# The Spinal Foundation

LASER ASSISTED MINIMAL INVASIVE SPINE SURGERY INFORMATION PACK

## Your Informed Decision

You have both the right and the obligation to make decisions regarding your healthcare. Your consultant can provide you with the necessary information and advice and if you have any questions please do not hesitate to ask.

This form is designed to help you to review the information that you need to make an informed choice as to whether or not to undergo Laser Assisted Minimal Invasive Spine Surgery (LAMISS).

Although LAMISS is effective in most cases, no guarantee can be given that a specific patient will benefit from the treatment or that even if the procedure is initially successful that the results will be permanent as this is a degenerative condition.

However LAMISS offers a quantum leap in the diagnosis and offers person specific selection and targeting of treatment.

## Techniques

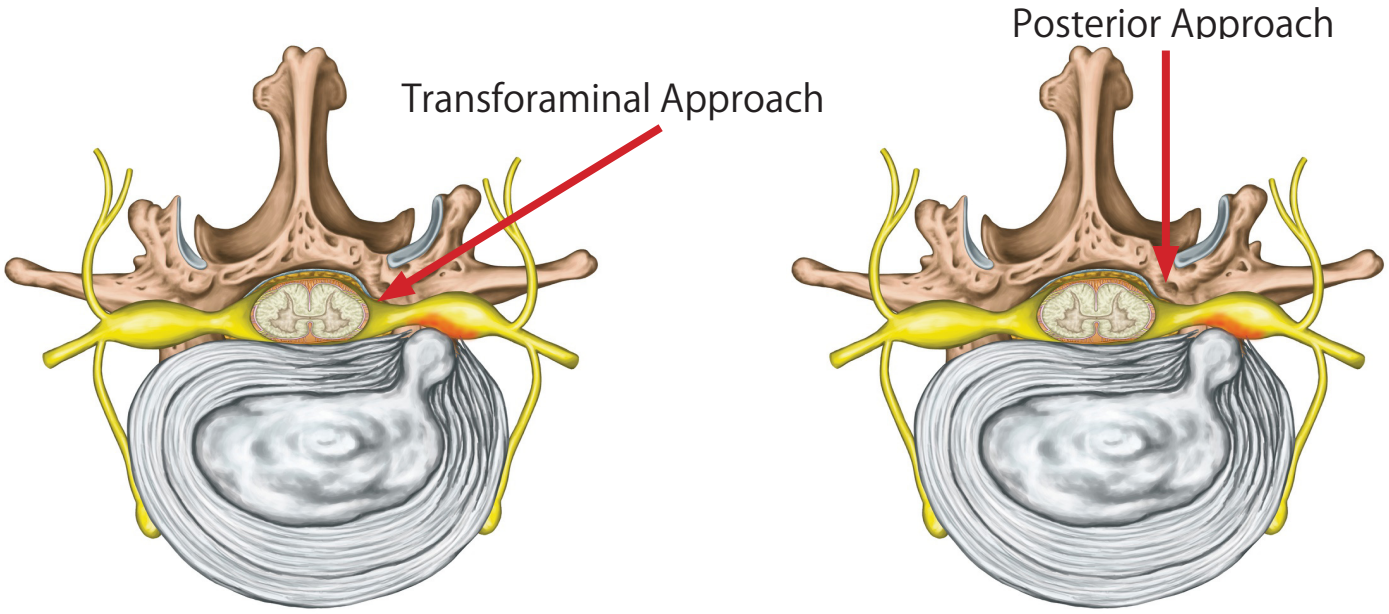
The technique of Transforaminal LAMISS combines the use of several techniques to treat the degenerative pathology:

- Transforaminal Endoscopic Lumbar Decompression and Foraminoplasty.
- Endoscopic Foraminal Undercutting.
- Endoscopic Intradiscal Discectomy.
- Laser Disc Decompression and Annuloplasty.

