The Diskit II is developed for treating discogenic pain in the lumbar (and thoracic) region. The diagnosis should be made first by anamnesis and physical examination (low back pain with(out) unilateral or bilateral ischialgia, provocation by cumulative loading, sitting intolerance, pain on (de)flexion, no severe neurological deficit, tenderness over the spinous processes at the painful level(s)). Next the diagnosis must be confirmed by MRI scan and preferentially by discography.

**Principle**

The Diskit II is composed of two straight sharp insulated needles of 15 or 20 cm length with active tips of 30 or 20 mm; the proximal end of the active tip has a radiopaque marker. Also, two thermocouple electrodes of suitable length (15 or 20 cm) are in the kit. These are needed for electrostimulation and making the (P)RF lesion bilaterally in the annulus.

After placing the needles in the annulus bilaterally in the disc under fluoroscopic control, electrostimulation with 2 and 50 Hz until 2 Volts is performed, injection of a mixture of half/half local anesthetic and dye is administered, and a RF dual lesion with conventional heat or a pulsed RF treatment is performed. Note: the ground plate is used only during electrostimulation and not during the dual electrode procedure whether thermal lesion or pulsed RF mode is selected.

In conventional RF Lesion Mode, the lesion is created only around the electrode tip. The NeuroTherm NT1000/1100 generator has the unique algorithm called Dual Electrode; one electrode is active and the other functions as the ground plate. The ground plate on the skin is only used for electrostimulation prior to applying the treatment radiofrequency. Since the electric field takes shape in between both electrodes, the RF heat lesion and the electric field is not only developing around the electrode tips but, also, in the tissue found between the two active tips. The resulting treatment potential may influence the interior portion of the disc by denervating nerve endings in the annulus believed to exacerbate the pain experience, initiate an autoimmune response within the disc and possibly inducing healing processes.
Technique

X-Ray View
The patient is in the prone position with a pillow under the abdomen and with AP fluoroscopic control the disc level to be treated is identified. In a slightly oblique view (15-20°) the lateral part of the disc is made visible and with rotation in the sagittal plane the disc space is projected in its optimal height.

Needle Placement
The entry point of the skin lies a little more medial compared to the entry point in discography (mostly 6-7 cm out of the midline), whereas, in discography the needle tip must be placed in the nucleus, the Diskit II electrode must be placed in the annulus.

If necessary the patient may have a little conscious sedation (propofol or alfentanyl) and local anesthetic is injected into the skin in the presumed needle trajectory. With the fluoroscopic tunnel vision technique (the direction of the needle is the same as the direction of the X-ray beam) the needle tip is aimed just lateral of the superior articular process of the facet joint, inferiorly passing the segmental nerve and trying to avoid contact with it.

The needle must be brought into the disc straightforward without bending it. Generally, one feels a loss of resistance phenomenon once the annulus is entered. In the lateral fluoroscopic view the needle tip must be positioned into the ventral part of the disc, but not penetrating its boundaries. The proximal end of the active tip of the needle (20 or 30mm) is fluoroscopically marked, in order to confirm that the total length of the active tip is in the annulus. The second needle is placed contra laterally in the disc in the same way.
**RF Generator Set Up**
The stylets of the needles are removed and the electrodes are placed for electrostimulation. In the NT 1000RF Generator select the ‘Dual Electrode’ option in the ‘Settings’ screen to use the Lesion RF Mode or select ‘Two Electrodes’ in the ‘Settings’ screen to use Pulsed RF Mode. In the NT 1100 RF Generator, simply select the ‘Dual Electrode’ option for both Thermal Lesion and Pulsed RF Modes.

With 50Hz (sensory) and 2Hz (motor) stimulation until 2V, the thresholds are determined, confirming the presence or absence of neural tissue in the annulus, in several cases causing a concordant stimulation.

The impedance at each side is displayed on the RF generator screen. The NT 1000/1100 will automatically choose the electrode with the highest impedance as the active one, because at that side the chosen lesion temperature will be reached first while the other side will function as the ground plate and the temperature at that side will be lower.

After communicating with the patient through each needle disco/annulography stimulation threshold, inject about 2 ml of a mixture of lidocaine 2% and dye to confirm the anatomical conditions and provocation of the discogenic pain.
Lesion Making with Dual Electrode
The maximum temperature is determined based upon the electrostimulation thresholds offered by the patient. We advise to start with 60°C for 2 min, expanding to 70°C for 2 minutes and 80°C for 2 minutes. If the patient experiences too much pain the lesion temperature must be lowered. The total lesion time until now has been 6 minutes. More data must be gathered about the necessary total lesion time.

Pulsed RF Treatment
The ‘Two Electrodes’ option is selected in the NT 1000 and the ‘Dual Electrode’ setting is selected in the NT 1100 RF Generator. Using this RF modality, the ground plate is required. Pulsed RF parameters should be set at:

- Frequency: 2Hz
- Pulse Width: 10 ms
- Amplitude: 60V
- Max. Temperature: 50°C
- Set Total Time: 8 minutes.

Post-Procedure
When the procedure is terminated, an intradiscal injection of 1 ml of Cefuroxim 100mg/ml through the needles must always be done as antibiotic prophylaxis.

The results of treatment with the RF dual lesion and PRF treatment are comparable. After RF lesioning, the patient can have long lasting (2 months) flare-up pain, but no neurological deficits have been reported. Whereas, after PRF treatment, flare-up pain rarely occurs and when it does usually lasts only for a few days.

The Pulsed RF treatment is a preferred alternative, but the results need to be confirmed in further studies.

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