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Treatment of herniated  
lumbar disk with  
PLDD procedure

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# Percutaneous Laser Disc Decompression (PLDD)

Percutaneous Laser Disc Decompression (PLDD) is a widely used mini-invasive technique



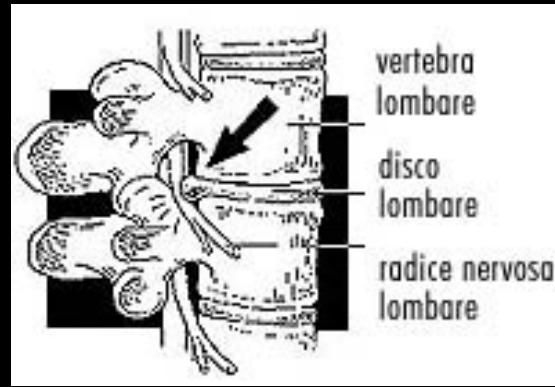
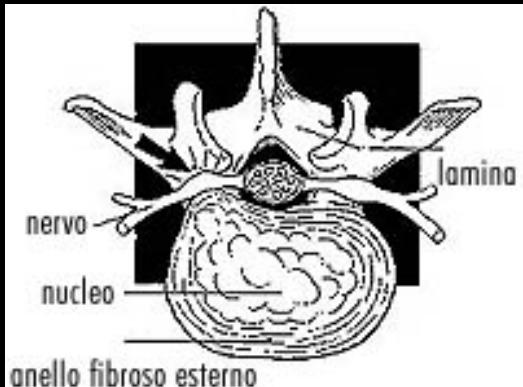
MINI - INVASIVE

# Percutaneous Laser Disc Decompression (PLDD)

- «Pldd» (Percutaneous Laser Disc Decompression) has been developed Daniel S. J. Choy, chief of «Laser Spine Center» at Columbia University in New York, who did the first procedure in february 1986.
- In 1991 «Fda» approved and certified the procedure.
- In 2002 first procedure in our center in Italy.

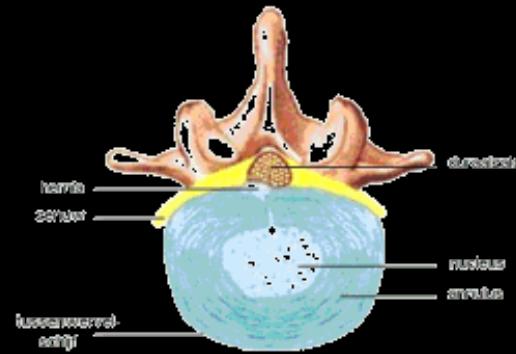


# Percutaneous Laser Disc Decompression (PLDD)



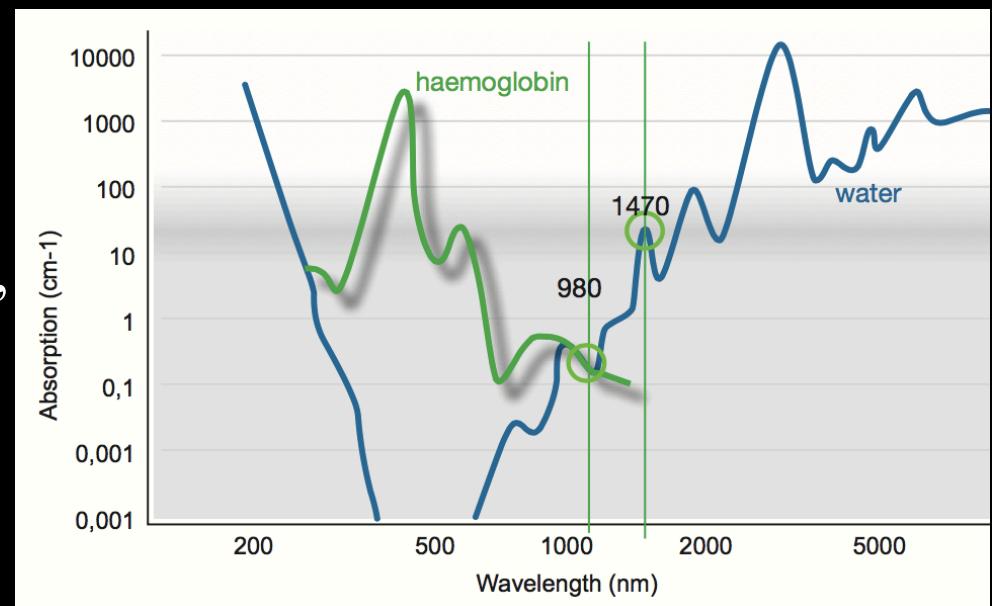
- With a very thin optical fibre, in local anesthesia, is possible to obtain a vaporization of a part of nucleus pulposus with nerve root decompression.
- The aim of this procedure is not the Herniotomy but reduction of nerve root compression
- Advantages: Minimal discomfort for the patient, there are not surgical wounds, Day Surgery procedure, fast recovery.