These techniques may be used individually or in combination on each targeted segment of the spine dependent upon the pathology, patient feedback and findings at each level. Where appropriate these techniques may be accompanied by the insertion of polymers into the disc to increase disc height and quench disc degeneration.

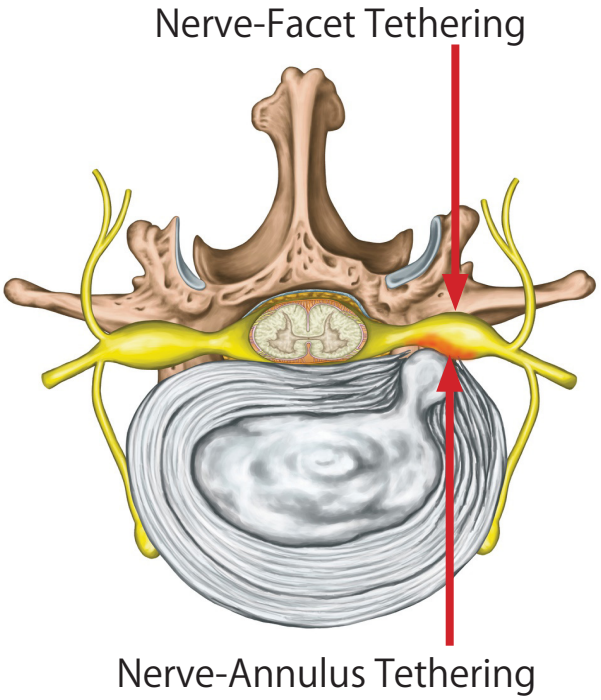
The individual techniques are described in detail on the Spinal Foundation website: www.spinal-foundation.org

## The Transforaminal Endoscopic Approach

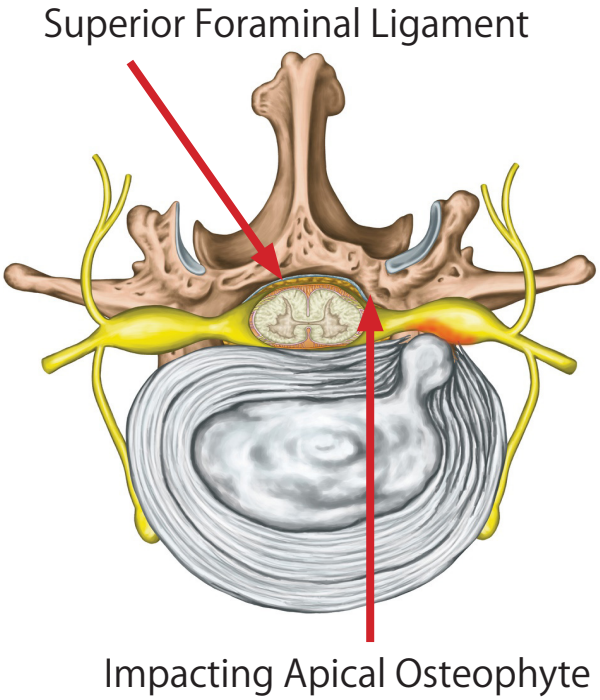



These techniques are used in the aware sedated state with advanced pain control which allows the patient feedback to guide the surgeon accurately to the source of the pain.

As a result the surgeon limits the procedure to the specific sites responsible for the predominant presenting symptoms. Clinical evaluation and MRI/CT scans alone can be misleading. Consequently conventional anaesthetised procedures tend to be more extensive and risk greater collateral tissue damage.



The avoidance of General Anaesthesia allows deployment in all ages including the elderly and those with co-morbidities (concurrent conditions such as Diabetes Mellitus, Multiple Sclerosis, Cardiac Conditions, Thrombo-embolic disorders, stroke / cerebrovascular accident, cancer etc.)




