RIWOSPINE
A Richard Wolf Company

USA

Interventional percutaneous 4 MHz radiofrequency nucleoplasty of the vertebral disk

Pathologies and therapeutic target

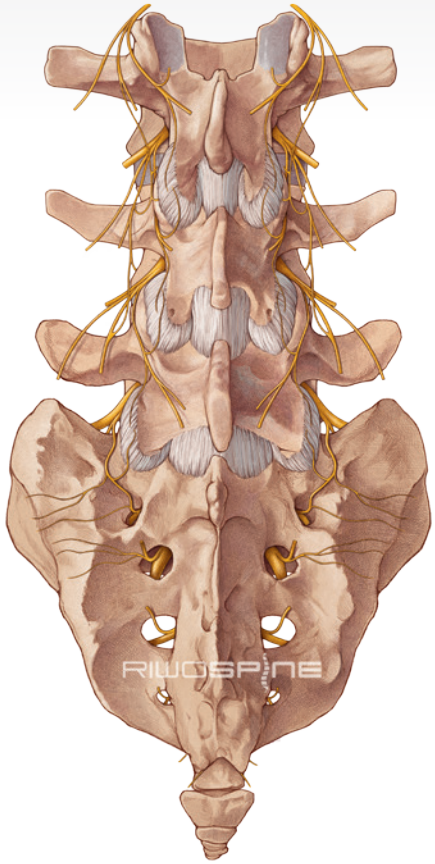
Diskogenic pain syndrome

Diskogenic pain syndrome is one of the degenerative diseases (wear-related) of the spine. The cause of diskogenic pain syndrome is degenerative wear of the vertebral disk, starting with a loss of fluid in the inner core of the vertebral disk (nucleus polposus). Since the vertebral disks then lose resilience and elasticity, this can lead to segmental instability. Hyper mobility in the affected segment, sheering loads and restrictions of the mechanical properties of the vertebral disk cause inflammatory reactions as a result of this.

Sensitization of the region can result in a reduction of the stimulus threshold and lead to chronic diskogenic pain. The vertebral disk is regarded as the trigger for pain, even if there is no disk herniation.

Furthermore, protrusions of the vertebral disk can press on the spinal and extra-spinal nerve structures and generate radicular pain as a result.

Percutaneous nucleoplasty uses 4 MHz radiofrequency current to selectively reinforce the vertebral disk tissue (volume reduction) and to destroy the small nerve fibers at the fiber ring of the vertebral disk using ablation. The spinal nerves are indirectly decompressed and the destruction of the nerve fibers prevents conduction of pain information to the brain.



Multifunctional and endoscopically assisted

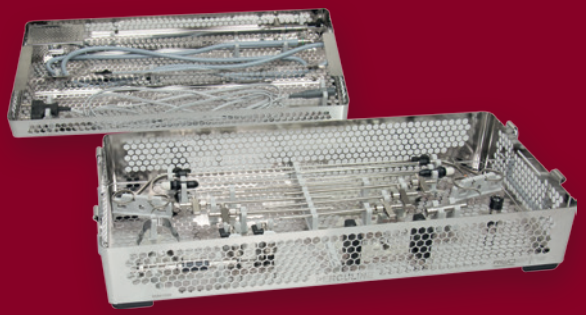
Additional instruments such as biopsy and grasping forceps can be inserted in the working sleeves as necessary. This enables additional decompression of neural structures by means of larger volume reduction of the vertebral disk.

Using a mini-endoscope permits direct visualization of the interior of the vertebral disk and visual control and documentation of the therapy.

PERCULINE nucleo

REUSABLE instrument set for percutaneous nucleoplasty using 4 MHz radiofrequency energy.

ECONOMICAL pain intervention solution providing decompression and denervation at the lumbar spine.



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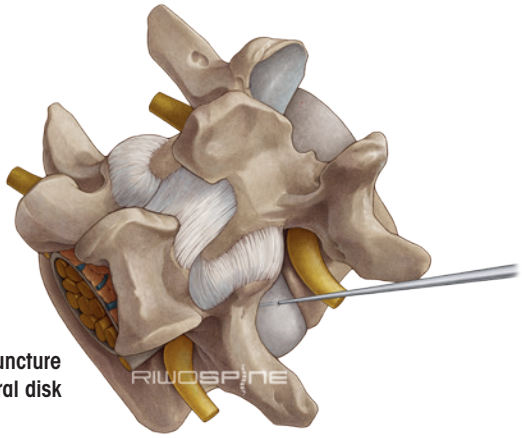
Interventional approach for 4 MHz radiofrequency nucleoplasty of the vertebral disk

Patient positioning, setup and anesthesia

The patient is in the prone position with slightly bent knees. The operating area and the C-arm are covered with sterile drapes. The intervention is generally carried out under local anesthetic.