# PLDD

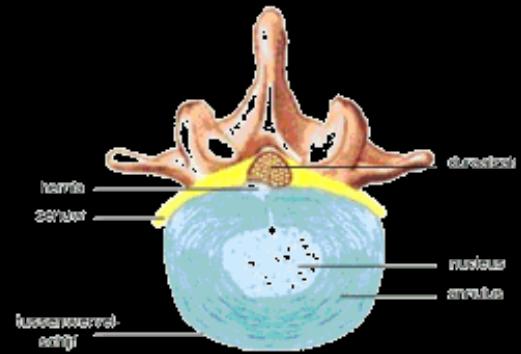


## Tissue interaction

laser platform previously utilized was based on the absorption characteristics of wavelength at start 980 nm which, thanks to its interaction with H<sub>2</sub>O and hemoglobin, allows to perform secure and precise procedures especially near delicate anatomic structures like nervous structures.



# PLDD

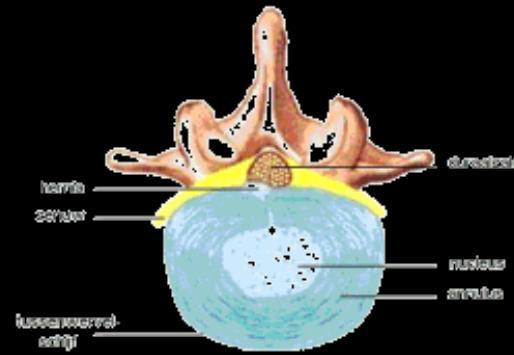


## Tissue interaction

Nowadays we utilize 1470 nm laser platform (Neo V)



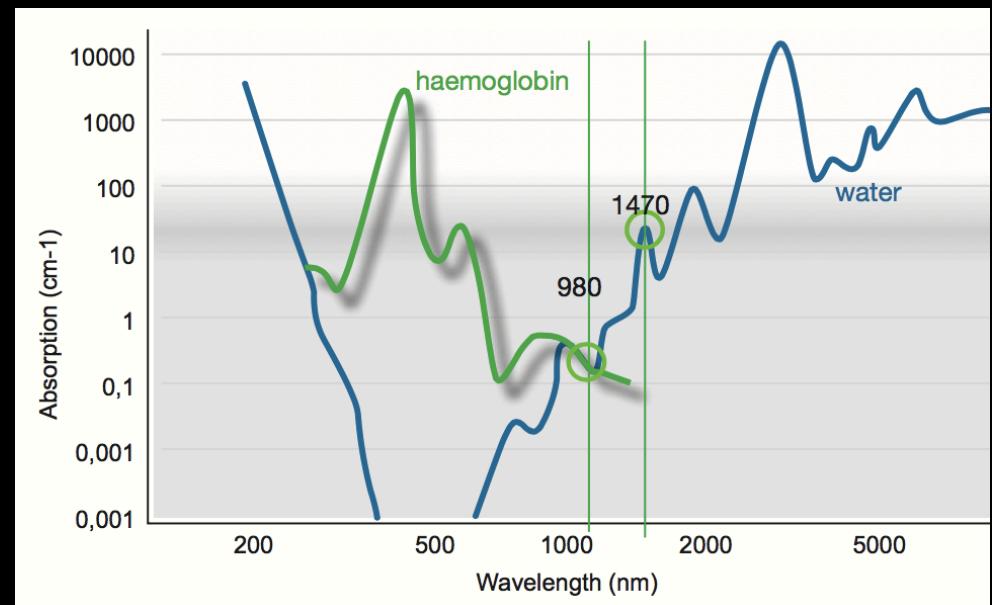
# PLDD



## Tissue interaction

The 980 nm wavelength offers equal absorption by blood and water, enabling efficient tissue ablation and coagulation.

