surgery at different level. (P value is 0.250).

'O'CANALE SUBJECTIVE SCALE OF ASSESMENT OF LOW BACK ACHE INCLUDES[33] SYMPTOMATIC SCORE;

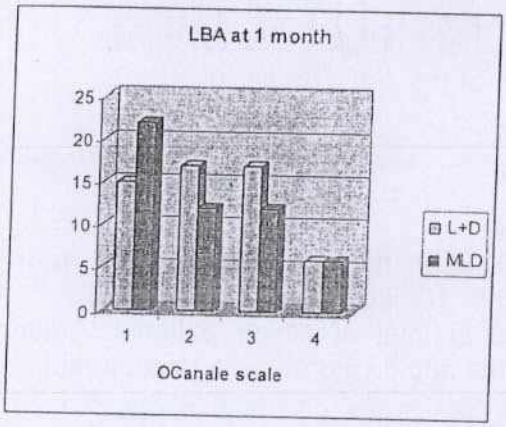
Score1. Complete pain free
2. Pain on strenuous activity
3. Persistent pain &sciatica
4. Not improved

We have assessed low back pain at 1month, 3month, 6month, and 12 months in 'O'Canale scale O" canale scale at 1 month Table 14

Table 14
Table showing patients with post operative low back ache at 1 month.

score	L+D	MLD
1	15	22
2	17	12
3	17	12
4	6	6
total	55	52

Figure 8
Figure showing patients with post operative low back ache at 1 month.



Most 34(61.81%) of open laminectomy & discectomy patients had O'Canale Score of 2 or 3 i.e. pain on strenuous activity & persistent pain 9 (sciatica). Most 34(65%) of the micro lumbar discectomy patients had a score of 1or 2. (P value is 0.395)

'O" canale scale at 3rd months

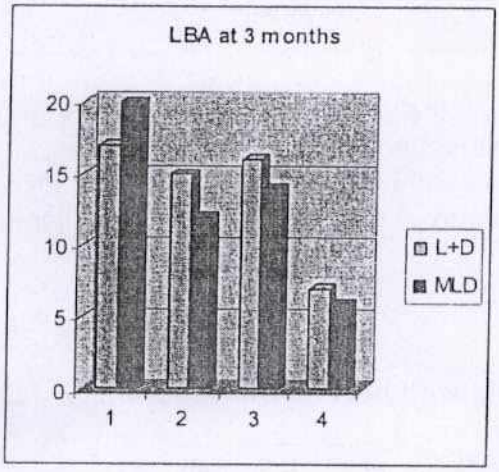
Table 15

Table showing patients with post operative low back ache at 3rd months.

score	L+D	MLD
1	17	20
2	15	12
3	16	14
4	7	6
total	55	52

Figure 9

Figure showing patients with post operative low back ache at 3rd month.



Most 32(58%) of open laminectomy & discectomy patients had O'Canale Score of 2 or 3 i.e. pain on strenuous activity & persistent pain (sciatica). Most 32(58%) of the micro lumbar discectomy patients had a score of 1or 2. (P value is 0.872)

O" canale scale at 6th months

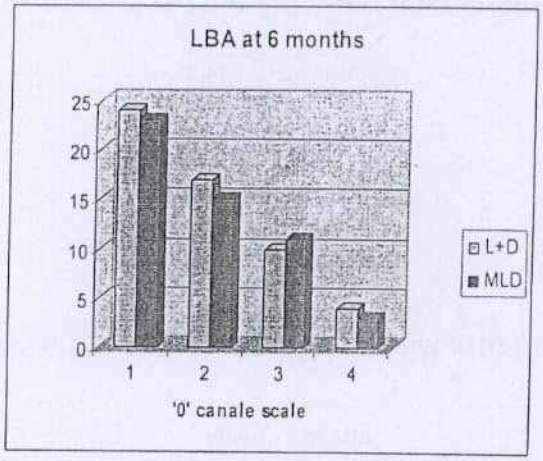
Table 16

Table showing patients with post operative low back ache at 6th months.

score	L+D	MLD
1	24	23
2	17	15
3	10	11
4	4	3

Figure 10

Figure showing patients with post operative low back ache at 6th month.



Among micro lumbar discectomy 23 (44.2%) patients had a score of 1.Among open laminectomy & discectomy 24 (43.6%) which is almost equal to the above number of patients. Even statistically the difference is insignificant (p value is (0.969). Among micro lumbar discectomy 27 (52%) patients had a score of 1.Among open laminectomy & discectomy28 (51%) patients had a score of 1. (P value is (0.893).

O" canale scale at 12th months

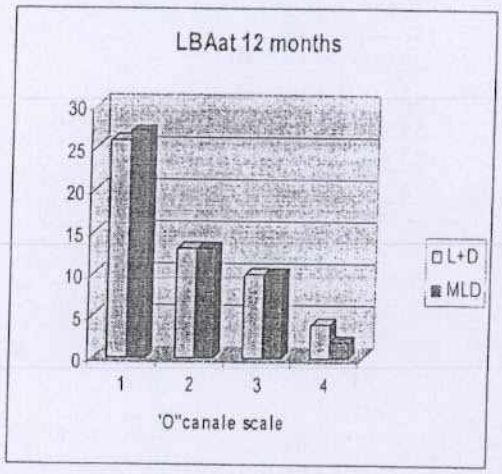
Table 17

Table showing patients with post operative low back ache at 12th months.

score	L+D	MLD
1	26	27
2	13	13
3	10	10
4	4	2

Figure 11

Figure showing patients with post operative low back ache at 12th month.