# Treatable Conditions

Based upon the pioneering experience since 1990 we use LAMISS to address lumbar and certain cervical or thoracic conditions such as:

- Slipped discs (disc protrusions or extrusions or sequestra),
- Nerve compression and spinal narrowing (axial and lateral recess or foraminal stenosis),
- Claudication,
- Leaking Discs or High Intensity Zones (Black Disc Syndrome),
- Leg pain (Sciatica),
- Arm pain (Brachialgia),
- Spinal "instability",
- Vertebral slippage (spondylolytic spondylolisthesis or degenerative spondylolisthesis),
- Scoliosis, (Adult Adolescent or Aged)
- Arachnoiditis,
- Failed Back Surgery,
- Failed Fusion Surgery
- Failed Total Disc Replacement Surgery
- Vertebral Compression Fractures with secondary foraminal compromise.

For further information please explore http://www.spinal-foundation.org/conditions

# Treatment Pathway

Initially, patients will usually be referred for Muscle Balance Physiotherapy and Reformer Pilates rehabilitation. This may aggravate symptoms at the outset. These may be quenched by a CT Guided Nerve Root Block of the irritated nerves.

When such conservative measures fail conventional referral would offer microdiscectomy, open decompression, interbody lumbar caged and instrumented fusion or Total Disc Replacement. This is where "Combination Laser Assisted Minimal Invasive Spine Surgery" can render assistance. The aware state technique commences with palpation of the spinal segment foramen and its disc and its nerves. This allows the exact source of the pain to be detected and distinguish this from all the other pathologies that could be the potential sources of the predominant presenting symptom(s).

Once determined then precise targeted LAMISS will commence with discography at those levels reproducing the symptoms. Polymer reconstruction, LDD, EID and TELDF will be performed at each level www.spinal-foundation.org/techniques.

# Clinical Outcomes

## Laser Assisted Minimal Invasive Spine Surgery – Combination Minimal Invasive Spine Surgery

LAMISS using the combination of techniques listed above offers an 80% chance of a good clinical impact achieving at least a 50% reduction in pain in the back, buttock, upper and lower leg and a doubling of performance when reviewed at 2 to 4 years. A failure to achieve these benefits in either the back, buttock or leg is deemed a poor result and failure. These criteria are stricter than in most studies of clinical outcome following spinal surgery. (In the cervical spine our criteria are applied to the outcomes following cervical surgery where the benefits must be achieved in the neck, shoulder, and arm as a total entity).

The incidence of complications was 2.4% in our first 958 cases. These included 1% aseptic discitis and 1% recurrence and two infections in 958 cases. 28% of the first 250patients treated by Transforaminal Endoscopic Lumbar Decompression and Foraminoplasty (TELDF) had a postoperative flare and in 12% this was significant. In a review of 958 TELDFs, I patient had a disc infection, 9 had aseptic discitis. There was 1 dural tear, 1 deep wound infection, 2 transient and 1 persisting foot drop at 2 years, 1 myocardial infarction, 1 transient erectile dysfunction, 1 panic attack and 8 residual protrusions (2.4%).

The "Good" and "Excellent" outcomes at 10 years amount to 72% and half of these cases were failed back surgery in an independent study with cohort integrity of 69%.

## LUMBAR LASER DISC DECOMPRESSION (LDD)

Outcomes – 50% of patients with moderate disc degeneration had a >50% reduction in pain sustained over 3 – 9 years (average 5.3 years) with a further 21% receiving a functional improvement. Laser Disc Decompression produced less gratifying results in patients who had undergone previous back surgery.

Risks – 4/388 had aseptic discitis. No neurological complications, recurrent disc prolapse 2%, 17% required Endoscopic Lumbar Decompression

## CERVICAL LASER DISC DECOMPRESSION (LDD)

Outcomes – 51% of 105 Cervical Laser Disc Decompression procedures had a halving of their pain and doubling of their performance when reviewed 2 – 7 years later (3.9 years).

Risks – 1 auto-fusion, 1 late post-operative infection associated with transient paresis, 2 transient swallowing discomfort.

