



**ORTHOPEDICS &
NEUROSURGERY**

PAIN MANAGEMENT

Innovative Percutaneous Laser Procedures
for Spine & Joint Pain

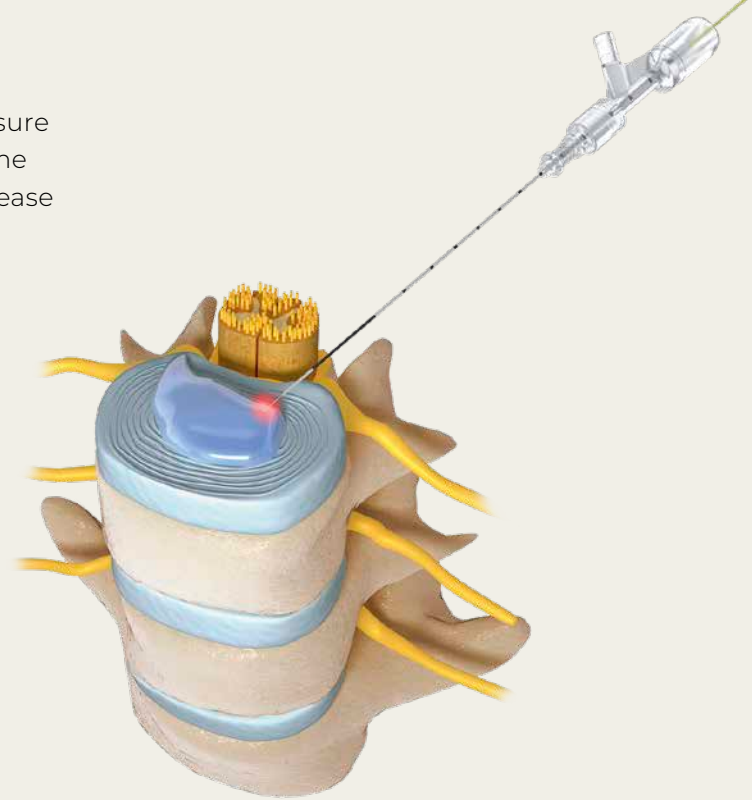


Technology
meets Anatomy

LEONARDO® in PLDD

During treatment with LEONARDO®, a small volume within the closed hydraulic space of the nucleus pulposus is vaporized, reducing the intra-discal pressure (a thermal “shrinking effect”). This reduction in volume and pressure of the pathological disc leads to a decrease in disc herniation and thereby relieves nerve root compression. Additionally, it results in denervation of pain receptors (nociceptive nerves) that grow from the dorsal ligament into the annulus fibrosus. Painful facet joints can also be treated in the same session for enhanced relief through combination therapy.

The therapeutic effect of intra-discal laser therapy is based on these specific characteristics. Thanks to a standardized treatment protocol and controlled heating, the surgeon achieves a defined shrinkage of the disc. As disc fluid is vaporized, intra-discal pressure decreases. The laser energy used in this minimally invasive procedure strengthens the disc by inducing laser-stimulated collagen remodeling and scarring. Moreover, neo-vascularization in inflamed discs can be eliminated by denervating the pain receptors inside the annulus fibrosus.



LEONARDO® in Joint Denervation

Denervation of facet joints, sacroiliac joints, and knee joints using diode fiber laser technology offers a minimally invasive approach to managing acute and chronic pain. This technique uses concentrated light beams to precisely target and ablate nerve tissues responsible for transmitting pain signals.



Facet Joint



SI Joint



Knee Joint

Developed for long-term pain relief

Our orthopedic fibers are designed based on over 30 years of experience in a wide range of medical laser applications. They allow highly precise and focused ablation, enabling treatment of even challenging anatomical areas. Targeting additional nerve structures can result in more effective and longer-lasting pain relief.