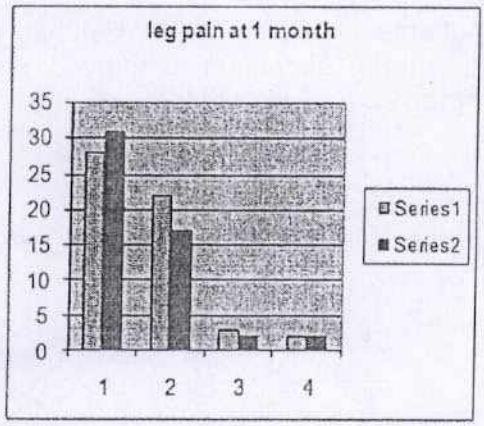
So the outcome of low back ache at 6 months & 1 year is almost the same.
Leg pain; Leg pain is assed in all 107 patients at 1month, 3month, 6month, and 12 month

Leg pain at 1 month.

Table 18
Table showing patients with post operative leg pain at 1 month.

score	L+D	MLD
1	28	31
2	22	17
3	3	2
4	2	2

Figure 12
Figure showing patients with post operative leg pain at 1 month.



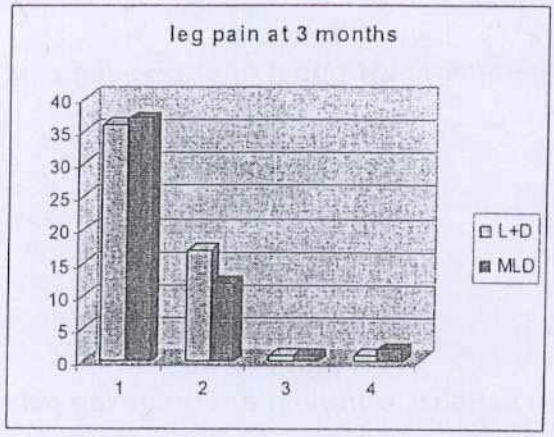
Among microlumbar discectomy patients total of 48 (92.30%) had complete recovery or marked decrease in leg pain at 1 month.Among open laminectomy & discectomy patients total of 50 (90.90%) had complete recovery or marked decrease in leg pain at 1 month. (P value is 0.822)

Leg pain at 3 month

Table 19
Table showing patients with post operative leg pain at 3 months.

score	L+D	MLD
1	36	37
2	17	12
3	1	1
4	1	2

Figure 13
Figure showing patients with post operative leg pain at 3 month.



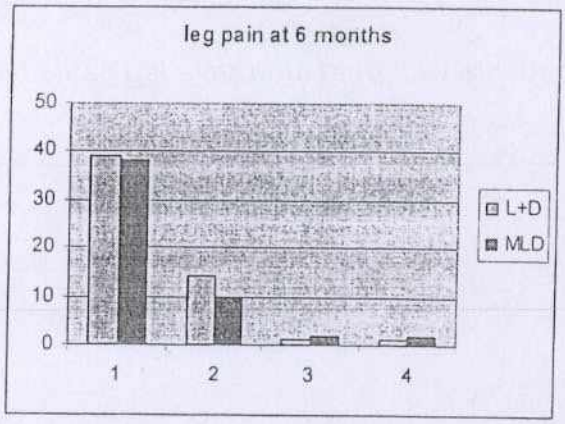
Among microlumbar discectomy patients total of 49 (94.23%) had complete recovery or marked decrease in leg pain at 3 month. Among open laminectomy & discectomy patients total of 53 (96.36%) had complete recovery or marked decrease in leg pain at 3 month. (P value is 0.768)

Leg pain at 6 month

Table 20
Table showing patients with post operative leg pain at 6 months.

score	L+D	MLD
1	39	38
2	14	10
3	1	2
4	1	2

Figure 14
Figure showing patients with post operative leg pain at 6 month.



Among microlumbar discectomy patients total of 48 (92.30%) had complete recovery or marked decrease in leg pain at 6 month.__Among open laminectomy & discectomy patients total of 53 (96.36%) had complete recovery or marked decrease in leg pain at 6 month. P value is 0.734)

Leg pain at 12 month

Among micro lumbar discectomy patients total of 49 (94.23%) had complete recovery or marked decrease in leg pain at 12 month.

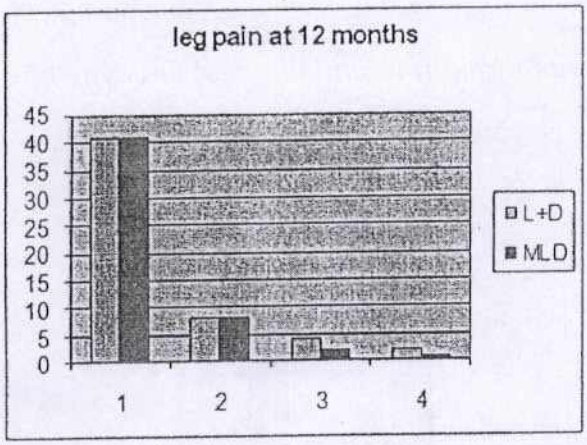
Table 21

Table showing patients with post operative leg pain at 12 months.

score	L+D	MLD
1	41	41
2	8	8
3	4	2
4	2	1

Figure 15

Figure showing patients with post operative leg pain at 12 month.



Among open laminectomy & discectomy patients total of 49(89%) had complete recovery or marked decrease in leg pain at 12 month.In comparing both type of surgery with leg pain at 12 month the prognosis seems to be same. Statistically also the difference is insignificant (p value is 0.817).

Straight leg raising test at 1 month & 3 months

** Straight leg raising test performed at 1month & 3 month post op showed differences but there afterwards very little variation was present. There was significant improvement in SLR after surgery. The difference between the two at 1 month and 3 months is not significant. (P value is 0.66 at 1 month and 0.903 at 3 months.)

Figure 16

Figure showing patients straight leg raising test and type of surgery at1 month.