## ENDOSCOPIC INTERLAMINAR LUMBAR DECOMPRESSION (EILD)

Outcomes – Limited experience – Successful restoration of mobility and walking distance in 10 patients analysed 1 – 2 years following aware state Endoscopic Interlaminar Lumbar Decompression. These patients age ranged between 71 – 84 and all had co-morbidities including Diabetes Mellitus, Bleeding and Cardiac Disorders.

Risks – Spinal Haematoma (Bleeding and compression from the clot), Post-operative infection, Transient paresis. We had 1 case of a Dural Tear which was successfully treated with a gel patch endoscopically

## CONVENTIONAL MICRODISCECTOMY

Outcomes – In 152 patients reviewed >2 years after surgery, 98% had returned to work (Carragee – 1999) but only 73% had a good clinical impact (Schade 1999)

Risks – 5/3% dural tears, 5/9% re-herniation which resolved spontaneously, 5.3% re-operated re-herniation, 0.7%, transient foot drop, prolonged would drainage, transient ulnar nerve weakness, partial suprascapular nerve, weakness, superficial would infection, bilateral L5/S1 nerve palsy, transient post-operative Cauda Equina Syndrome, transient increased sciatic and bladder retention

## POSTERIOR LUMBAR INTERBODY FUSION

Outcomes – In 71 patients reviewed 2 years after surgery (France 1999) 57% had a beneficial clinical impact and single level bone fusion was achieved in 86% and in double level fusions this occurred in 43%

Risks – In 41 patients with instrumented fusion 12% required re-operation. 12% Pseudarthoses repairs, 1 hardware removal. Turner 1992 review article reports complications as deep infections – 1.5%, superficial infection – 1.6%, Deep Vein Thrombosis – 3.7%, Pulmonary Embolus – 2.2%, neural injury – 2.8%, donor site infection – 1.5%, donor site chronic pain – 8.7%, donor site pelvic instability – 1.9%, graft extrusion – 2%, instrumentation failure – 7.3%

# Complications

**Complications** from spinal laser surgery are uncommon but sometimes they do occur. It is possible that the procedure(s) that you will undergo will not help you. Several treatments may be necessary before adequate results are obtained. Furthermore, it is possible that you will be worse after spinal laser treatment than you were before. Some of the possible consequences or complications of spinal laser surgery are as follows:-

• **Pain** may occur during the operation but the use of local anaesthesia and powerful intravenous analgesia will be combined with surgical care and expertise to minimise this. During the first few hours after the operation midline and peripheral pain may occur which may require the administration of painkillers. Occasionally patients may have flashbacks to the procedure in the first few days after surgery.

• **Scarring** - An on-going evaluation reveals that 48 out of 1,000 patients had detectable perineural scarring following this procedure but 17 of these 48 patients had MRI proven pre-existing scarring and 28 had had prior open surgery.

• **General complications** - The risks of stroke, heart attack, chest or urinary tract infection, venous thrombosis and embolism, and death are minimised by the avoidance of general anaesthesia. Some of these complications can cause permanent disability and although it is highly unlikely some can even cause death.

• **Infection** - In 1,000 patients 1 has had a deep wound infection resulting from a tooth infection. 1 have had a disc infection which resolved with anti-biotics within 3 months and 8 have had aseptic discitis. Patients are given protective antibiotics during the procedure.

• **Bleeding** - The procedure is conducted during saline irrigation of the wound. The laser beam is used to remove unwanted tissue and to seal bleeding points under direct visualisation by the surgeon.

• **Dural tear**- this is usually recognised shortly after surgery and treated by lying flat for a number of hours following the procedure.

• **Healing** - The small wound is closed with one or two stitches which are removed seven days later.

• **Rehabilitation** - Post-operative physiotherapy is required for six to twelve weeks. Recurrence of disc protrusion has been noted in 18 out of 1,000 patients. Recurrent back pain led to fusion surgery in about 2% of patients treated with TELDF in the early years.

• **Foot drop weakness** - In our first 1,000 patients only one patient had post-operative foot drop which is now under further investigation. There have also been 2 transient foot drops which resolved over 2-6 weeks.