Positioning the cannula and guide wire

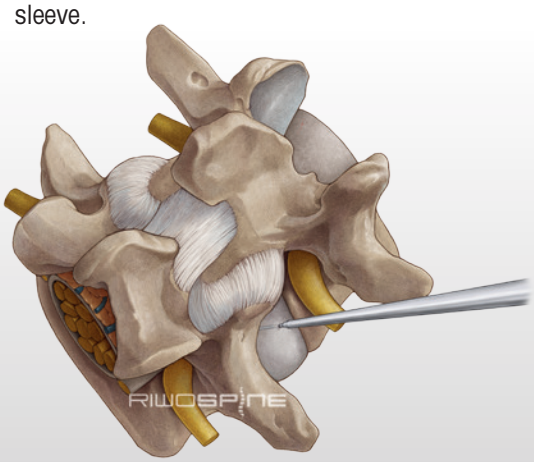
Marking the entry point of the cannula on the skin surface under AP and lateral X-ray control for a posterolateral access port. Application of local anesthetic and placement of the puncture cannula under X-ray control in the vertebral disk. Replacement of the puncture cannula with a guide wire.



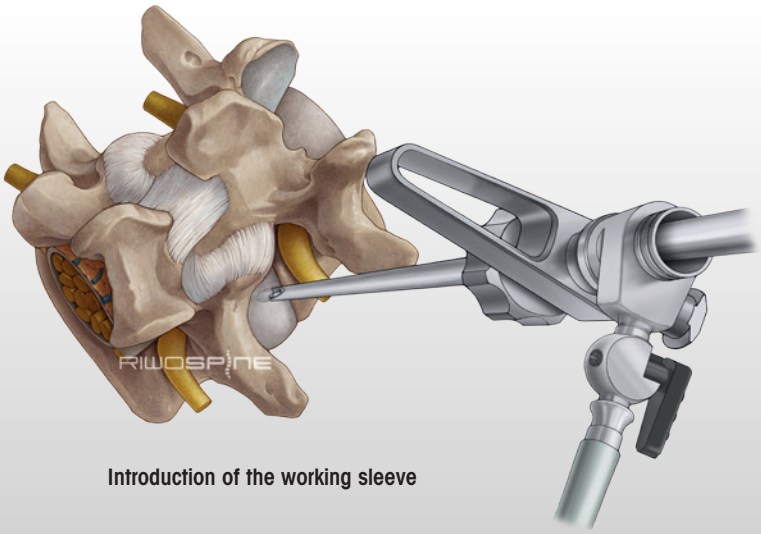
Posterolateral access of the puncture cannula to the vertebral disk

Introduction of the dilator and working sleeve

Introduction of the dilator using the guide wire under X-ray control. Introduction of the working sleeve using the dilator and moving the working sleeve further forward through the fiber ring of the vertebral disk by knocking slightly with a hammer until the inner core has been reached. This is also carried out alternately under AP and lateral X-ray control. Connection of the irrigation fluid to the working sleeve.



Dilation of the access port



Introduction of the working sleeve

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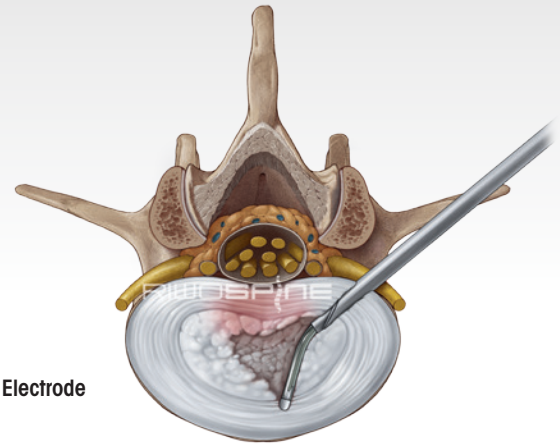
Interventional approach for 4 MHz radiofrequency nucleoplasty of the vertebral disk

Radiofrequency application TipControl RF Electrode

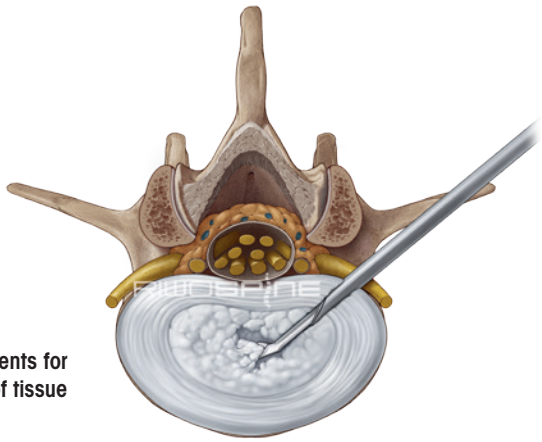
Introduction of the TipControl RF Electrode into the cavity created and activation of the RF application (Excise and Precise Mode) with the foot switch for tissue shrinking of the inner core of the vertebral disk and as necessary for coagulation of the inner fiber-ring parts of the vertebral disk for electrothermal denervation.