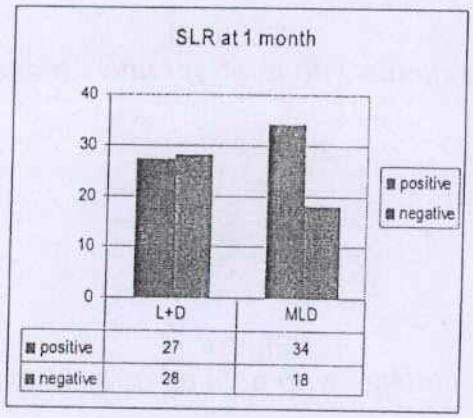
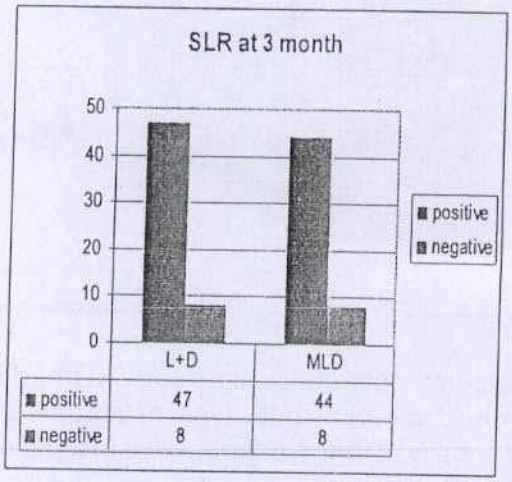


Figure 17

Figure showing patients straight leg raising test and type of surgery at 3 month.



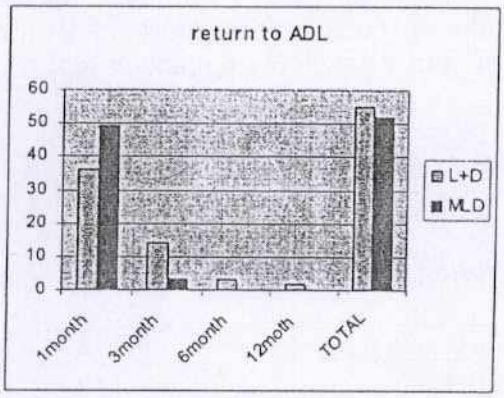
Time taken for return to ADL.

Table 22

Table showing patients with time taken for return to activities of daily life.

return to ADL	L+D	MLD
1month	36	49
3month	14	3
6month	3	0
12month	2	0
TOTAL	55	52

Figure 18
Figure showing time taken for return to activities of daily life between two surgical group of patients.



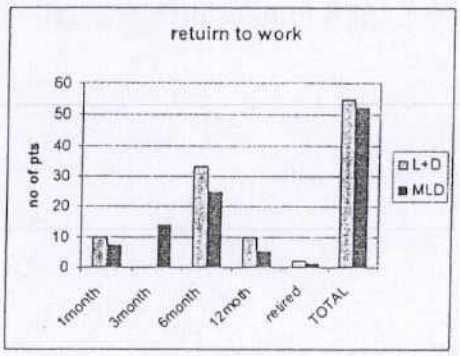
Activities of daily life included the routine day to day activities which included Turn over while lying, turn over while standing, and wash face and lean.Among micro lumbar discectomy 49(94.23%) returned to ADL in the first postoperative month. Where as only 36 (65.45%) patients returned to ADL at one month in case of open laminectomy and discectomy.The mean time for return to ADL in case of microlumbar discectomy cases is1.12 months theStandard deviation is 0.47 months. The mean time for return to ADL in case of open laminectomy and discectomy cases is2.18 months. Standard deviation is 0.47 months. (P value is 0.001).

Time taken for return to work

Table 23
Table showing patients with time taken for return to work.

return to work ADL	L+D	MLD
1month	10	7
3month	0	14
6month	33	25
12moth	10	5
Retired	2	1
TOTAL	55	52

Figure 19
Figure showing time taken for return to work between two surgical groups of patients.



Returns to work in months were recorded as follows; 17 (15.88%) patients didn't return to work at the end of 1 year among 107 patients.39 (75%) of the patients returned to work at end of 3 months among microlumbar discectomy patients. 33 (60%) patients returned to work at the end of 3 months among open laminectomy & discectomy patients. The mean time taken after surgery excluding the patients retired; Among micro lumbar discectomy patients it is 2.91 months, standard deviation is 2.03 months.Among open laminectomy and discectomy patients it is 4.07 months with mean deviation of 2.14 months. (p value is <0.001).

Prolo economic functional scale at 6months

Table 24

Table showing patients with prolo's economic scale at 6 months.

prolo economic fn score at 6 month	no of pts in L+D	no of pts in MLD	total
3	0	1	1
4	2	1	3
5	5	2	7
6	12	8	20
7	10	15	25
8	11	13	24
9	15	12	27
Total	55	52	107

Statistically the difference between the two is insignificant. (P value is 0.508) at 6 months.

Prolo economic functional scale at 12months

Table 25

Table showing patients with prolo's economic scale at 1year.

prolo economic fn score at 12 month	no of pts in L+D	no of pts in MLD	total
3	1	1	2
4	1	1	2
5	6	2	8
6	9	8	17
7	10	13	23
8	8	10	18
9	20	17	37
Total	55	52	107

Statistically the difference between the two is insignificant (p value is0.818) at 12 months.

JAPANESE ORTHOPAEDICASSOCIATION SCORE (JOAS) WITH THAT OF TYPE OF SURGERY: **JOAS ranges from minimum of 6 to maximum of 29.here at 12 months it ranges from 12 to 29.

Table 26

Table showing patients with Japanese orthopedic association scale at 1year.

JOAS	L+D	MLD
12	0	3
14	0	1
15	2	1
16	1	2
18	2	3
19	3	0
20	5	5
21	4	1
22	0	1
23	2	6
24	8	8
25	4	2
26	7	6
27	7	3
28	6	7
29	4	4
Total	55	52

Statistically the difference between the two is insignificant. (P value is 0.230).

DISCUSSION

Total of 122 patients registered for operation with lumbar inter vertebral disc prolapse. Among them 15 patients were lost from follow up, hence excluded from analysis. Among 107 patients, 52(48.5%) patients underwent micro lumbar discectomy (M) and 55(51.4%) patients Underwent Open laminetomy and discectomy (L).

