



**ORTHOPEDICS &  
NEUROSURGERY**

# PAIN MANAGEMENT

Innovative Percutaneous Laser Procedures  
For Spine & Joint Pain

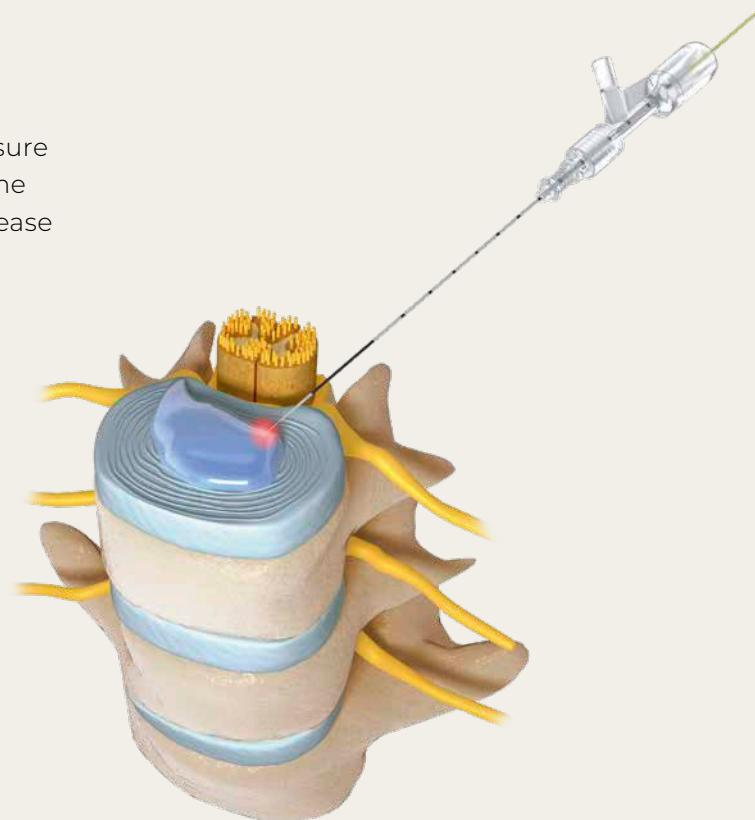


Technology  
meets Anatomy

# 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.

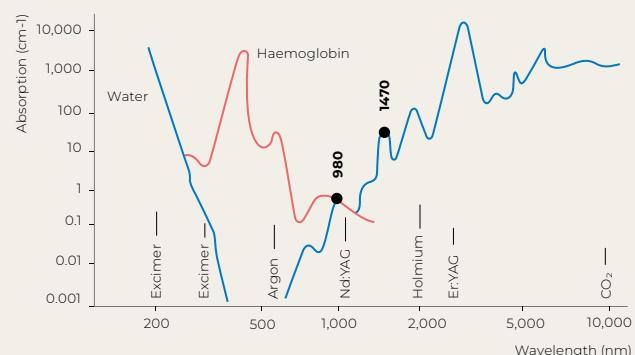
**Better absorption with 1470 nm**

## 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  $\mu\text{m}$ ) 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 NM



### Technical Specifications

Leonardo® Dual 45	
<small>INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR REFLECTED RADIATION</small>	
<b>CLASS 4 LASER PRODUCT</b> Diode-Laser 1470 nm CW 15 W (Max.) Diode-Laser 1470 nm CW 30 nm CW 15 W (Max.) Diode-Laser 532 nm CW 1 mW (Max.) (Aiming) Diode-Laser 532 nm CW 10 nm CW 1 mW (Max.) (Aiming) IEC 60825-1:2008 EN60601-2-22:2007	
<small>VISIBLE LASER RADIATION AVOID EYE EXPOSURE TO DIRECT RADIATION</small>	
<b>CLASS 3R LASER PRODUCT</b> Diode-Laser 532 nm CW 1 mW (Max.) (Aiming) Diode-Laser 532 nm CW 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 NM	LEONARDO® DUAL 45
<b>REF</b>	SL1470nm8W	SL980+1470nm45W
<b>Wavelength</b>	1470 nm	980 nm and 1470 nm
<b>Max. power</b>	12 W (1470 nm)	max. 45 Watt (1470 nm/15 Watt + 980 nm/30 Watt) separately adjustable
<b>Fiber diameter</b>	≥ 360 µm	≥ 360 µm
<b>Aiming beam</b>	635 nm, max. 4 mW	532 nm and 635 nm, green 1 mW, red 4 mW, user controlled intensity
<b>Treatment mode</b>	CW, Pulse Mode (optional), ELVeS® Signal, ELVeS® Segment, Derma Mode	CW, Pulse Mode, ELVeS® Signal, ELVeS® Segment, Derma Mode
<b>Pulse duration /-break</b>	0.01–60 sec./0.01–60 sec.	0.01–60 sec./0.01–60 sec
<b>Power supply</b>	110 - 240 VAC, 50 - 60 Hz (7.2 VDC @ 36 W)	110 – 240 VAC, 50 / 60 Hz, 450 VA
<b>Batteries</b>	Li-ion batteries	–
<b>Dimensions (H×W×D)</b>	6 cm × 9 cm × 21.5 cm	approx. 28 cm × 37 cm × 9 cm
<b>Weight</b>	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.

### Kits and 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
502200830	PLDD Kit 360/18/150 biolitec®, Y-Click Adapter, ID
502200835	PLDD Kit 360/21/150 biolitec®, Y-Click Adapter, ID
502200840	PLDD Kit 360/18/200 biolitec®, Y-Click Adapter, ID
503200830	PLDD Kit 360/18/150 Y-Click Adapter, IC
503200835	PLDD Kit 360/21/150 Y-Click Adapter, IC
503200840	PLDD Kit 360/18/200 Y-Click Adapter, IC
501200820	Endoscopic NEUROTOMY Probe
503200820	Endoscopic NEUROTOMY Probe, IC

## CONTACT US

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