

Comparison of Operative versus Non-Operative Treatment for Lumbar Canal Stenosis

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INTRODUCTION

Backache has been the scourge of mankind ever since he assumed the erect posture. The pain has troubled patients and treating doctors alike. Pinpointing the cause of backache and treating it successfully has been their constant endeavor.

Degenerative disease of the spine is one of the common and more frequently encountered causes of low back pain in elderly. With the median age of population rising and more elderly people maintaining an active life style functional limitation due to symptomatic degenerative disease of spine is becoming more common. Lumbar canal stenosis remains one of the most frequently encountered clinically important degenerative spinal disorders in the aging population.

Lumbar canal stenosis is the terminology used to describe developmental or congenital narrowing of the spinal canal that produces compression of the neural elements before their exit from the neural foramen. The narrowing may be limited to a single motion segment or it may be more diffuse spanning two motion segments or more.

Treatment is aimed at not only obtaining immediate pain relief but also to prevent long term disabling sequelae such as chronic backache and spinal instability. With advances in our understanding of pathoanatomy and the clinicopathological correlation, the treatment has changed from various non-operative modalities to decompression and subsequently to decompression and fusion with or without instrumentation.

The present dissertation is a study of 40 cases of lumbar canal stenosis treated over a period of two and half years either by nonoperative modality or by operative modality such as decompression and fusion with or without instrumentation if required.

CLASSIFICATION

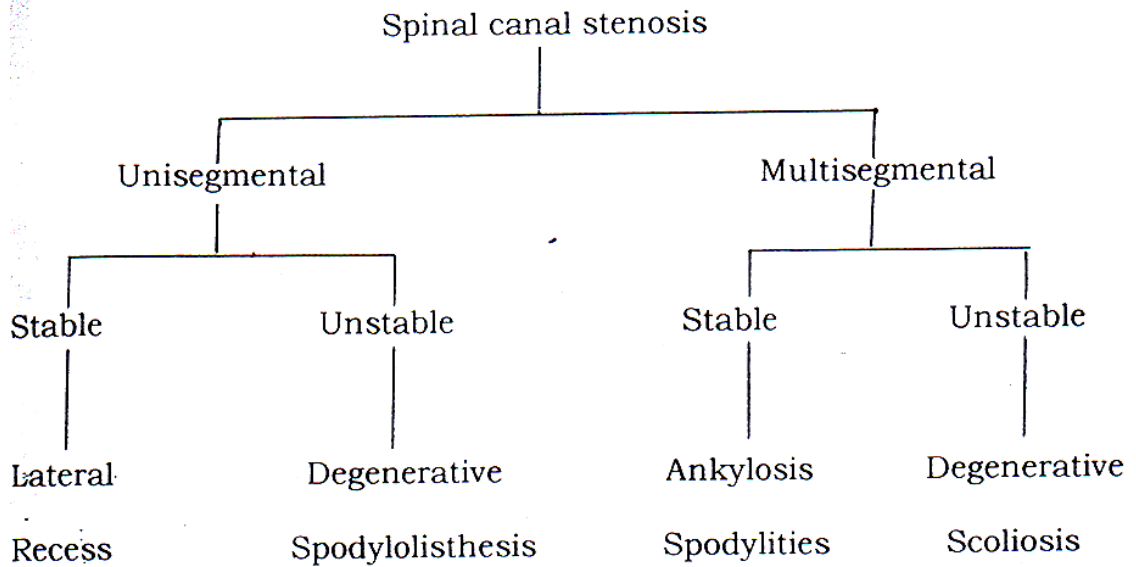
Spinal stenosis is classified according to

