AVANOS | COOLIEF Cooled Radiofrequency Treatment

COOLIEF* STEP-BY-STEP MODALITY OVERVIEW

TABLE OF CONTENT

GENERAL PRECAUTIONS AND ACTIONS DURING PROCEDURE

1. Ideal set-up involves the placement of the generator and pump unit on a trolley close to the treatment site or at the foot end of the patient.

2. Attach the grounding pad prior to the sterile preparation and draping of the patient. Make sure that the skin surface is dry and remove hair. Ideal location is as close as possible to the treatment area and make sure the long side is perpendicular towards the target area.

3. Always apply sterility, involving: skin disinfection, draping of the patient, sterile instrument field and wearing sterile gown, surgical face mask and gloves.

4. To make it more comfortable for the patient, anaesthetise the skin prior to insertion of the introducer. Make sure to anaesthetise only the area at the skin entry point and not too close to the target area.

5. When the introducer is in place, remove the stylet. Insert the probe and secure with the luer lock connection. Check impedance, it should read 200 - 500 Ohms.

6. If desired, perform sensory stimulation testing. Sensory stimulation is performed at 50 Hz and should give a positive response (paraesthesia) within a range of 0,3 to 1,5 Volt.

7. ALWAYS perform motor stimulation testing. Motor stimulation is performed at 2 Hz and should give a negative response (no twitching of a defined muscle or muscle group) within a range of 1,5 to 2 Volt.

8. In case sensory and motor stimulation failed to produce the expected outcome, REMOVE the probe and INSERT the stylet before you make the adjustment. DO NOT change position with the probe inside the introducer.

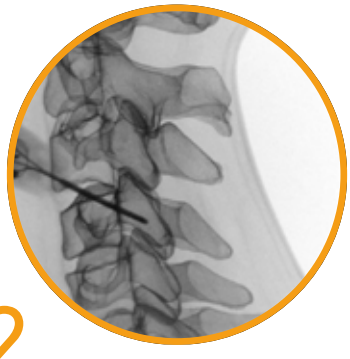
9. After sensory and motor testing, remove the probe and administer local anaesthetic (0,5 ml – 1 ml) at target site PRIOR to lesioning. Allow some time for the fluid to disperse.

10. After the lesioning, administer some local anaesthetic (1 ml – 2 ml), with or without added steroids.

CERVICAL

1

- Patient in lateral position, painful side upwards.
- Stabilise head with foam bolster or pillow.
- Obtain true lateral view, tilt cranially/caudally to correct for superimposition lateral mass
- Aim for clear parallel contour of joint.



2

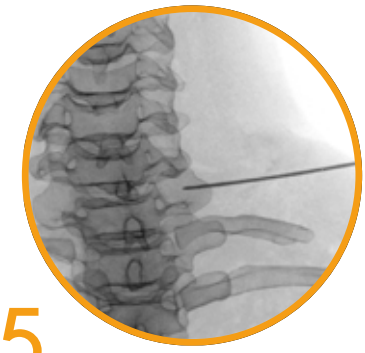
- Identify target by identifying landmark vertebral level (wide SP at C2 and longest SP at C7)
- Inject local anaesthetic (optional: leave needle in situ as marker).
- Overlay target (centroid lateral mass) with tip introducer.

3

- Insert introducer coaxial till bony contact.
- Stabilise when inserting probe, maintaining depth and orientation whilst lesioning.
- Perpendicular approach allows potential to lesion 3 levels with 1 insertion point.

4

- For C7, target is the APEX of the SAP, just above the transverse process.



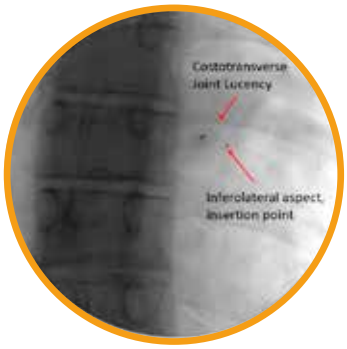
5

- In AP view, probe 2 mm off of lateral aspect of C7 SAP.

6

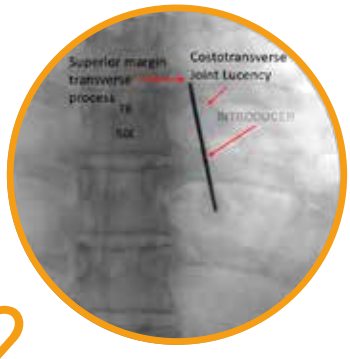
- In contralateral oblique view, probe tip posterior to pedicle, adequately far from neural foramen.

THORACIC



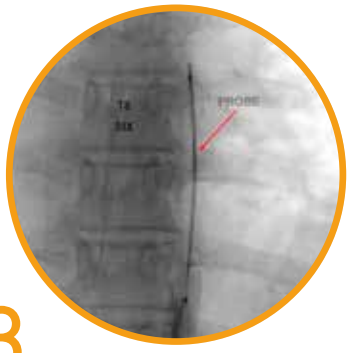
1

- Patient in prone position, AP view and locate treatment level.
- Rotate ipsilateral oblique (if needed) until costotransverse joint lucency or transverse process is clearly visible.
- Rotate cranially/caudally to "separate" transverse process from rib and to square of endplates.
- Insert introducer at the infero-lateral aspect.