The 1470 nm, with higher water absorption, enables precision ablation and highly localized heating, being advantageous around critical structures.





# Percutaneous Laser Disc Decompression (PLDD)

The technique begins inserting with percutaneous approach a needle with a small diameter (18, 20, 21 G) within the nucleus pulposus of intervertebral herniated disc.

Once reached, always under constant fluoroscopic control, a thin optical fiber laser ( $400\mu$ ) is inserted inside the guide needle and transmits a given amount of energy to the diseased disc (from 250 to 1800 Joules).

The whole procedure is performed with a mild local anesthesia. The treatment can last from 10 to 30 minutes.

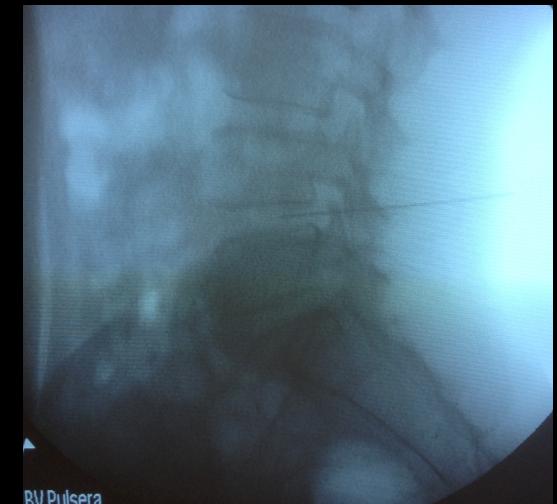
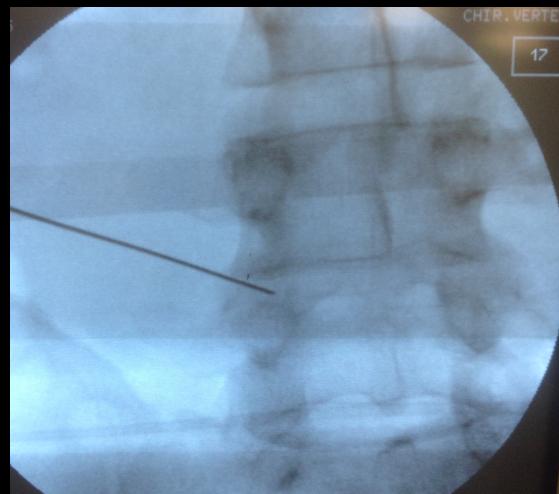
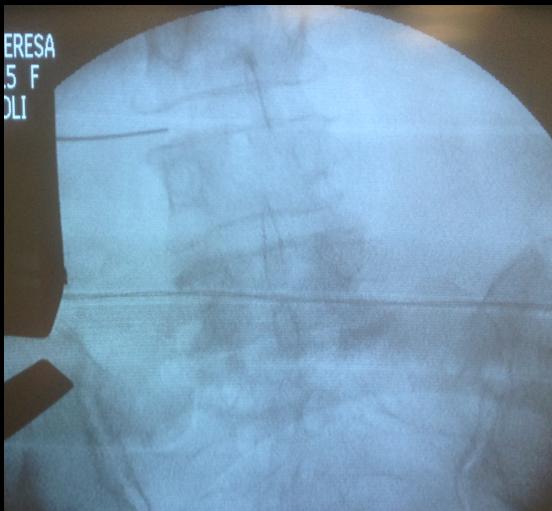
# SURGICAL TECHNIQUE:

**PLDD** procedure has innovative features



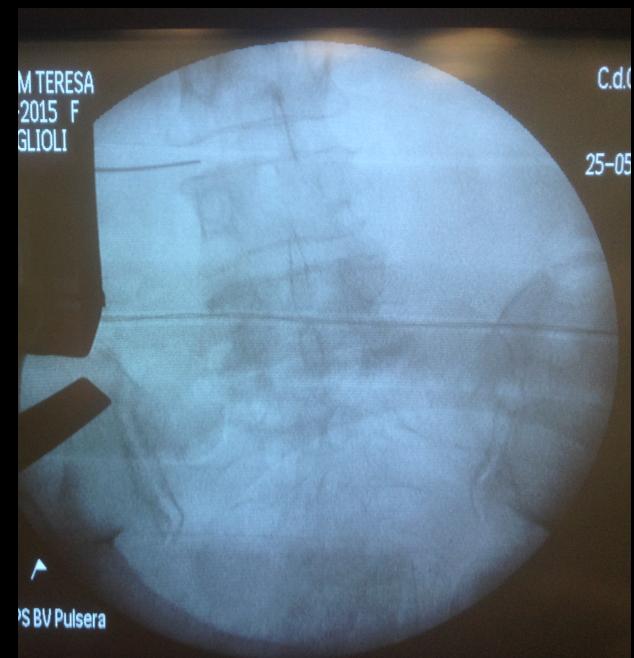
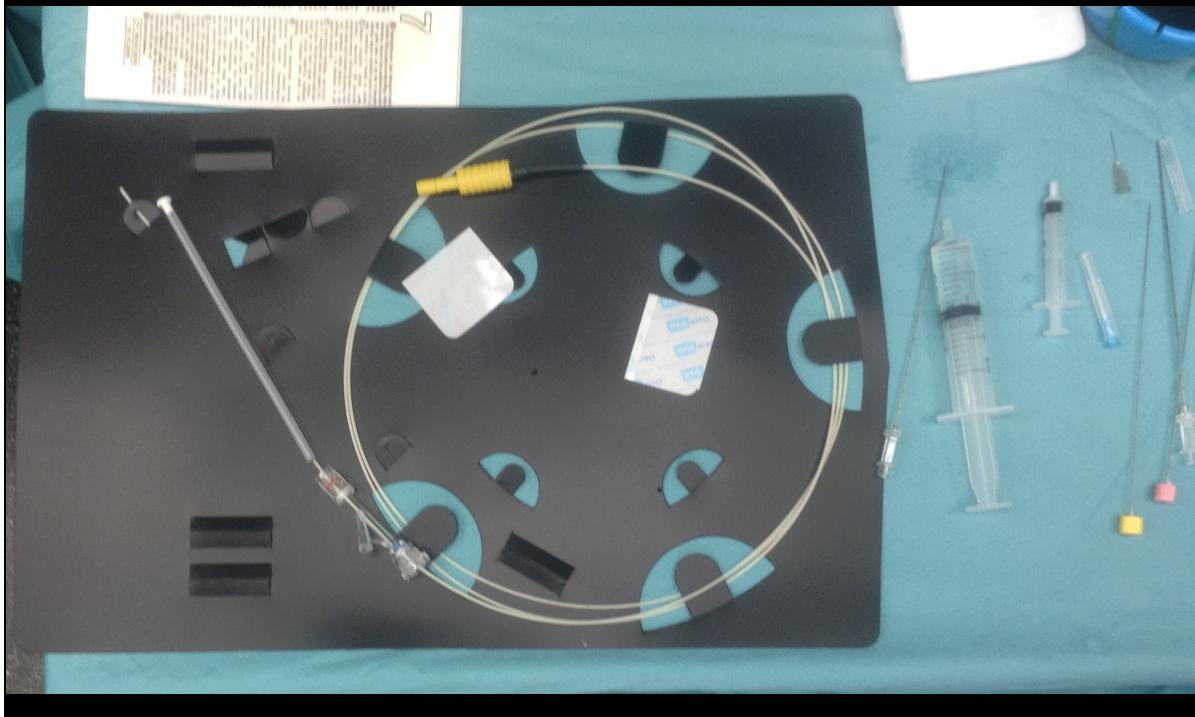
the particular and effective absorption of the wavelength (1470 nm)

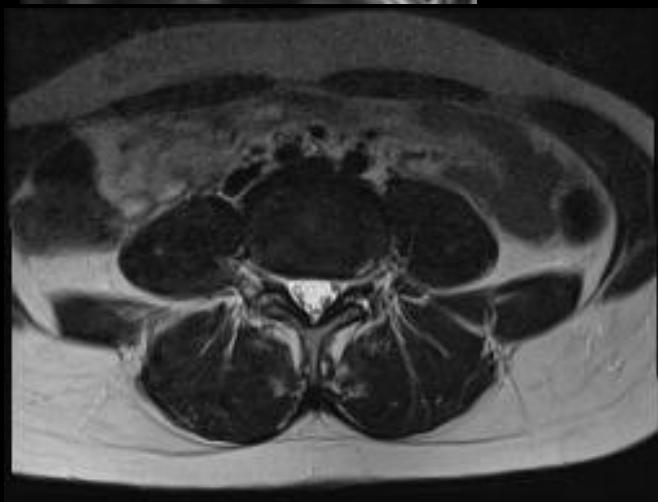
the use of special and dedicated PLDD Kit containing the special optical fiber of 400 microns in order to perform a microinvasive access (percutaneous needle 18-20 G) to disc area.