1. Etiology
2. According to stability.
3. Site of stenosis
4. Anatomical classification.
5. Anatomical classification.

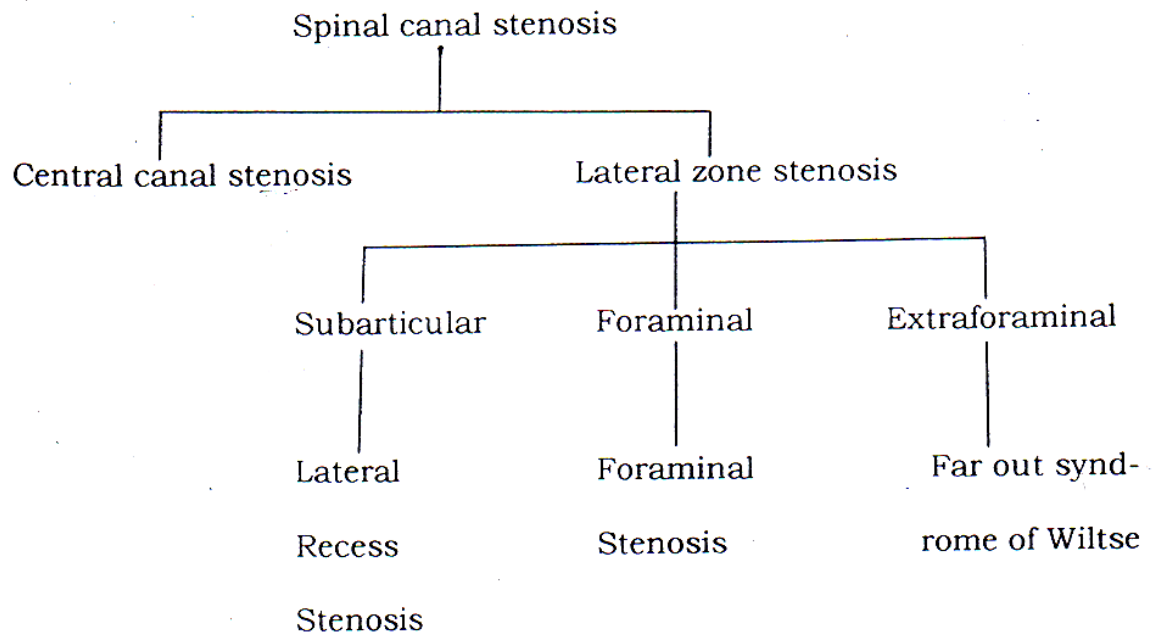
Etiological classification

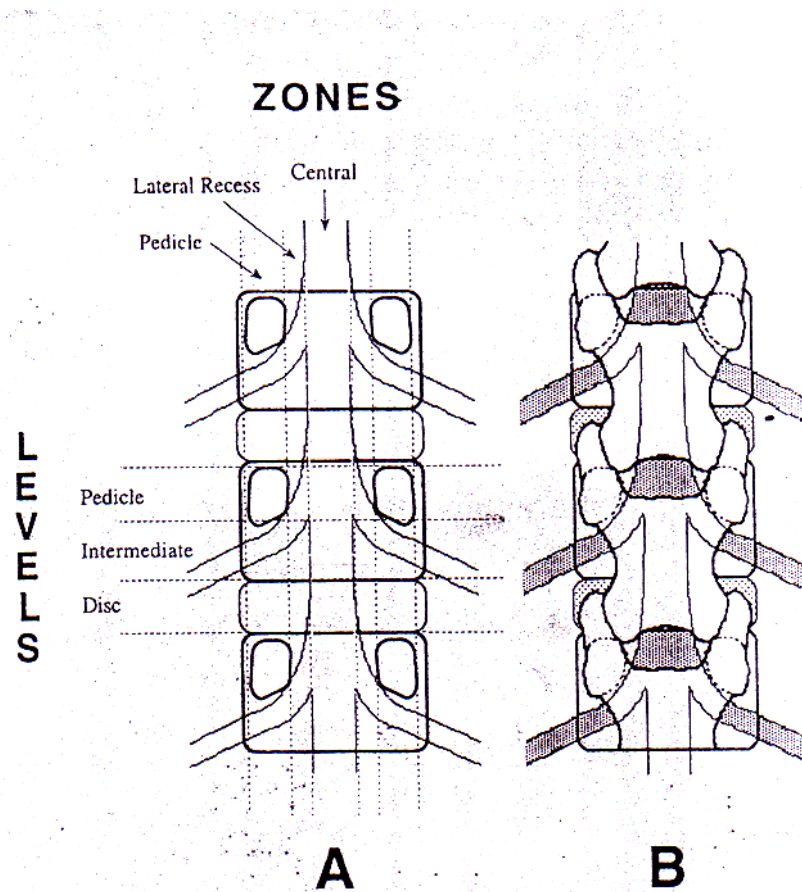
1. Congenital / Developmental stenosis
 - A. Idiopathic
 - B. Achondroplastic
2. Acquired stenosis
 - A. Degenerative
 - B. Spondylolisthetic / Spondylolytic
 - C. Combined
 - D. Iatrogenic
 1. Post – laminectomy
 2. Post-fusion
 - E. Post traumatic
 - F. Miscellaneous
 1. Pagets disease
 2. Flourosis
 3. Foresters disease
 4. Diffuse Idiopathic Skeletal Hyperostosis.

Stability wise classification



Classification according to site:





**LINE DIAGRAM DEMONSTRATING GRID LIKE
SUBDIVISION OF LUMBAR CANAL INTO
THREE ZONES AND THREE LEVELS.**

**THREE ZONES LATERAL SPINAL CANAL
UPPER CIRCLE – ENTRANCE ZONE
MIDDLE CIRCLE – MIDDLE ZONE
LOWER CIRCLE – EXIT ZONE**

Anatomical classification

Anatomical classification of lumbar canal stenosis is used to identify specific areas of narrowing of spinal canal and is particularly useful as guides for operative decompression. Spinal canal is divided in grid like manner into series of transverse (three levels from cephalad to caudad and sagittal region (three zone from midline laterally)).