Table 27

Table showing total number of patients studied compared with other study groups.

comparison with others in total no of patients selected					
study group	ref no	TOTAL	MLD	L+D	
E kotilainen et al	2	274	274		
Gordon f findley et al	24	79	79		
Matthew r quigley et al	41	374	374		
Roy silver et al	52	540	270	270	
Harold.L.asch et al	26	220	220		
Tycho tullberg et al	59	60	30	30	
our study		107	52	55	

Here we observed that among other studies, number of patients undergoing analysis is relatively more when compared to our study group, except tycho tullberg et al's study, where only 60 patients were considered for analysis. In our study minimum age of patient was 18 years and maximum age was 80 years. Among 107 patients, Most 40(37%) of the patients were between age group 31-40 years, followed by 41-50 years (31 Patients (28%))

Table 28

Table showing age group of patients studied compared with other study groups.

patients age rages from			
sl no	study group	ref no	years
2	Gordon f findley et al	24	25-56
6	Tycho tullberg et al	59	17-64
7	our study		18-80

In our study group patient's age is comparable with other studied in literature.

Age incidence

Among micro lumbar discectomy patients most 25 (48%) were between the age group 31-40 years. Among open laminectomy and discectomy patients, most18 (32%) patients were between 41-50 years followed by 15(27.27%) between the age group 31-40 years. The mean value of age in micro lumbar discectomy patients was 37.06 years (SD=9.87). The mean value of age in open laminectomy and discectomy patient was 43.13 years (SD=12.68)

Table 29

Table showing mean age group of patients in years compared with other study groups

mean age group of patients in years				
sl no	study group	ref no	MLD	L+D
1	E Kotilaimen et al	2	42	
2	Gordon f Findley et al	24	38	
3	Matthew r Quigley et al	41	42	
6	Tycho tullberg et al	59	40	38
7	our study		37.4	43.4

In Our study mean age group of patients is comparable with mean age group of patients' studied in literature.

Sex incidence

42 (52%) open laminectomy and discectomy patients were male; where as 31(42%) male patients underwent micro lumbar discectomy.

Table 30

Table showing patient's comparison with other study in sex ratio versus type of surgery

	comparison with other study in sex ratio versus type of surgery					
	study group	ref no	MLD		L+D	
sl no			male%	female%	male%	female%
1	E Kotilainen et al	2	54	46		
2	Gordon f Findley et al	24	49	51		
3	Matthew r Quigley et al	41	69	31	70	30
4	Roy silver et al	52	50	50	50	50
5	our study		60	40	76	24

In all the above studies the incidence of male patients was more compared to female patients, except Roy Silver et al study. Only in Roy Silver et al's study patient's selection were in equal number between the male and female sex groups. In our study male patients were more in both the surgeries.

Symptomatic LBA

Even though only LBA was not an indication for surgery most 77 (71%) of the patients were having low back ache. 45(82%) patients of open laminectomy & discectomy were having low back ache. 32 (61%) patients of Microlumbar discectomy patients were having low back ache.

Symptomatic leg pain

Among 107 patients, 99 (92%) patients were having leg pain. 96% of open laminectomy and discectomy patients were having leg pain. Whereas, 88 % of microlumbar discectomy patients were having leg pain as main symptom. In our study frequency of distribution of disc prolapse in patients, correlates with the frequency of distribution of disc prolapse studied in literature. This can be explained on the biomechanics of lumbar intervertebral disc.

Length of skin incision

The mean length of incision for open laminectomy is 68.91mm and the standard deviation is14.00 mm.The mean length of incision for micro lumbar Discectomy is 29.9mm and the standard deviation is 8.19 mm. (P value is <0.001) statically the difference in skin incision is highly significant.Our study correlates with similar studies quoted in literature.

Duration of surgery

The mean time taken for open laminectomy and discectomy was 103.45 minutes (SD=25.92). The mean time taken for microlumbar discectomy was 51.92 minutes (SD=11.85) .statistically p value is < 0.001 i.e. the difference in duration of time between open laminectomy and discectomy, and micro lumbar discectomy patients was very much significant.

Table 31

Table showing patients with duration of time taken for surgery compared with other study groups.

sl no	Study author name	reference	surgery	mean time
3	Tychotullberg et al	59	L+D	120 minutes
			MLD	51 minutes
4	Our study		L+D	103.45minutes
			MLD	51.92 minutes

Time taken for surgery in our study is comparable with other studies described in literature.

Amount of blood loss during surgery

Among open laminectomy and discectomy patients most 27(50%) of the patients lost around 70-90 ml of blood. The mean amount of blood loss is 85.05ml (SD=17.62). Among micro lumbar discectomy patients most 32(62%) of them lost 21-30 ml of blood. The mean amount of blood loss was 32.12 ml (SD=9.36). Statistically p value is <0.001.i.e the difference in amount of blood loss is highly significant.

Table 32
Table showing patients with amount of blood loss during surgery compared with other study Groups.

sl no	author name	reference	surgery	mean blood loss
1	Roy silver et al	52	L+D	100ml
			MLD	25ml
2	Silver HR et al	51	L+D	100ml
			MLD	25ml
3	Our study		L+D	85ml
			MLD	32ml

Our study correlates with similar studies quoted in literature

Preoperative complications

(1) During surgery one micro lumbar patient had superficial nerve root laceration. Statistically the difference is Insignificant (Chisq test p value is 0.228). In span fort et al's study the nerve root injury % in both surgeries was same.

Table 33
Table showing patients with nerve root injury during surgery compared with other study Groups.

sl no	author name	reference	surgery	IONRI%
1	span fort et al	56(p2503)	L+D	0.5
			MLD	O.5
2	Tychotulliberg et al	59	L+D	1.6
			MLD	0.8
3	Our study		L+D	0
			MLD	1.9

(2) Accidental dural tear occurred in total of seven patients. Among them 4(7.2%) were open laminectomy And discectomy patients, and 3 (5.3%) were micro lumbar discectomy patients. P value is0.753.statistically The Difference is Insignificant. In our study accidental dural tears are more among both the groups as compared to studies in literature.