Osteoarthritic
Knee Pain



Anterior Post Surgical
Knee Pain



- Typical ablation targets
- Potential laser targets



Procedural Advantages

1. Minimally Invasive: Laser denervation is performed percutaneously, resulting in smaller incisions, reduced tissue trauma, and faster recovery compared to open surgery.

2. Low Complications: The minimally invasive nature of laser denervation reduces infection risk and postoperative pain.

3. Outpatient Procedure: Laser treatments can be performed on an outpatient basis, allowing same-day discharge and rapid return to daily activities.

4. Cost Efficient: Percutaneous laser denervation is quick and does not require costly CT or endoscopy equipment. It can be performed as a day-case procedure without the need for full OR infrastructure.

5. Versatility: The laser can be used across various anatomical regions and medical specialties, providing fast ROI.

6. Large Patient Population: Laser ablation has no restriction in patients with pacemakers or other active implants.

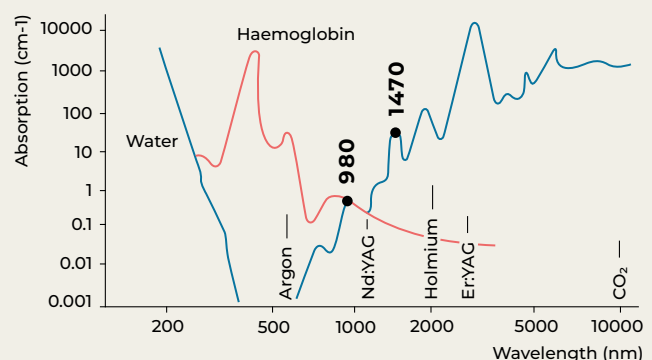
Better
absorption
with
1470 nm

Tissue interaction with LEONARDO[®] DUAL

The LEONARDO[®] DUAL platform utilizes the combined absorption characteristics of the 980 nm and 1470 nm wavelengths. This dual-wavelength system provides excellent interaction with water and hemoglobin, ensuring moderate penetration depth into disc tissue. It allows procedures to be performed safely and accurately, even near delicate anatomical structures.

Microsurgical precision is guaranteed by specially designed PLDD laser fibers, ensuring surgical effectiveness, ease of handling, and maximum safety. The use of flexible, tactile laser fibers (core diameter: 360 μ m) combined with microsurgical PLDD techniques allows for accurate and controlled interventions in

sensitive areas such as the cervical and lumbar disc zones. PLDD treatments are typically applied after unsuccessful conservative therapies, under fluoroscopic, ultrasound, or CT guidance.



1470 nm wavelength has a 40 times higher absorption in water compared to 980 nm.

LEONARDO® DUAL 45

LEONARDO® Mini 1470



Technical Specifications

Leonardo® Dual 45

INVISIBLE LASER RADIATION
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR INDIRECT RADIATION

CLASS 4 LASER PRODUCT
Diode-Laser 980 nm +/- 30 nm CW 35 W (Max.)
Diode-Laser 1470 nm +/- 30 nm CW 15 W (Max.)
IEC 60825-1:2008 EN60601-2-22:2007

VISIBLE LASER RADIATION
AVOID EYE EXPOSURE TO DIRECT RADIATION

CLASS 3R LASER PRODUCT
Diode-Laser 635 nm +/- 10 nm CW 4 mW (Max.) (Aiming)
Diode-Laser 532 nm +/- 10 nm CW 1 mW (Max.) (Aiming)
IEC 60825-1:2008 EN60601-2-22:2007