The three transverse levels from cephalad to caudad are the pedicle level, the intermediate level (body) and the disc level. The pedicle level extends from the superior to the inferior border of the pedicle. The intermediate level extends from inferior border of the pedicle to inferior end plate of the vertebra caudally. The disc level begins at the inferior end plate and extends caudally to the superior border of the next pedicle.

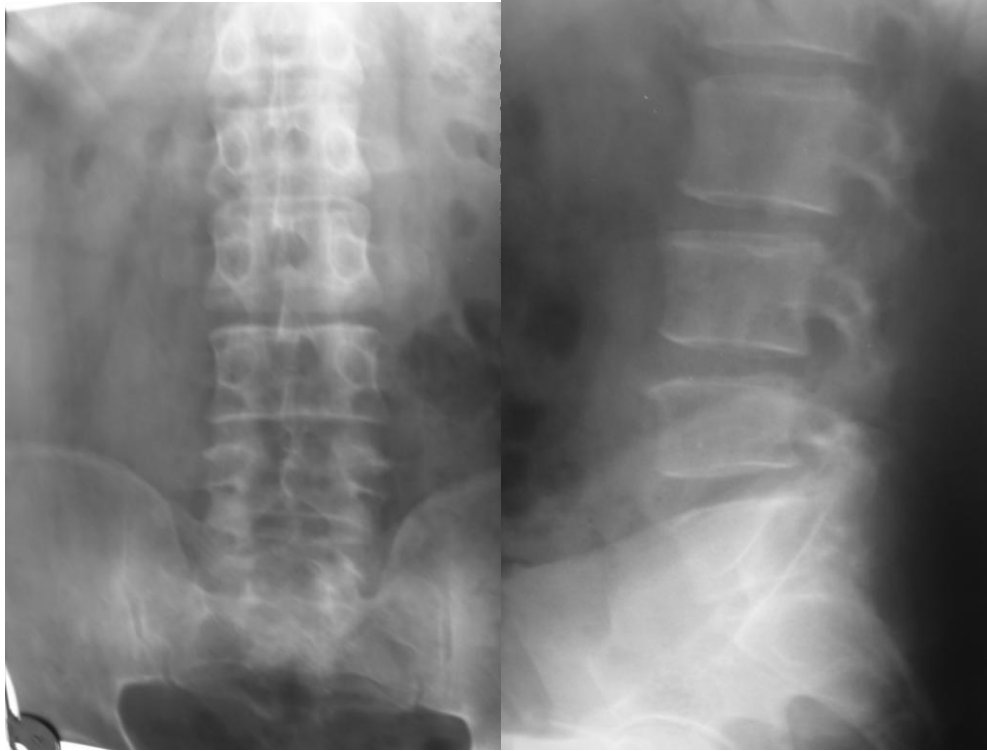
From midline laterally the three sagittal zones are central zone, lateral recess zone, and the pedicle zone. The central zone is the area between normal lateral borders of non-compressed dural sac. The lateral recess zone is the area between the lateral border of the dural sac medially and longitudinal line connecting the medial edges of the pedicle laterally. The pedicle zone is the area between medial and lateral borders of the pedicle. This grid like subdivision of spinal canal helps in anatomical localization of stenotic element and consequent effective decompression.

MATERIALS AND METHODS

This is a study of 40 cases of lumbar canal stenosis, which was carried out in the Department of Orthopaedics at Sion Hospital.

Case selection: Case selection was done on the bases of examination and findings.

Clinically the patients had neurogenic claudication, back pain, and/or sciatica as the main complaints. Neurogenic claudication is characterized by pain, weakness and numbness in the legs which comes on with walking and is relieved on sitting down or by flexing forwards. Sensory symptoms precede the motor manifestations in majority of patients. However if the patients continue his activity beyond the appearance of discomfort or parasthesia, the legs may become weak. The examination at this time may disclose sensory deficit and/or loss of reflexes. As the disease progresses some pain may be experienced at rest and weakness on effort become a prominent symptom. Straining rarely aggravates the pain. These patients have bilaterally symmetrical symptoms; however there is paucity of signs. If signs are present then they consist of varying degree of paravertebral muscle spasm with limitation of spine movements and occasionally restriction of straight leg raising test. Motor weakness is not evident peripherally. Impairment of deep tendon reflexes occurs in most patients' ankle reflex being more severely affected. Sensory changes if present are predominant in fifth



**X-RAY FINDINGS SUGGESTIVE OF LUMBAR CANAL
STENOSIS**

AP VIEW

LATERAL VIEW

lumbar and first sacral dermatomes. If there is an associated disc prolapse, the pain is aggravated by coughing, sneezing, straining at stools, lifting heavy weight etc. They have a restricted SLR and have sensory and motor deficits pertaining to the involved roots.