Table 34
Table showing patients with dural tear during surgery compared with other study Groups.

	Author	reference	Surgery	IODT%
1	Atsushi Fujiwara et al	1	L+D	4
			MLD	4
2	E kotilaimen et al	2	MLD	4
3	Roy silver et al	52	L+D	0.4
			MLD	1.1
4	span fort et al	56(P2503)	L+D	1.66
			MLD	1.66
5	Our study		L+D	7.2
			MLD	5.7

Postoperative stay in hospital

The mean time of stay in hospital was very less in case microlumbar discectomy patients. Statistically P value is < 0.001.i.e early discharge of microlumbar discectomy patients is significant. Most 40(76%) of the microlumbar discectomy patients got discharged on5&6 post operative day. The mean Day of discharge was 5.63 days (SD=0.89). Most 50(91%) of open laminectomy discectomy patients got discharged on 10 to 12 day. The mean Number of days in hospital is 11.07 days with SD of 1.25.

Figure 20

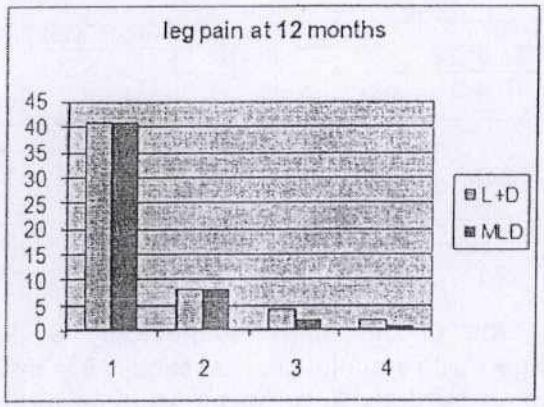


Table 35

Table showing patients with mean date of discharge.

Type of surgery	D.O.D. mean	SD
lami+discectomy	11.07	1.25
MLDiscectomy	5.63	0.89

Table 36

Table showing patients with mean date of discharge compared with other study Groups.

sl.no	Author	reference	surgery	D.O.D
1	Atsushi Fujiwara et al	1	L+D	7.5
			MLD	3.3
2	E.Kotilaimen et al	2	MLD	5
4	Roy silver et al	52	L+D	5.1
			MLD	7.1
5	our study		L+D	11
			MLD	5.63

Most of studies describe that microlumbar discectomy patients can be discharged on the next post operative Day; however our study mean value of discharge is 5.63 days .This can be explained on the basis of focused treatment on cost effective management in other countries where hospital expenses are huge. (Reference spine volume 23 no 20 pp2195-2200)

Post operative complications

(1) Total of 21(19.6%) patients had urinary retention .11(20%) of them were post operative patients of open Laminectomy and discectomy.10 (19%) of them were the patients of microlumbar discectomy who needed Catheterization for a short period except those who had urinary disturbance from before surgery. Statistically The difference is insignificant. (P value is 0.920).

Table 37

Table showing patients with superficial wound compared with other study Groups.

sl.no	author name	reference	surgery	superficial wound infection
1	E Kotilaimen et al	2	MLD	1.7
2	Roy silver et al	51	L+D	1.5
			MLD	0.7
3	Spanfort et al	56(p2506)	L+D	2.2
			MLD	2.2
4	Tycho Tullberg et al	59	L+D	1
			MLD	1
	Our study		L+D	1.9
			MLD	0

(2)Superficial wound infection; One of the open laminectomy & discectomy patient developed superficial wound infection managed with Antibiotics. Statistically it is insignificant. (P value is 0.240). Superficial wound infection is same in study 3, 4. In our study group only microlumbar discectomy patients had 2% superficial infective rate.

3) One (1.9%) of the micro lumbar discectomy patients had discitis which was managed on conservative line of treatment. statistically p value is 0.228.ie. the difference between the two is statistically insignificant.

Table 38

Table showing patients with discitis compared with other study Groups.

s.no	author name	reference	surgery	discitis
1	E Kotilaimen et al	2	MLD	2
2	Roy silver et al	51	L+D	1.1
			MLD	0.4
3	Spanfort et al	56(p2506)	L+D	2
			MLD	2
4	Tycho tullberg et al	59	L+D	1
			MLD	1
5	Our study		L+D	1.0
			MLD	1.9

One Microlumbar discectomy patient had discitis..

(4) At 12 month follow up one open laminectomy and discectomy patient who complained of acute back ache & leg pain, on x-ray Revealed spondylolisthesis. Statistically the difference is insignificant (p value is 00.1). One (1.9%) microlumbar discectomy patient underwent repeat surgery at same level. One (1.8%) open laminectomy and discectomy patient underwent repeat surgery at different level. Statistically the difference is insignificant. (P value is 0.250).

Table 39
Table showing patients with nerve root injury during surgery compared with other study Groups.

sl.no	Author	reference	surgery	resurgery in %
1	Atsushi Fujiwara et al	1	L+D	4
2	E.Kotilaimen et al	2	MLD	1.7
3	Mathew Quinley et al	41	MLD	0.4
4	Roy silver et al	52	L+D	5.1
			MLD	5.5
5	our study		L+D	1.8
			MLD	1.9

The maximum % of resurgery is accounted in Roy silver et al's open laminectomy and discectomy patients (5.1%) and the least was in our study group which is 1.8%. The least % of patients undergoing resurgery after microlumbar discectomy is in Mathew Quinley et al's Study. In our study 1.9 % microlumbar discectomy patients underwent resurgery.