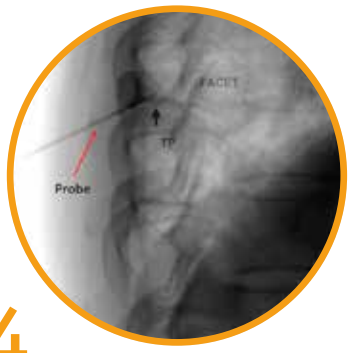
2

- Advance introducer to superomedial aspect of costotransverse joint lucency.
- Place tip of the introducer at the superior lateral aspect of the transverse process.
- Concern for pneumothorax mitigated by lateral to medial approach.



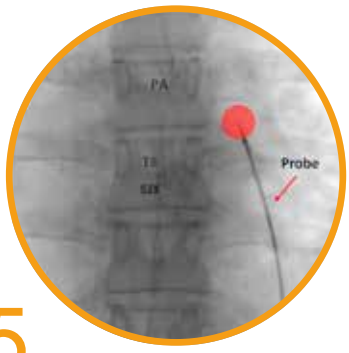
3

- Replace the stylet with probe.
- Advance probe until dark band is at the superior border of the transverse process.



4

- Confirm depth on lateral view.
- Tip of the electrode should NOT be more ventral than the anterior margin of the transverse process.
- Hereby avoid the risk of inadvertent heating of the pleural cavity.



5

- Confirm placement at the superolateral corner of the transverse process in AP view.
- Proceed with the lesioning.

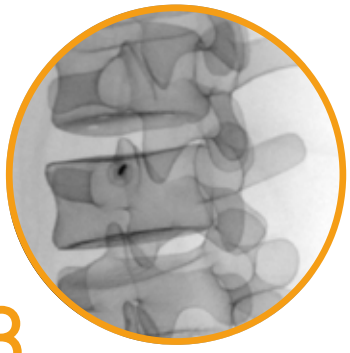
LUMBAR

1

- Patient in prone position.
- True AP image of treatment level, tilt C-arm to square off superior end plates.

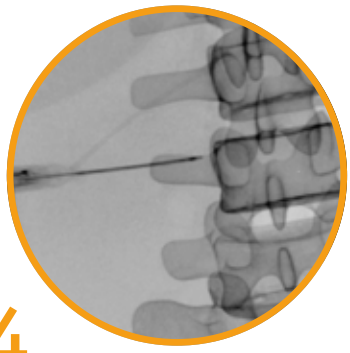
2

- Rotate ipsilateral oblique (35°-40°) and place SAP in centre of disc space.



3

- Target location is the midpoint of the base of the SAP, also referred to as "Scotty dog eye".



4

- Insert introducer using a gun barrel approach till bony contact.
- AP view to check if not lateral on the transverse process.

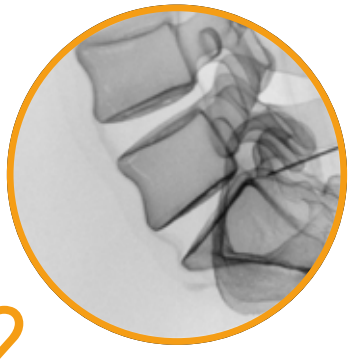
5

- Go to lateral view to confirm depth and to assure tip is posterior to the z-joint lucency.

SIJ

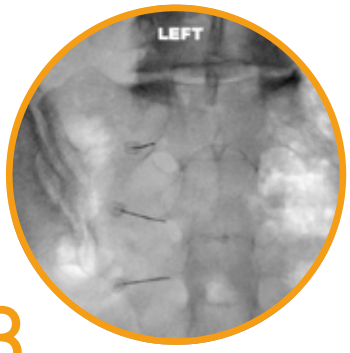
1

- Patient in prone position.
- In AP view, identify notch between SAP and sacral ala. If necessary, angulate cranially (5°-10°) and/or ipsilaterally (10°-15°).
- Advance introducer till bony contact, needle tip not beyond bony border.



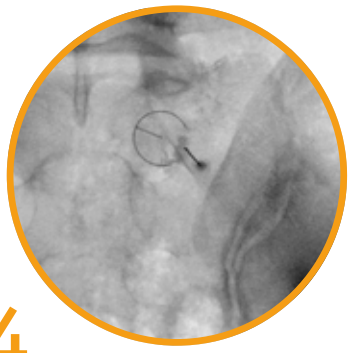
2

- Obtain lateral view to confirm depth.
- Tip of stylet no deeper than the AP midline of the SAP.



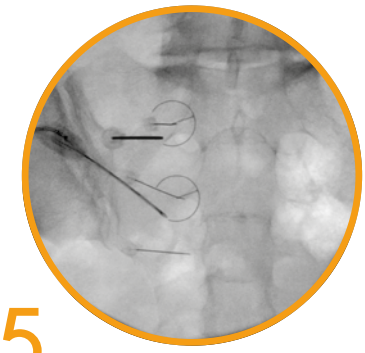
3

- AP view and flatten S1 superior endplate.
- Identify posterior sacral foramen, rotate ipsilateral for better visualisation (if needed).
- Place thin gauge needle at lateral border, it will act as reference point.