All patients clinically suspected to be suffering from lumbar canal stenosis were subjected to following radiological investigations: **Plain X-rays lumbosacral spine:** following views were taken,

- (1) Anteroposterior view
- (2) Lateral view
- (3) Right oblique view
- (4) Left oblique view
- (5) Flexion view
- (6) Extension view

The following finding on plain x-rays were suggestive of lumbar canal stenosis:

- (1) Presence of hypertrophy of facet joint
- (2) Reduced distance between the pedicle and the facet joint
- (3) Laterally aligned and irregular facet joint
- (4) Reduced distance between the posterior border of vertebral body and anterior border of the superior facet.
- (5) Short stout spinous process and the laminae.
- (6) Reduced distance between the pedicles of adjoining vertebrae.

(7) Associated features of prolapsed disc viz.

Reduced intervertebral disc space

Posterior osteophytes etc.

Once the diagnosis of lumbar canal stenosis was made patient were subjected to conservative line of management which consisted of:

(1) Limitation of activity: It does not mean complete bed rest. It consists of reduced activity in form of

- (a) Avoidance of lifting heavy weights.
- (b) Avoidance of twisting movements.
- (c) Avoidance of repeated forward bending.

(2) Physical therapy: This consisted of

- (a) Hot water fomentation.
- (b) Deep heat (short wave diathermy)
- (c) Massage
- (d) Ultrasonic therapy
- (e) Aerobic exercises which consist of stationary bicycling, brisk walking, swimming, treadmill walking etc. this aerobic exercises release endorphins which relieve pain.
- (f) Williams flexion exercises program
- (g) Posture alteration: Patients are taught to assume a posture of flexion of spine so that a relative increase in spinal canal diameter takes place.

- (3) **Drugs:**
- (a) Anti-inflammatory drugs like Piroxicam, Diclofenac sodium etc.
 - (b) Skeletal muscle relaxants.
- (4) **Lumbosacral Corset:** A lumbosacral frame type belt was given to all patients, which was adjusted in slight flexion. It only serves to remind the patient to restrict lumbar spine movements. The patients were instructed to wear it only when they were -Up and about for a prolonged period and remove it during sleep and regular household activities.
- (5) **Epidural steroids:** This was given to 5 out of 40 patients in the study. The epidural injection is the combination of long acting steroid with an epidural anesthetic agent.

Long acting steroid- Methyl Prednisolone (Depo-medrol)

Anesthetic agent- Lignocaine, Bupivacaine.

The two are mixed together, diluted in 10cc saline and injected into epidural space. Dilution with normal saline helps to increase the volume of injection and break adhesions that interfere with the injection.

The present protocol is to inject three times in the span of 48-72 hours.

Contraindication: Local infections.

Neurologic disease

Bleeding disorder

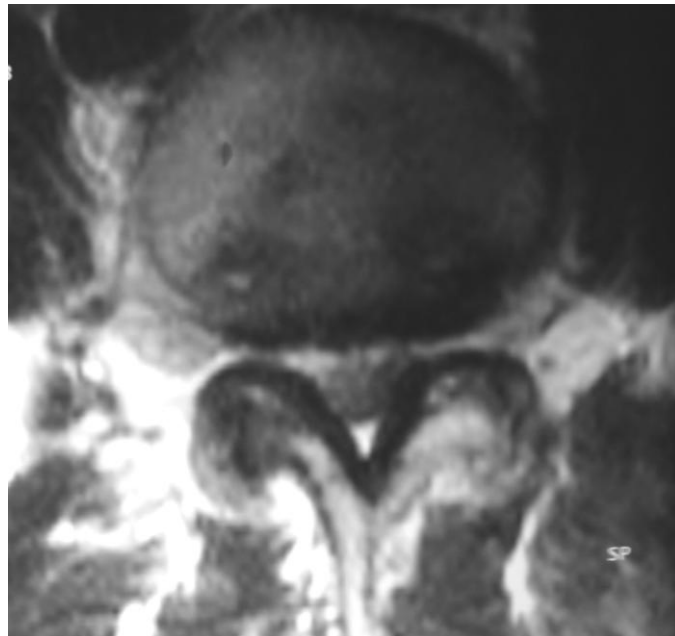
Position: Knee -Chest position.

Needle used: 20 or 22 gauge disposable needle.

Technique: With patient in knee-chest position the skin in midline' is anaesthetized. Highest point of the iliac crest is used to locate the interspace between fourth and fifth lumbar vertebrae. The needle is advanced till the resistance of ligamentum flavum is encountered. Then glass syringe is applied to the needle and needle slowly advanced applying light pressure on the syringe. When epidural space is encountered the resistance is suddenly lost and the epidural space will accommodate air. The syringe is detached from the needle to check if CSF comes out. If it doesn't come out, the agent is injected into the epidural space. The needle is withdrawn and tincture benzoin seal is applied.