• **Thigh weakness** – In the first 4,000 patients, 4 had transient post-operative thigh weakness following L3/4 interventions and one needed further revision.

• **Cauda Equina Syndrome** – This condition causes loss of control of bladder and rectal sphincter function and weakness of gluteal and leg power bilaterally. This is attended by numbness of the buttocks and around the scrotum / vagina and anus. This condition probably arises from inherent impoverished blood supply of the lower lumbar nerves.

# Postoperative course

## Journey Home

You are usually treated as an overnight stay and leave mid morning the following day. We like to keep you overnight to give you the chance to recover and to ensure that you have any analgesia that you may need.

On the journey home, you should sit in a normal passenger seat and the journey should be broken every hour for a short 5 minute upright walk to regain posture and mobilise the nerve.

## Stitches

Your wound will usually have 2 stitches to be removed 7 days following surgery. Please keep this wound drive until they have been removed.

## Mobility in the first 6 weeks

During the first 6 weeks we recommend that you are mollycoddled. When you are at home we recommend that you sit upright on a firm chair at a desk or table, reading a book, Kindle, working on a computer, watching TV, listening to the radio for 20 minutes at a time. Then we ask that you walk around for 2 – 5 minutes at a time to regain your posture and stimulate your deep muscles to recruit.

You should avoid more than 25% flexion or extension of the spine, picking up items from the floor, front loader duties, ironing, hovering, lifting as during cooking during this period. You can climb stairs keeping an upright posture.2 – 3 times a day you can take a short "Free Walk" of about 5 - 10 minutes equating to a short walk in the garden or about 300 metres. Please ensure that this is over smooth ground.

## Physiotherapy Exercises

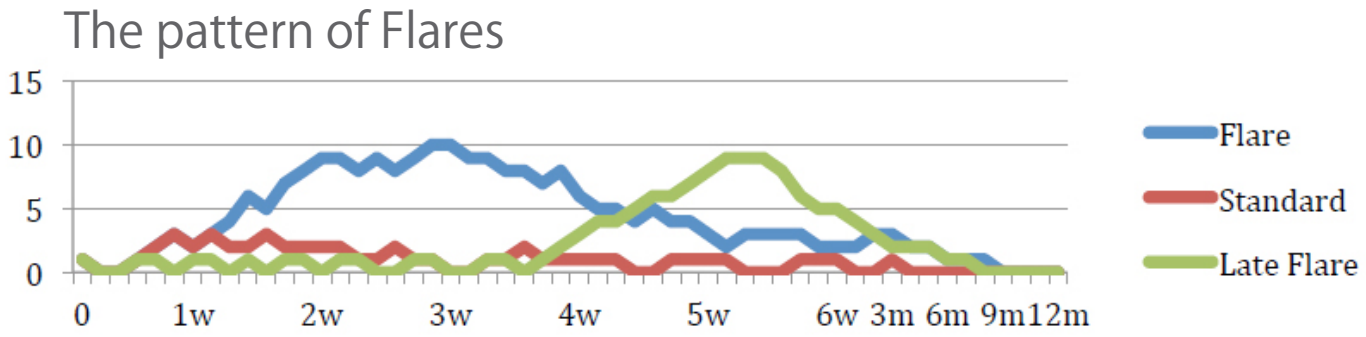
Whilst in hospital you will be shown 3 Muscle Balance Physiotherapy exercises to be increased to 7 exercises after 3 weeks. After your review at 6 weeks from surgery, you will be asked to make an appointment with a specialist group in your area who teach Muscle Balance Physiotherapy (Alexander technique) and Reformer Pilates rehabilitation. This group will work with you over many months to bring out the full benefits from your surgery and reverse some of the degeneration and muscle atrophy (wasting) that has preceded your surgery and takes months to reverse.