'O'CANALE SUBJECTIVE SCALE OF ASSESMENT OF LOW BACK ACHE INCLUDES[33]

SYMPTOMATIC SCORE;

Score1. Complete pain free
2. Pain on strenuous activity
3. Persistent pain &sciatica
4. Not improved

We have assessed low back pain at 1month, 3month, 6month, and 12 months in 'O'Canale scale Most 22(42.30%) of the microlumbar discectomy patients had complete low back pain relief (OCS-1) at 1 Month. Most 34(61.81%) of open laminectomy & discectomy patients had a O'Canale Score of 2 or 3 The above score indicates that there is early relief of back pain in microlumbar discectomy when compared to Open laminectomy & discectomy .However statistically it is insignificant (p value is 0.395). Among microlumbar discectomy patients 20 (38.46%) had a score of 1 at three months when compared to Open laminectomy & discectomy where 17 (30.90%) had a score of 1 which shows, back pain is more Relieved in microlumbar discectomy patients however statistically the difference is insignificant (p value is 0.872). Among microlumbar discectomy 23 (44.2%) patients had a score of 1 at 6 months. Among open laminectomy & Discectomy 24 (43.6%) patients had a score of1 which is almost equal to the above number of patients. Even statistically the difference is insignificant (p value is (0.969). Among microlumbar discectomy 27 (52%) patients had a score of 1 at 1 year. Among open laminectomy & Discectomy 28 (51%) patients had a score of 1 at one year, which is almost equal to the above% of Patients. Statistically the difference is insignificant (p value is (0.893).So the outcome of low back ache at 6 months & 1 year is same.

Symptomatic leg pain and type of surgery

Leg pain is assessed in all 107 patients at 1month, 3month, 6month, and 12 month in scale of 1,2,3,4 Score

Leg pain at 1st month;

Among microlumbar discectomy patients total of 48 (92.30%) had complete recovery or marked Decrease in leg pain at 1 month. Among open laminectomy & discectomy patients total of 50 (90.90%) had complete recovery or marked Decrease in leg pain at 1 month. In comparing both type of surgery with leg pain at 1 month the prognosis seems to be same. Statistically Also the difference is insignificant (p value is 0.822).

Leg pain at 3rd month;

Among microlumbar discectomy patients total of 49 (94.23%) had complete recovery or marked Decrease in leg pain at 3 month. Among open laminectomy & discectomy patients total of 53 (96.36%) had complete recovery or marked

decrease in leg pain at 3 month. In comparing both type of surgery with leg pain at 3 month the prognosis seems to be same. Statistically also The difference is insignificant (p value is 0.768). Total of 4(93% success) patients among microlumbar discectomy were considered failure. Total of 2(97% success) patients among open laminectomy and discectomy were considered failure. Statistically the difference is insignificant.

Symptomatic postoperative leg pain at 12th month versus type of surgery

Among microlumbar discectomy patients total of 49 (94.23%) had complete recovery or marked Decrease in leg pain at 12 month. Among open laminectomy & discectomy patients total of 49(89%) had complete recovery or marked Decrease in leg pain at 12 month. In comparing both type of surgery with leg pain at 12 month the prognosis seems to be same. Statistically Also the difference is insignificant (p value is 0.817) Total of 2(94% success) patients among microlumbar discectomy were considered failure. Total of 5(90% success) patients among open laminectomy and discectomy were considered failure.

Table 40

Table showing patients with leg pain at 12 months compared with other study Groups.

sl.no	Auther	type of surgery	LP at 12months relieved%	Sl no	Roy silver et al	MLD	85
1	Atsushi Fujiwara et al	L+D	92	6	Samjavedan	MLD	98
2	E kotilaimen et al	MLD	94	7	Tychotullberg et al	MLD	80
3	Gorden F Findley et al	MLD	91	8	our study	L+D	95
4	Harold L Asch et al	MLD	80			MLD	90
5	Mathew Quinley et al	MLD	90				

Even though criteria for selection to be full filled are different in different studies the values are correlating.

Post operative straight leg raising test at 1st month & 3rd months

Straight leg raising test performed at 1month &3 month post op showed differences but there afterwards Very little variation was present. There was significant improvement in SLR after surgery. The difference Between the two at 1 month and 3 months is not significant. (P value is 0.66 at 1 month and 0.903 at 3 months.

Table 41

Table showing patients with SLR at 1month.

Straight Leg Raising Test Post Operative at 1 Month * Type of Surgery Crosstabulation

			Type of Surgery		
			L	M	Total
Straight Leg Raising Test Post Operative at 1 Month	N	Count	27	34	61
		% within Straight Leg Raising Test Post Operative at 1 Month	44.3%	55.7%	100.0%
	Y	Count	28	18	46
		% within Straight Leg Raising Test Post Operative at 1 Month	60.9%	39.1%	100.0%
Total		Count	55	52	107
		% within Straight Leg Raising Test Post Operative at 1 Month	51.4%	48.6%	100.0%

Table 42
Table showing patients with SLR at 3month.

Straight Leg Raising Test Post Operative at 3 Months * Type of Surgery Crosstabulation

			Type of Surgery		
			L	M	Total
Straight Leg Raising Test Post Operative at 3 Months	N	Count	47	44	91
		% within Straight Leg Raising Test Post Operative at 3 Months	51.6%	48.4%	100.0%
	Y	Count	8	8	16
		% within Straight Leg Raising Test Post Operative at 3 Months	50.0%	50.0%	100.0%
Total		Count	55	52	107
		% within Straight Leg Raising Test Post Operative at 3 Months	51.4%	48.6%	100.0%

Time taken for return to ADL

Among microlumbar discectomy 49(94.23%) returned to ADL in the first postoperative month. Whereas only 36 (65.45%) patients returned to ADL at one month.

The mean time for return to ADL in case of microlumbar discectomy cases is1.12 months the Standard deviation is 0.47 months. The mean time for return to ADL in case of open laminectomy and Discectomy cases are 2.18 months. Standard deviation is 0.47 months.
Statistically the difference is highly significant value is 0.001.