In our institute epidural steroids injections were given by the anaesthetist. All five patients who were given steroids responded favorably to it.

(6) **Antidepressant drugs:** Low doses of these drugs have beneficial effect on the neurogenic type of pain that is probably related to alteration in membrane characteristics or metabolism. These also have a sedative effect.



MRI FINDINGS SUGGESTIVE OF LUMBAR CANAL STENOSIS CROSS SECTION

7. TENS (Transcutaneous Electric Nerve Stimulation).

All patients were subjected to this conservative line of management and reviewed at the end of 1, 3, 8 & 6 months.

MRI of lumbosacral spine was performed for all 22 patients who were not relieved by conservative management.

The main advantage of MRI over other methods like myelography, myelography with CT scan and Plain CT scan is being its non invasive nature and being radiation free. Also as this investigations were performed only for patients who had not responded to conservative treatment, soft tissue conditions like tumors, infection and pars fracture were ruled out and main disadvantage of MRI, non specificity i.e. high degree of false positive results were negated.



MRI FINDINGS SUGGESTIVE OF LUMBAR CANAL STENOSIS IN SAGGITAL SECTION

OPERATIVE TREATMENT

The surgery was performed only to relieve the patient of his/ her symptoms. Improvement in neurologic status post surgery was an added benefit of surgery.

The surgery consisted of

1. Decompression of the stenosed canal by laminectomy
2. Decompression with fusion.
3. Decompression with fusion with instrumentation.

Surgery for spinal stenosis is one of the more extensive and technically demanding, yet common, procedures performed on the spine. Surgical success hinges on an in-depth understanding of the pathophysiology involved and a thorough knowledge of spinal anatomy. Insight into spinal instability is also required.

An unsuccessful decompressive laminectomy leads to a "failed back" with decreasing rates of good results and increasing disability with each subsequent salvage attempt. This can have particularly disastrous consequences in older patients with their associated complicated medical histories and perhaps already limited function.

OUTCOMES & ANALYSIS

The findings of our study of 40 cases of lumbar canal stenosis were as follows-

Age distribution : The youngest case was 35 years. The oldest being 69 years. The mean age incidence was 45 years.

The distribution in different age groups was,

| AGE GROUP | NO. OF PATIENTS |
|------------------|------------------------|
| 35-40 YEARS | 4 |
| 40-50 YEARS | 21 |
| 50-60 YEARS | 10 |
| 60-70 YEARS | 5 |
| TOTAL | 40 |

Sex distribution: there was female preponderance in this study there were 24 females and 16 males in this study.

Duration of pain: Most of the patients had endured the pain for two years. The earliest presentation was at 4 months duration. On an average patient presented after 22 months of pain, the maximum duration being 6 years.

| AGE GROUP | NO. OF PATIENTS |
|-------------------|------------------------|
| 0-6 MONTHS | 1 |
| 6 MONTHS – 1 YEAR | 6 |
| 1-2 YEARS | 21 |
| 2-5 YEARS | 9 |
| > 5 YEARS | 3 |
| TOTAL | 40 |

Type of pain: In the present study 14 patients had only leg pain 18 patients had both leg pain and back pain and 8 patients had only back pain.

| TYPE OF PAIN | NO. OF PATIENTS |
|-------------------------|------------------------|
| ONLY LEG PAIN | 14 |
| LEG PAIN WITH BACK PAIN | 18 |
| ONLY BACK PAIN | 8 |
| TOTAL | 40 |

Etiology of lumbar canal stenosis: - Most of the patients in the present study were of degenerative or spondylolytic or combined variety.

| ETIOLOGY OF LUMBAR CANAL STENOSIS | NO. OF PATIENTS |
|--|------------------------|
| CONGENITAL | 1 |
| DEGENERATIVE | 13 |
| SPONDYLOLYTIC | 9 |
| COMBINED | 17 |
| IATROGENIC | 0 |
| TOTAL | 40 |

Restricted lasegues test: Only 10 patients had restriction of SLR. The rest had unrestricted and free SLR of 90 degrees.

Power and sensations: - 17 patients had slight reduction of power of which 5 had decreased power at rest while 12 had demonstrable weakness of power only after exercise.

23 patients had reduced sensations in either or both the lower limbs.

Deep tendon reflexes were diminished in 36 patients (90%)

Investigations :-

Plain x-rays – all 40 patients.

MRI – In 22 patients who did not respond to conservative treatment and hence were subjected to surgery.

Decompression alone was done in 10 patients.

Decompression with fusion was done in 7 patients.