You will be given sheets explaining the post-operative exercises. These are also available on the Spinal Foundation website www.spinal-foundation.org

## Driving

During the first 6 weeks following surgery you must avoid driving partly because you may not have sufficient power to control the vehicle and insurance companies will not insure you. Also driving causes repetitive lateral loading and rotation of the lumbar spine which may set back recovery.

# The Post-Operative Flare




For many patients the postoperative course is relatively untroubled by pain and they are able to pursue their rehabilitation exercises and a comfortable recovery. Their pattern is shown in the graph above as "Standard". By contrast 17% suffer a marked, temporary but very painful recurrence of symptoms from their sensitised nerve(s) termed the "Flare". This usually starts from the 5th day following surgery and reaches a plateau at 10 days and begins a roller coater decrescendo 2 – 3 weeks later. The duration can be longer. In some cases the flare seems to begin rather later and this may be related to an activity trigger and this delayed flare is graphed as "Late Flare".

During the flare you should reduce your walks and Muscle Balance Physiotherapy exercises. You should take a siesta in the morning and afternoon on your bed – not the comfortable looking sofa which will lure you into incorrect damaging postures.

# Medication

Following surgery your medication needs to be adjusted to your symptoms. If you do not have a "flare" then follow the medication chart at phase 1 levels with regular Omeprazole and Ibuprofen and Paracetamol for the first 2 weeks and then consider weaning. If you develop increasing symptoms then it is likely that you are developing a flare and should follow the regimen at Phase 2, 3 and then 4 levels as dictated by the severity of the symptoms.

Where this regimen offers insufficient control then additional drugs such as Oxycodon, Amitryptaline and Pregabolin can be prescribed. Where the patient cannot tolerate nonsteroidal anti-inflammatory therapy because of gastric ulceration, asthma or kidney or liver failure then herbal remedies may be explored.

On rare occasions a CT Guided Nerve Root Block(s) may be offered at target levels to quench the symptoms.

## Recommended post-operatrive medication regime

| Drug | Dose | Phase 1 Pre-Flare | Phase 2 Early-Flare | Phase 3 Peak-Flare | Phase 4 Improving |
|---|---|---|---|---|---|
| Ibuprofen | 400mg | 2/day | 4/day | | 4/day |
| Naproxen | 500mg | | | 2/day | |
| Omeprazole | 20mg | 1/day | 1/day | 1/day | 1/day |
| Paracetamol | 500mg | 1-2 PRN | 6-8/day | 8/day | 1-2 PRN |
| Codeine | 30/60mg | 30/60mg PRN | 30/60mg PRN | *30/60mg PRN | Reduce |
| Lactulose | 15ml | 2/day | 2/day | 2/day | 2/day |
| Additional Therapies to be prescribed after consultation | | | | | |
| Amitryptaline | 5mg | At Night | At Night | At Night | Reduce |
| Nefopam | 30mg | | | 1-6/day | |
| Pregabalin | 150mg | | | 2-3/day | 2/day |
| Herbal Therapies | | | | | |
| Serrapeptase | Follow the maker's instructions. Alternative to Ibuprofen / Naproxen | | | | |
| Turmeric | Follow the maker's instructions. Alternative to Ibuprofen / Nefopam | | | | |
| Arnica | Follow the maker's instructions. Treatment for bruising. | | | | |

(PRN = "as required" up to 6 hourly)
*Nefopam is a powerful drug and may make you drowsy so reduce the use of Codeine when taking Nefopam
Your medication will be adjusted upon email demand and at your follow-up consultation.

# Long-Term Objectives & Tasks

The flare graph shows the longer-term pattern of rehabilitation. The predominant presenting symptoms represent the final stage in a degenerative process that may have taken many years to develop, so rehabilitation must be expected to take a long time to complete. So you may notice further step-changes of improvement at about 6 months, 9 -12 months after your surgery. So you need to keep up with your exercises for life.

# Follow – up Arrangements

You will be reviewed at 6 weeks following surgery and the planning of your Muscle Balance Physiotherapy and Reformer Pilates rehabilitation and further monitoring will be agreed.