Application of the TIPControl RF Electrode

Introduction of the biopsy or grasping forceps for manual removal of tissue

Introduction of biopsy or grasping forceps through the working sleeve into the inner core of the vertebral disk and volume reduction by removing tissue from the vertebral disk under X-ray control.



Introduction of manual instruments for removal of tissue

Introduction of the mini-endoscope through the working sleeve into the vertebral disk and monitoring and documentation of the therapy

The endoscope connected to an endoscopic camera and light source can be introduced through the working sleeve into the vertebral disk for visualization of the vertebral disk.

Innovative principles for effective nucleoplasty

- Multi-functional options:
  - Spinal Decompression
  - Disc volume reduction
    - by manual mechanical resection
    - by RF application
  - Denervation of the annulus structures
- Endoscopic visualization for verification and documentation
- Continuous irrigation flow for precise coagulation and cooling of the surrounding tissue
- Re-usable instrument set

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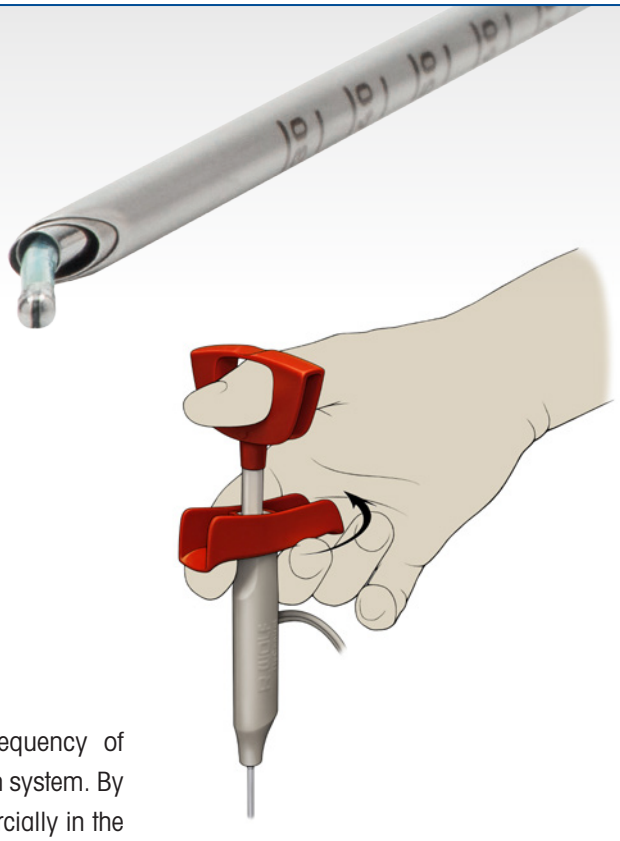
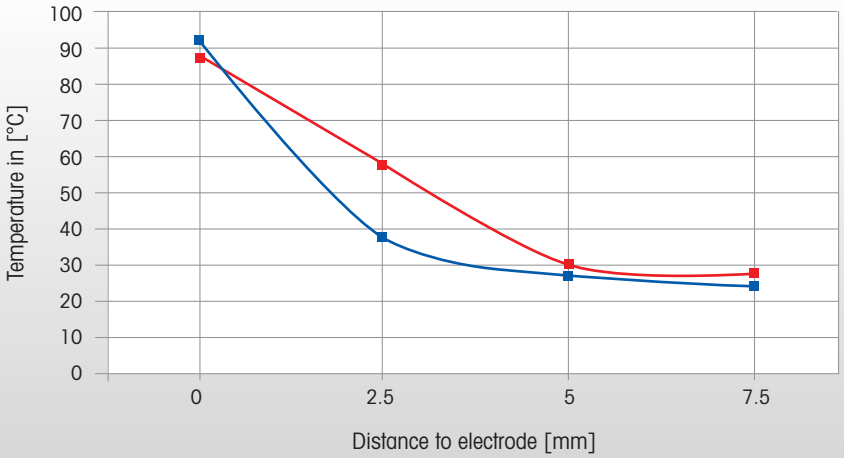
At a glance



Precise and tissue conserving

The Curis® RF4 Radiofrequency Generator with a working frequency of 4 MHz is the centerpiece of an effective tissue-preserving coagulation system. By comparison with standard radiofrequency devices supplied commercially in the marketplace, the electricity frequency of the Curis® RF4 is approximately 10 times higher. While coagulation and resection of the tissue can be achieved at the electrode through contact with the tissue, neighboring areas of tissue experience significantly less heat (see picture*). The occurrence of thermally induced tissue necrosis and irritations in adjacent nerves are thereby minimized. The actively articulating TipControl RF Electrode facilitates the controlled positioning of the radio frequency application in the tissue.



The temperature profile in the muscle tissue depends on the distance to the bipolar electrode tip and the device frequency.

*RIWOspine laboratory testing, "Study of the influence of different application parameters during radio-frequency denervation of facet joints and sacroiliac forthe optimization to success of therapy." March 28, 2017. Data on file.

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