Decompression with fusion with instrumentation was done in 5 patients.

| OPERATIVE TREATMENT | FEMALES | MALES | TOTAL |
|-----------------------------|----------------|--------------|--------------|
| DECOMPRESSION ALONE | 6 | 4 | 10 |
| DECOMPRESSION WITH FUSION | 4 | 3 | 7 |
| FUSION WITH INSTRUMENTATION | 3 | 2 | 5 |
| TOTAL | 13 | 9 | 22 |

Results of treatment:-

| | PATIENTS TREATED NON-OPERATIVELY | | | | |
|-----------------------|---|------------|------------|------------|-----------|
| | 100% | 75% | 50% | 25% | 0% |
| IMPROVEMENT IN | | | | | |
| LEG PAIN | 5 | 4 | 2 | 1 | 2 |
| BACK PAIN | 0 | 1 | 2 | 3 | 6 |
| SENSATIONS | 1 | 2 | 5 | 1 | 0 |
| MOTOR POWER | 0 | 3 | 1 | 2 | 1 |

| | PATIENTS TREATED OPERATIVELY | | | | |
|-----------------------|-------------------------------------|------------|------------|------------|-----------|
| IMPROVEMENT IN | 100% | 75% | 50% | 25% | 0% |
| LEG PAIN | 9 | 6 | 2 | 1 | 0 |
| BACK PAIN | 3 | 7 | 2 | 2 | 0 |
| SENSATIONS | 2 | 6 | 4 | 0 | 1 |
| MOTOR POWER | 1 | 3 | 4 | 0 | 1 |

Complications: In our study only one patient had complication. He had superficial wound infection that was successfully treated conservatively with higher antibiotics and daily dressings.

This has been a very recent study and none of the patients had any new neurological deficits at that vertebral level or any other level during a follow up post surgery.

Post-operative X-rays- X-rays of lumbo-sacral region was taken on 2nd postoperative day to evaluate the decompression achieved and to demonstrate the bone graft.

DISCUSSION

A study of 40 cases was made of patients with lumbar canal stenosis. The diagnosis of lumbar canal stenosis was based on clinical findings and supported by radiological investigations.

Comparison of age distribution:

| AGE | KATZ ET AL | CAPUTY ET AL | EPSTEIN ET AL | YAMADA ET AL | PRESENT STUDY |
|---------|---------------|-----------------|------------------|-----------------|------------------|
| MINIMUM | 55 | 43 | 17 | 58 | 35 |
| MAXIMUM | 89 | 84 | 51 | 70 | 69 |
| MEAN | 69.3 | 67 | 35 | 62.5 | 45 |

Comparison of sex distribution:

We had female preponderance. This was in agreement of the series by Hopp et al but most of the other series also had female preponderance except for Johnson's study, which has male preponderance.^{18, 3, 21, 20}

| AGE | JOHNSON AL | HOPP ET AL | CAPUTYET AL | KATZ ET AL | PRESENT STUDY |
|---------|---------------|---------------|----------------|---------------|------------------|
| MALES | 24 | 38 | 46 | 26 | 16 |
| FEMALES | 8 | 62 | 54 | 62 | 24 |

Most of the patients suffered from chronic pain (lasting more than 4 months).

In our study the average duration was 1 year and 10 months. This is compatible with most of the other studies.^{3, 5, 20, 30}

Comparison of duration of pain prior to operation

| DURATION IN MONTHS | CAPUTY ET AL | CIRIC ET AL | JOHNSON ET AL | YAMADA ET AL | PRESENT STUDY |
|--------------------|--------------|-------------|---------------|--------------|---------------|
| MINIMUM | 1 | 6 | 4 | 7 | 4 |
| MAXIMUM | 144 | 120 | 96 | 144 | 72 |
| MEAN | 6 | 48 | 22 | 44 | 22 |

Clinically there is a host of symptoms but there is paucity of signs. Neurologically the patient may have some sensory or motor symptoms but are not congruous with the severity of symptoms. This disparity between symptoms and signs is of diagnostic importance. The SLR maneuver is typically normal or nearly so as per Charles Wilson.¹⁹ The SLR may be restricted in case of compression of lateral recess.^{5, 13, 30}

Comparison of SLR restriction

| SLR RESTRICTION | CIRIC ET AL | EPSTEIN ET AL | YAMADA ET AL | PRESENT STUDY |
|-----------------|-------------|---------------|--------------|---------------|
| TOTAL CASES | 16 | 12 | 5 | 40 |
| RESTRICTED SLR | 2 | 8 | 1 | 10 |

Non-operative treatment of lumbar canal stenosis consisted of:-

1. Limitation of activity
2. Physical therapy

- A. Deep heat (SWD).
 - B. Ultrasonic Therapy.
 - C. William's Flexion Exercise Program.
3. NSAIDS.
 4. Lumbosacral corset
 5. Epidural Steroids

The non-operative treatment was given to all 40 patients in this study, only 18 patients responded to it as in this patients the inflammatory, component of soft tissue had caused compromised canal diameter in relatively narrow canal. Non-operative treatment is not useful when irreversible bony and soft tissue changes have already occurred.