Table 43
Table showing Time taken for return to ADL compared with other studies.

sl.no	Author	surgery	Return to ADL
1	Atsushi Fujiwara et al	L+D	10 wk
		MLD	8wk
2	Harold L .Asch et al	MLD	50% 6wks 75% at 6months
3	Roy silver et al	L+D	14.5wks
		MLD	13.5wks
4	Our study	L+D	65% at 1month
		MLD	94%at1month

Most of the patients returned to ADL in study one on 10 week in case of open laminectomy and discectomy. Most of the patients returned to work in study one on 8 week in case of microlumbar discectomy patients. 50%of the patients returned to ADL in study group two at 6 week and 75% at 6moths in case of open Laminectomy and discectomy patients. Most of the patients returned to ADL in study group 3 on 14.5 week in case of open laminectomy and Discectomy patients. Most of the patients returned to ADL in study one on13.5 week in case of microlumbar discectomy patients.

Time taken to return to work

Return to work in months was recorded as follows; 17 (15.88%) patients didn't return to work at the end of 1 year among all patients. 39 (75%) of the patients returned to work at end of 3 months among microlumbar discectomy patients. 33 (60%) patients returned to work at the end of 3 months among open laminectomy & discectomy patients. The mean time taken after surgery to return to work excluding the patients retired; Among microlumbar discectomy patients it is 2.91 months, standard deviation is 2.03 months. Among open laminectomy and discectomy patients it is 4.07

months with mean deviation of 2.14 months. The above findings show that return to work is early in microlumbar discectomy patients. Statistically the difference is highly significant (p value is <0.001).i.e. Microlumbar discectomy patients returned to work early, when compared to open laminectomy and discectomy.

Table 44

Table showing Time taken for return to work compared with other studies.

sl.no	Author	type of surgery	%RTW
1	Harold L Asch et al	MLD	65
2	Mathew Quinley et al	MLD	87
3	Roy silver et al	L+D	94
		MLD	99
4	Our study	L+D	82
		MLD	87

Least (65%) number of patients who retuned to work is in Harold et al study among microlumbar discectomy Patients. Maximum (99%) number of patients returned to work is in Roy silver study.

prolo economic functional scale[48]

The score between microlumbar discectomy and open laminectomy were calculated at six months and 1 year, Statistically the difference in score between the two is insignificant. (P value is 0.508 and 0.818).

JAPANESE ORTHOPAEDIC ASSOCIATION SCORE (JOAS)

Japanese orthopedic association score ranges from minimum of 6 to maximum of 29.Here at 12 months it ranges from 12 to 29. The score between microlumbar discectomy and open laminectomy were calculated at 1 year, Statistically the difference in score between the two types of surgeries is insignificant. (P value is 0.230).

SUMMARY

Total of 122 patients registered for operation for lumbar inter vertebral disc prolapse. Among them 15 patients were lost from follow up, hence excluded from analysis. Among 107 patients 52(48.5%) underwent micro lumbar discectomy (M) and 55(51.4%) patients underwent Open laminectomy and discectomy (L).Among 107, 73(68.2%) were male, 34 (31.8%) were female patients.Most 40(37%) of the patients were between age group 31-40 years, followed by 41-50 years i.e.31 (28%) patients. The mean value of micro lumbar discectomy patient's age was 37.06 years. The mean value of laminectomy and discectomy patient age was 43.13 years. 45(82%) patients of open laminectomy & discectomy, 32 (61%) patients of MLD were having low back ache. Among all patients 99 (92%) of the patients were having leg pain (chief complaint).96% of patients were having leg pain for open laminectomy and discectomy, where as 88 % were the patients of micro lumbar discectomy. 3(27.3%) open laminectomy and discectomy and 8(15%) micro lumbar discectomy patients had Bladder disturbance. Majority 53(49.5%) were having disc prolapse between L4-L5 level, and L5-S1 i.e.47 (44%), then L3-L4 (n=5), and L2-L3 (n=2). None 0 (0%) of the patients had disc prolapse at L1-L2. The least time taken for surgery is 20 min and the maximum time taken is 2 hours. The mean time taken for microlumbar discectomy surgery is 51.92minutes.The mean time taken for open laminectomy and discectomy was 103.45 minutes Among open laminectomy and discectomy patients mean amount of blood loss is 85.05ml.Among microlumbar discectomy patients mean amount of blood loss is 32.12 ml. The mean length of incision for open

laminectomy and discectomy is 68.91mm. The mean length of incision for micro lumbar discectomy is 29.9 mm The mean amount of blood loss was 32.12 ml Among microlumbar discectomy patients,. The mean amount of blood loss was 85 ml among open laminectomy and discectomy patients.

One micro lumbar discectomy patient had superficial nerve root laceration (1.9%). Dural tear occurred in total of seven patients. Among them 4(7.2%) were open laminectomy and discectomy patients and 3 (5.3%) were micro lumbar discectomy patients. One (1.9%) of the open laminectomy & discectomy patient developed superficial wound infection. One (0.9%) of the micro lumbar discectomy patients had discitis which was managed on conservative line of treatment. Total of 21(19.6%) patients had urinary retention .11(20%) of them were post op patients of open laminectomy and discectomy.10 (19%) of them were the patients of microlumbar discectomy. statistically the difference is insignificant One (1.8%) microlumbar discectomy patient underwent resurgery at same level. Among open laminectomy and discectomy one (1.9%) underwent resurgery at different level. The mean number of days in hospital is 11.07 days among open laminectomy and discectomy patients. The mean number of days in hospital is 5.63 days among microlumbar discectomy patients. There is early relief of back pain in microlumbar discectomy when compared to open laminectomy & discectomy. Among microlumbar discectomy patients total of 50 (96%) had complete recovery or marked decrease in leg pain at 1 month. Among open laminectomy and discectomy patients total of 49(89%) had complete recovery or marked decrease in leg pain at 1 month If we are considering based on leg pain score 1, 2 success and 3, 4 failure. Total of 96% success - -among microlumbar discectomy. 89% success among open laminectomy and discectomy Straight leg raising test performed at 1month &3 month post op showed differences but there afterwards very little variation was present. There was significant improvement in SLR after surgery. The difference between the two at 1 month and 3 months is not significant The mean time to return to ADL in case of microlumbar discectomy cases is1.12 months . The mean time for return to ADL in case of open laminectomy and discectomy cases is2.18 months. 39 (75%) patients returned to work at end of 3 months among microlumbar discectomy. 33 (60%) patients returned to work at the end of 3 months among open laminectomy & discectomy patients.