# PLDD





# PLDD

key issue is patient selection

## Inclusion criteria:

- Symptomatic herniated disc (onset at least six weeks and resistant to drugs, FKT and other conservative treatment);

- Foraminal herniated disc

- Possibility of recurrent herniated disc treatment

in accord to ISLASS, International Society Of Laser Assisted In Spinal Surgery.

# Percutaneous Laser Disc Decompression (PLDD)

## Exclusion criteria

- Free discal fregments
- Failed Back Sindrome
- Spinal stenosis with ligamentum flavum hypertrophy
- Spondylosis with osteophytes
- Moderate or severe Spondylolishtesis
- Posterior longitudinal ligament ossification
- Infections or coagulopathy



Migrated herniated disc = herniotomy by miniopen surgical technique



Contraindicated the treatment of discs with high degree of dehydration (Pfirmann IV-V)

Danger to reach high temperatures (above 100 degrees celsius) with the risk of combustion.

# **Percutaneous Laser Disc Decompression**

## **(PLDD): *literature***

- 85 % of patients have a resolution of symptoms lombalgia and / or sciatica.
- In 70 % of cases it occurs in the first 2/3 weeks, the remaining 30% it takes 3 to 10 weeks.
- In the first 5 years after treatment in 3.2 % of cases relapse may occur (often in these cases, you can repeat the treatment) .

## PLDD : complications

- Complications rates variate from 0.4 to 1 %;
- The most feared complication is represented by DISCITIS (septic, aseptic)
- Other complications reported are rarely intestinal perforation, cauda equina syndrome, lesion of a nerve root (consequent outcomes depend on the function performed by the nerve root involved).

## **PLDD: “standard Post Op”**

- In the first 4-5 PO days, in 10 % of cases there is the presence of more or less marked lumbar tenderness (entry point of the fiber laser) which can be eased with the use of local application of ice.
- Hospitalization 12 h (maximum 24 hours).
- Walking free, part-time use of lumbar corset in the first 10 days
- Resumption of work after 15 days (except heavy works)

## In Our Experience:

more of 650 cases  
between 2004 and 2014

*Currently in our center we perform about 100 cases/year*



# Results

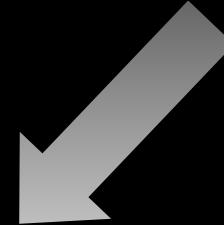
clinical symptoms evaluation  
( VAS, Oswestry):

Recovery of symptoms in about 60 days with immediate responses to treatment already in the early hours in over 80 % of cases.

In 6 % of patients was necessary reoperation with Mini-open herniotomy.

In 14 % of patients moderate improvements of symptoms

**Our results:**



**satisfied patients = 90%**

**Complications:**

9 cases of transient meningism

1 case septic discitis (recovered with antibiotic therapy)

1 case septic spondylitis (recovered with antibiotic therapy)

No major complications

# ***CONCLUSIONS I***

- *KEY ISSUE IS PATIENT SELECTION*
- “Micro-invasive” procedure with excellent tissue interaction
- Aesthetic advantage: No incision, no scar
- Local anesthesia + sedation ( no general A. )
- Day Surgery
- Excellent patient compliance: minimum discomfort/pain intra- and postoperative
- Fast recovery (gradual resumption of work after 15-20 days)



# ***CONCLUSIONS II***



- Encouraging results ( > 90% of patients avoid short-medium term Open Surgery)
- Costs from 50 to 70 % lower than traditional surgery
- Alternative choice in complicated situations (....old patient and/or inoperable, recurrent hernia, adjacent segment disease)
- Probably indications can enlarge more like treatment of symptomatic disc bulging, excluded from surgery “OPEN ”

# ***CONCLUSIONS III***



- Absence of major complications in experienced hands
- "Substantial" preservation of spine structures
- No periradicular fibrotic adhesions that could complicate traditional herniotomy
- No pain, sometimes chronic, due to muscle damage after surgery
- No instability after surgery (sometimes it remaining in post herniotomy)
- It does not preclude further standard surgery .....



LESS IS BETTER  
BUT  
LESS IS MORE

THANKS