Investigations:

Patients who did not respond to conservative treatment were subjected to following investigations,

1. Plain X-ray: The following X-rays of lumbosacral spine were taken. (A) Anteroposterior view
(B) Lateral view in flexion
(C) Lateral view in extension (D) Rt. Oblique view

(E) Lt. Oblique view

The oblique views particularly helped us to visualize the facet joint pathology more clearly under flexion and extension views are useful for picking up latent instability of the lumbar spine.

2. MRI: Only to confirm the extent of lumbar canal stenosis in cases where diagnosis was already made clinically.

After confirming irreversible bony and soft tissue compression of nerve roots patients who did not respond to conservative treatment were subjected to surgery in the form of,

- (a) Decompression
- (b) Decompression with fusion
- (c) Decompression with fusion with instrumentation

The decision regarding fusion of the spine was based on clinical findings and the occupational demands of the patients.

We graded the symptomatic improvement as per relief of pain, return to work, and need to take analgesic drugs. Results were termed as,

- (a) Excellent: If there was occasional pain leading the patient to take analgesics rarely.

- (b) Good: If patient had marked relief of pain but required to take analgesics regularly.
- (c) Fair: If patient had mild relief from pain but was still physically incapacitated and required analgesics regularly.
- (d) Same: If the patient did not improve after surgery.
- (e) Worse: If the patient deteriorated after surgery.

We had 15 excellent results and rest were good results. This compared very well with the study of other authors. (5, 30, 16, 12)

COMPARISON OF IMPROVEMENT OF PAIN

| PAIN RELIEF | CIRI C ET AL | YAMADA ET AL | EPSTEIN ET AL | HARRY ET AL | PRESENT STUDY |
|--------------------|---------------------|---------------------|----------------------|--------------------|----------------------|
| EXCELLENT | 13 | 5 | 11 | 13 | 15 |
| GOOD | 2 | 0 | 3 | 22 | 7 |
| FAIR | 0 | 0 | 1 | 13 | 0 |
| SAME | 0 | 0 | 0 | 0 | 0 |
| WORSE | 1 | 0 | 0 | 2 | 0 |
| TOTAL | 16 | 5 | 15 | 50 | 22 |

We had only one case with complication. Patient developed superficial wound infection which was treated conservatively with daily dressing and antibiotics as per sensitivity report. The wound healed uneventfully. Patient had followed up with occasional back pain but was neurologically normal.

CONCLUSION & RECOMMENDATIONS:

Lumbar Canal stenosis is a progressive degenerative disorder of the spine most frequently causing morbidity in middle aged and elderly. The diagnosis is essentially clinical and only supported by radiological investigations.

Non-operative line of treatment is effective for relief of symptoms in most patients in whom inflammatory edema of nerve roots cause compromised canal diameter in a relatively narrow canal. But the pain relief and recovery of sensation and weakness is not as good as in those subjected to surgery especially when radiological evidences of irreversible bony and soft tissue changes are already present.

Surgery for lumbar canal stenosis is performed only when patient has reached the state of disability i.e. patient is unable to carry out his day-to-day activities due to pain. Limited operative decompression with retention of stabilizing elements may decrease short term morbidity but lead to long term failure due to recurrent stenosis or development of stenosis at an adjacent level. Decompression of the stenotic lumbar canal along with fusion is definitely better than decompression alone, specially so in patients having degenerative lumbar spinal stenosis with Spondylolisthesis or Degenerative scoliosis. Pedicle instrumentation after laminectomy provides segmental fixation, improves the rate of fusion and avoids the need to extend fusion to adjacent normal levels.

Surgery is aimed only at providing relief of symptoms and not for achieving improvements in neurological status. If any neurological improvement occurs it is to be regarded as an additional bonus benefit of the surgery.