CeramOptec GmbH
Siemensstr. 44, D-53121 Bonn

Model	LEONARDO® Mini 1470 Set	LEONARDO® DUAL 45 Set
REF	SL1470nm12W	SL980+1470nm45W
Wavelength	1470 nm	980 nm and 1470 nm
Max. power	12 W (1470 nm)	max. 45 Watt (1470 nm/15 Watt + 980 nm/30 Watt) separately adjustable
Fiber diameter	≥ 360 µm	≥ 360 µm
Aiming beam	635 nm, max. 4 mW	532 nm and 635 nm, green 1 mW, red 4 mW, user controlled intensity
Treatment mode	CW, Pulse Mode (optional), ELVeS® Signal	CW, Pulse Mode, ELVeS® Signal, ELVeS® Segment, Derma Mode
Pulse duration /-break	0.01 – 180 sec./0.01 – 180 sec.	0.01 – 60 sec/0.01 – 60 sec
Power supply	110 to 240 VAC, 50 to 60 Hz (7.2 VDC @ 36 W)	110 to 240 VAC, 50/60 Hz, 450 VA
Batteries	Li-ion batteries	–
Dimensions (H×W×D)	6 cm × 9 cm × 21.5 cm	approx. 28 cm × 37 cm × 9 cm
Weight	900 g	approx. 8.5 kg

All laser sets include 3 safety goggles, foot switch, interlock connector, power cord and manual in a carrying case.

Fibers

REF	Product
502200810	Ceralas® Orthopedic Fiber 360/35, ID, 150 mm
502200815	Ceralas® Orthopedic Fiber 360/35, ID, 200 mm
503200810	Orthopedic Fiber 360/35, IC, 150 mm
503200815	Orthopedic Fiber 360/35, IC, 200 mm
AB1635	Fine needle for Pain Therapy - 18 G/150 mm
AB1633	Fine needle for Pain Therapy - 21 G/150 mm
AB1636	Fine needle for Pain Therapy - 18 G/200 mm
501200820	Endoscopic NEUROTOMY Probe
503200820	Endoscopic NEUROTOMY Probe, IC

Note: Orthopedic Kits have been created as a combination of single products. They should provide users an easy way to acquire all the relevant devices and accessories to perform the treatment. All information regarding Orthopedics Kits references (unit of use and unit of sales) are described in the appendix - provided separately.

CONTACT US

To Learn More About a Whole New World of Minimally Invasive Laser Therapies

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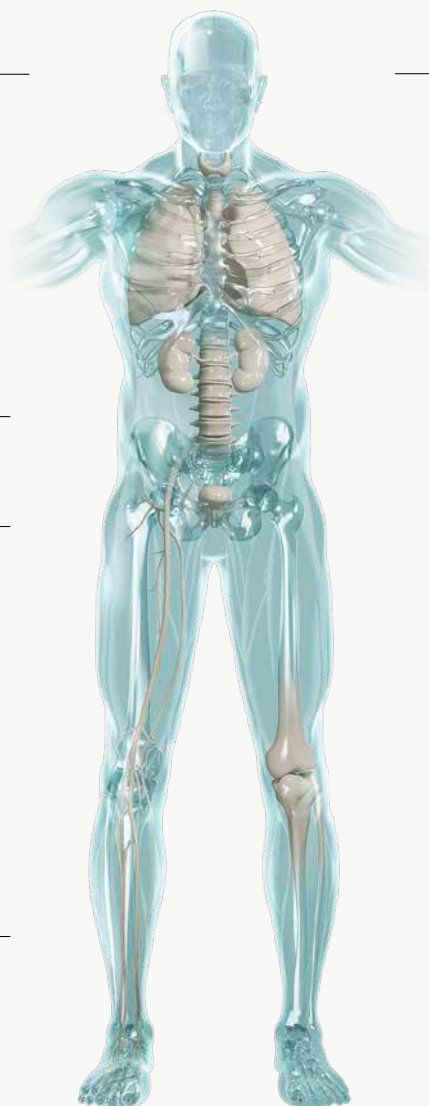
Thoracic Surgery

Aesthetics

Urology

Proctology

Phlebology



Aesthetics

Thyroid Treatment

Orthopaedics & Pain Management

Gynaecology

Orthopaedics & Pain Management



biolitec GmbH
Untere Viaduktgasse 6/9
A-1030 Wien
info@biolitec.com

Legal Manufacturer
CeramOptec GmbH
Siemensstr. 44
53121 Bonn

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