Prolo economic functional scale

Statistically the difference between the two is insignificant at 3months, 12 months;

Japanese Orthopedic association Score (JOAS)

statistically the difference between the two is insignificant at, 12 months;

After performing chi sq and student T test the difference is significant with 95% confidence limit is as follows;

(1)Time taken for surgery in microlumbar discectomy patients is less.

(2) Length of incision for microlumbar discectomy patients is less.

(3) Post operative stay in hospital is less in microlumbar discectomy patients.

(4)Amount of blood loss is minimal in microlumbar discectomy patients.

(5) Early Return to activities of daily life in microlumbar discectomy patients.

(6) Early return to work microlumbar discectomy patients.

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CONCLUSION

Intevertebral disc prolapse is one of the most important causes for loss of working hours in Young and middle aged people. In most instances disc surgery is essentially the surgery of freeing the nerve root .The goal can be achieved by different means. Surgeries like microlumbar discectomy, open laminectomy and discectomy have evolved in this manner to help these patients to return to work early and without affecting the results. In our study it is shown that there is a significant advantage of the following factors in microlumbar discectomy patients over open laminectomy and discectomy group; Duration of surgery, length of incision, amount of blood loss, post operative stay in hospital, early return to activities of daily life, and early return to work. However other post operative signs, symptomatic improvement remained same in both the groups at later part of period. One lacunae of study is that the minimum follow up is only one year, and hence iatrogenic spinal canal stenosis /root canal stenosis/ instability could not be assessed or compared. Our study agrees in all aspects with similar studies in literature and confirms that microlumbar discectomy is the gold standard in disc surgery.

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APPENDIX – 1 (PROFORMA)

1. NAME :
2. AGE :
3. SEX : MALE/FEMALE
4. OCCUPATION
5. ADDRESS :
6. HOSPITAL NUMBER : IP/OP
7. SYMPTOMS : ☐ LOW BACK ACHE.
   ☐ LEG PAIN R☐ L ☐
   ☐ NEUROLOGICAL SYMPTOMS
   ☐ BLADDER AND BOWEL NVOLVEMENT.
8. SIGNS : TENDERNESS AT
   SLR
   SENSORY DEFICIT
   MOTOR DEFICIT
   REFLEXES.
9. PRE-OPERATIVE INVESTIGATION : X-RAY - POSITIVE FINDINGS
   MRI –
10. CONTRA INDICATION FOR SURGERY:
11. ASSOCIATED DISEASES & OTHER RELEVANT HISTORY IF ANY :
12. TYPE OF SURGERY : ☒ MICROLUMBAR DISCECTOMY
13. ☐ OPEN LAMINECTOMY & DISCECTOMY

14. DATE OF SURGICAL :
15. OPERATIVE EVENTS : a) DURATION OF SURGERY ____MINUTES
b) LENGTH OF EXPOSURE _____ CMS SKIN INCISED.
c) AMOUNT OF BLOOD _____ LOSS.
15. BLOOD TRANSFUSION IF ANY :
16. INTRA OPERATIVE COMPLICATIONS :
17. POST OP. COMPLICATIONS :
18. DOD :

19. FOLLOW UP DETAILS :

At	DURATION IN MONTH 0M	1M	2M	3M	4M	6M	12M
SYMPTOMS:-							
• LOW BACK ACHE	☐	☐	☐	☐	☐	☐	☐
• SCIATICA							
• NEUROLOGICAL DEFICIT							
MOTOR	☐	☐	☐	☐	☐	☐	☐
SENSORY	☐	☐	☐	☐	☐	☐	☐
• BOWEL AND BLADDER INVOLVEMENT	☐	☐	☐	☐	☐	☐	☐

20. DELAYED COMPLICATIONS : YES ☐ NO ☐
IF YES DETAILS _____
21. PROLO ECONOMIC SCALE : 1 MONTH 6 MONTHS 1 YEAR
SCORE ☐ ☐ ☐
22. OCANALE SCALE :
SCORE☐ 1☐ 1 MONTH ☐ 2 M☐THS 4 M☐NTHS ☐6MONTHS 1 YEAR
22. ADL on ☐ :
23. Return to work & Type of work :
24. JOA Score at 12 months :

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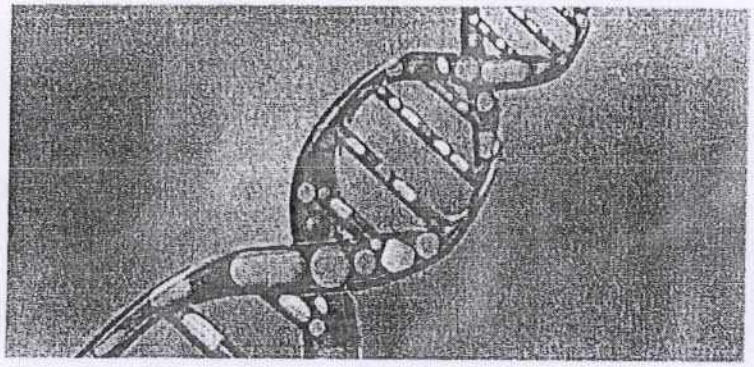

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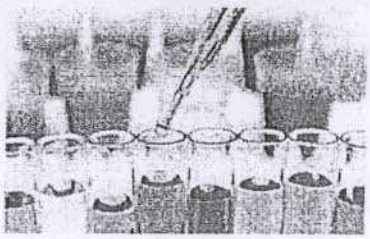

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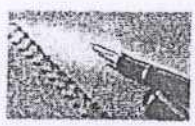

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