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MASTER CHART

| S.R. NO. | NAME | SEX/ AGE | ETIOLOGY OF LCS | DURATION OF PAIN | TYPE OF PAIN | RESTRICTED SLR | TREATMENT GIVEN |
|----------|------------|----------|-----------------|------------------|-----------------|----------------|--------------------------------|
| 1) | SAVITRIBAI | F/45 | COMBINED | 1-2 Years | ONLY LEG PAIN | PRESENT | CONSERVATIVE |
| 2) | PADMAJA | F/42 | SPONDYLOLYTIC | 6-months-1 year | ONLY BACK PAIN | ABSENT | CONSERVATIVE |
| 3) | REHMAN | M/54 | COMBINED | 2-5 years | BACK & LEG PAIN | ABSENT | DECOMPRESSI ON ONLY |
| 4) | SUNANDA | F/38 | SPONDYLOLYTIC | 1-2 Years | ONLY BACK PAIN | ABSENT | CONSERVATIVE |
| 5) | ANAND | M/45 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSI ON, FUSION & INST. |
| 6) | ALTAF | M/35 | SPONDYLOLYTIC | 6 months-1 year | ONLY BACK PAIN | ABSENT | CONSERVATIVE |
| 7) | JANABAI | F/68 | DEGENERATIVE | >5 years | ONLY LEG PAIN | PRESENT | CONSERVATIVE |
| 8) | SHAHIDA | F/40 | SPONDYLOLYTIC | 1-2 years | ONLY BACK PAIN | ABSENT | DECOMPRESSI ON, FUSION & INST. |
| 9) | RAMAKANT | M/48 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSI ON & FUSION |
| 10) | BHASKAR | M/57 | DEGENERATIVE | 2-5 years | ONLY LEG PAIN | PRESENT | DECOMPRESSI ON ONLY |
| 11) | TERESA | F/46 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | CONSERVATIVE |
| 12) | PRIYA | F/36 | CONGENITAL | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSI ON ONLY |
| 13) | NARAYAN | M/45 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | CONSERVATIVE |
| 14) | TARAMATI | F/51 | COMBINED | 2-5 years | BACK & LEG PAIN | ABSENT | DECOMPRESSI ON ONLY |
| 15) | RAVINDRA | M/60 | DEGENERATIVE | >5 years | ONLY LEG PAIN | PRESENT | DECOMPRESSI ON ONLY |
| 16) | DATTARAM | M/41 | SPONDYLOLYTIC | 6 months-1 year | ONLY BACK PAIN | ABSENT | CONSERVATIVE |
| 17) | VINAYAK | M/47 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSI ON, FUSION & INST. |
| 18) | RASHIDA | F/57 | DEGENERATIVE | 2-5 years | ONLY LEG PAIN | PRESENT | CONSERVATIVE |
| 19) | RAJANI | F/45 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSI ON ONLY |
| 20) | HAMEED | M/63 | DEGENERATIVE | 2-5 years | ONLY LEG PAIN | ABSENT | CONSERVATIVE |
| 21) | LATIKA | F/54 | DEGENERATIVE | 2-5 years | ONLY LEG PAIN | PRESENT | DECOMPRESSI ON & FUSION |
| 22) | MUSHTAQ | M/45 | COMBINED | 6 months-1 year | BACK & LEG PAIN | ABSENT | DECOMPRESSI ON & FUSION |
| 23) | RAKESH | M/43 | SPONDYLOLYTIC | 1-2 years | ONLY BACK PAIN | ABSENT | CONSERVATIVE |
| 24) | SHANTABAI | F/64 | DESIGNATIVE | >5 years | ONLY LEG PAIN | ABSENT | CONSERVATIVE |
| 25) | AFREEN | F/47 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSI ON & FUSION |
| 26) | CHHAYA | F/54 | DEGENERATIVE | 2-5 years | ONLY LEG PAIN | ABSENT | CONSERVATIVE |

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| 27) | MANISHA | F/55 | DEGENERATIVE | 2-5 years | ONLY LEG PAIN | PRESENT | DECOMPRESSION ONLY |
| 28) | KALPANA | F/40 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSION, FUSION & INST. |
| 29) | LALCNAND | M/45 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSION & FUSION |
| 30) | HARPREET | F/45 | SPONDYLOLYTIC | 1-2 years | ONLY BACK PAIN | ABSENT | CONSERVATIVE |
| 31) | SOHAN | M/50 | DEGENERATIVE | 6 months-1 year | ONLY LEG PAIN | PRESENT | CONSERVATIVE |
| 32) | YASMEEN | F/43 | SPONDYLOLYTIC | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSION, FUSION & INST. |
| 33) | GAYATRI | F/48 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSION & FUSION |
| 34) | ASHWINI | F/49 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSION ONLY |
| 35) | DINESH | M/53 | DEGENERATIVE | 2-5 years | ONLY LEG PAIN | PRESENT | DECOMPRESSION ONLY |
| 36) | POOJA | F/39 | SPONDYLOLYTIC | 0-6 months | ONLY BACK PAIN | ABSENT | CONSERVATIVE |
| 37) | HITEN | M/40 | COMBINED | 6 months-1 year | BACK & LEG PAIN | ABSENT | CONSERVATIVE |
| 38) | PARVATI | F/60 | DEGENERATIVE | 1-2 years | ONLY LEG PAIN | ABSENT | CONSERVATIVE |
| 39) | RAJAMMA | F/50 | DEGENERATIVE | 1-2 years | ONLY LEG PAIN | PRESENT | DECOMPRESSION ONLY |
| 40) | KAMALA | F/48 | COMBINED | 1-2 years | BACK & LEG PAIN | ABSENT | DECOMPRESSION & FUSION |