

# Percutaneous intradiscal laser ablation in the lumbar spine

Interventional procedures guidance

Published: 22 September 2010

[www.nice.org.uk/guidance/ipg357](http://www.nice.org.uk/guidance/ipg357)

This guidance replaces IPG27.

## 1 Guidance

This guidance replaces previous guidance on laser lumbar discectomy (interventional procedure guidance 27).

- 1.1 Current evidence on the safety and efficacy of percutaneous intradiscal laser ablation in the lumbar spine is adequate to support the use of this procedure provided that normal arrangements are in place for clinical governance, consent and audit.
- 1.2 Patients selected for the procedure should be limited to those with severe pain refractory to conservative treatment, in whom imaging studies show bulging of an intact disc, and who do not have neurological deficit requiring surgical decompression.

## 2 The procedure

### 2.1 Indications and current treatments

- 2.1.1 Symptomatic herniation (prolapse) of a lumbar intravertebral disc is a common cause of chronic low back pain and sciatica. Disc herniation is a result of the protrusion of the nucleus pulposus through a tear in the annulus fibrosus. The annulus fibrosus may rupture completely, resulting in an extruded disc, or it may remain intact but stretched, resulting in a contained (bulging) disc prolapse. Protruding discs may compress one or more nerve roots, resulting in pain and numbness in the leg.
- 2.1.2 Conservative treatment options include rest, analgesic or anti-inflammatory medication, epidural injection and physical therapies. Current surgical treatment options include microdiscectomy, percutaneous intradiscal electrothermal therapy, percutaneous intradiscal radiofrequency thermocoagulation and percutaneous disc decompression using coblation. Surgical decompression is considered when there is nerve compression causing weakness or persistent symptoms that are unresponsive to conservative treatment.

### 2.2 Outline of the procedure

- 2.2.1 The aim of percutaneous intradiscal laser ablation (also commonly referred to in the literature as percutaneous laser disc decompression) is to vaporise part of a prolapsed disc. It can only be carried out if the prolapse is contained (that is, the disc is bulging but the nucleus pulposus has not extruded through the annulus fibrosus).
- 2.2.2 The procedure is usually carried out under local anaesthesia and sedation, with the patient in the prone position. Under fluoroscopic guidance, a spinal needle is inserted through the annulus fibrosus into the nucleus pulposus, and an optical fibre is introduced through the needle. Laser energy is then delivered through the optical fibre to vaporise part of the nucleus pulposus.
- 2.2.3 Several types of laser are available for this procedure.

Sections 2.3 and 2.4 describe efficacy and safety outcomes from the published literature that the Committee considered as part of the evidence about this procedure. For more detailed information on the evidence, see the [overview](#).

## 2.3 Efficacy

- 2.3.1 A non-randomised comparative study of 1000 patients reported 'excellent' or 'good' MacNab criteria scores (pain relieved by 50% or more and improved motor function) in 84% (419/500) of patients treated by the procedure and 86% (428/500) of patients treated by microdiscectomy at mean 2-year follow-up (significance not stated).
- 2.3.2 A non-randomised comparative study of 106 patients reported 'excellent' MacNab criteria scores (pain relieved by 75% or more and no limitation of motor function) in 48% (29/60) of patients treated by the procedure compared with 48% (22/46) of patients treated by automated percutaneous lumbar discectomy (APLD) (follow-up not stated; difference reported as not significant).
- 2.3.3 A case series of 518 patients reported an overall success rate (using MacNab criteria; not otherwise described) of 75% (absolute figures and follow-up not stated).
- 2.3.4 The non-randomised comparative study of 1000 patients reported reoperation for herniation or persistent leg or back pain in 3% (16/500) of patients treated by the procedure and 7% (35/500) of patients treated by microdiscectomy at a mean 2-year follow-up.
- 2.3.5 A case series of 576 patients reported that 61% of patients were satisfied with the overall outcome of the procedure (absolute figures and follow-up not stated).
- 2.3.6 The Specialist Advisers listed key efficacy outcomes as recurrence rate, reoperation rate, leg and back pain score, Oswestry Disability Index score and successful decompression.

## 2.4 Safety

- 2.4.1 Aseptic discitis (post-procedural inflammatory pain) requiring up to 3 days of hospitalisation with steroid treatment was reported in 2 patients treated by the procedure in a non-randomised comparative study of 81 patients. Case series of 576 and 518 patients reported aseptic discitis in 4 and 2 patients respectively. In the second series both patients developed aseptic discitis up to 4 days after the procedure (not otherwise described) and were treated successfully with bed rest and analgesics.
- 2.4.2 Septic discitis 3 days after the procedure (confirmed by magnetic resonance imaging [MRI] and needle puncture culture, which was positive for *Staphylococcus aureus*) was reported in 2 patients in the case series of 518 patients. Both patients were treated with parenteral vancomycin for 6 weeks. Intervertebral disc infection (not otherwise described) was reported in no patients treated by the procedure and 1 patient treated by APLD in the non-randomised comparative study of 106 patients (timing of event not stated).
- 2.4.3 Subchondral vertebral osteonecrosis (confirmed by MRI) was reported in 2% (4/182) of patients in the case series of 182 patients: 1 patient underwent surgical treatment for persistent severe back pain, which resolved 1 year after the initial procedure, and 3 patients had conservative management of their pain which had diminished at 2-year follow-up after the initial procedure.
- 2.4.4 A case series of 10 patients who required salvage operations after the procedure to address herniated discs reported that all patients showed evidence of heat-induced cell necrosis and carbonisation, with herniating masses completely compressing and adhering to nerve roots.
- 2.4.5 The Specialist Advisers stated that bowel perforation was described in the literature. They considered theoretical adverse events to include dural tear, heat damage due to incorrect placement of the probe, recurrent protrusion of disc, nerve damage, infection, vertebral body collapse, loss of disc height and perineural scarring.

## 3 Further information

3.1 For related NICE guidance see our [website](#).

## Information for patients

NICE has produced [information on this procedure for patients and carers](#) ('Understanding NICE guidance'). It explains the nature of the procedure and the guidance issued by NICE, and has been written with patient consent in mind.

## 4 About this guidance

NICE interventional procedure guidance makes recommendations on the safety and efficacy of the procedure. It does not cover whether or not the NHS should fund a procedure. Funding decisions are taken by local NHS bodies after considering the clinical effectiveness of the procedure and whether it represents value for money for the NHS. It is for healthcare professionals and people using the NHS in England, Wales, Scotland and Northern Ireland, and is endorsed by Healthcare Improvement Scotland for implementation by NHSScotland.

This guidance was developed using the NICE [interventional procedure guidance](#) process.

It updates and replaces NICE interventional procedure guidance 27.

We have produced a [summary of this guidance for patients and carers](#). Information about the evidence it is based on is also [available](#).

### Changes since publication

3 January 2012: minor maintenance.

### Your responsibility

This guidance represents the views of NICE and was arrived at after careful consideration of the available evidence. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. This guidance does not, however, override the individual responsibility of healthcare professionals to make appropriate

decisions in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way which would be inconsistent with compliance with those duties.

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## Contact NICE

National Institute for Health and Clinical Excellence  
Level 1A, City Tower, Piccadilly Plaza, Manchester M1 4BT

[www.nice.org.uk](http://www.nice.org.uk)  
[nice@nice.org.uk](mailto:nice@nice.org.uk)  
0845 033 7780

# Endorsing organisation

This guidance has been endorsed by [Healthcare Improvement Scotland](#).

## Accreditation