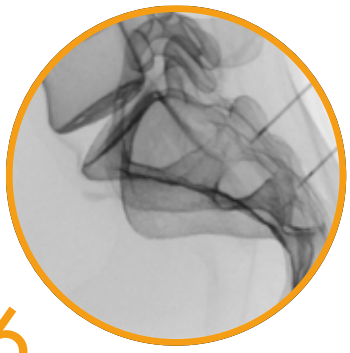
4

- Place Epsilon in AP view with central spoke at the finder needle tip (=centre clock face).
- Target entry point is 4:00 (right); 8:00 (left)
- Check lateral view, do testing and lesioning.



5

- Replace probe with stylet
- Redirect to 9:30 and 6:30 and repeat testing and lesioning.
- Right side: entry point is 4:00, redirect to 2:30 and 5:30.



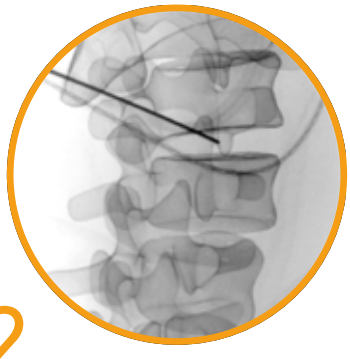
6

- Lateral view must assure probe tip not in vertebral canal and no cortical penetration.
- Check adequate depth on sacral plate prior to every treatment level.

TRANSDISCAL

1

- Patient in prone position.
- True AP view, flattened endplates at treatment level.
- Rotate C-Arm oblique approximately 35°-45° until medial border of SAP bisects the disc.

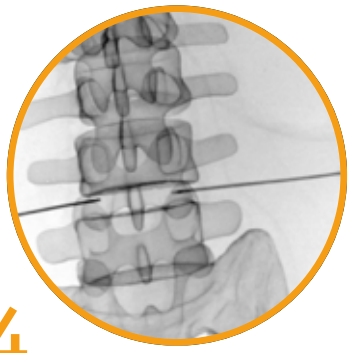


2

- Locate and mark entry point of the introducer, lateral to the SAP.
- Inject anaesthetic along the introducer tract, avoid area around the spinal nerve.

3

- Insert introducer in gun barrel approach, aiming for middle of disc height.
- Advance tip about 1 cm into the disc.
- Confirm position in lateral view, tip in posterior 1/3 of the disc.
- Repeat step 1 – 3 on contra-lateral side.



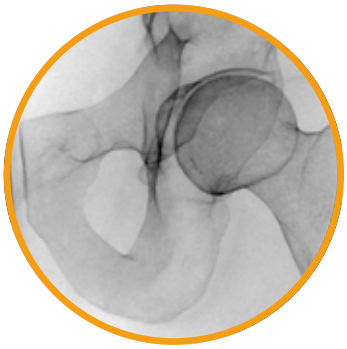
4

- Remove stylet and insert the probe.
- Confirm probe placement in AP view.
- Distal tips of the probes should align with the medial border of pedicles.

5

- If lateral, advance the probes to the medial border of pedicles.
- Confirm in lateral view that the probe tips are no deeper than midline of the disc.

HIP

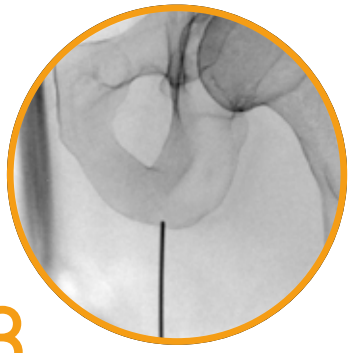


1

- Patient in supine position.
- Obtain AP image with head of femur in the center.

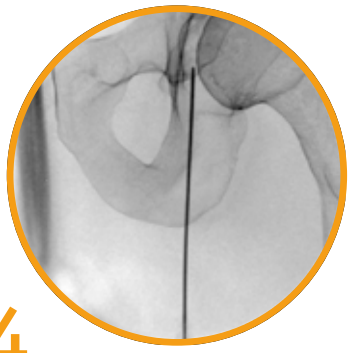
2

- Target femoral nerve is the 12 o'clock position on the superior osseous rim of the acetabulum.
- Overlay target with introducer, slide to entry point, lateral of the inguinal crease.
- Advance introducer to the target site where osseous acetabulum is contacted.



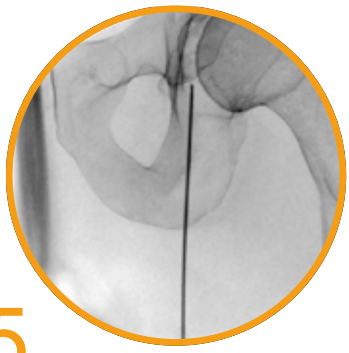
3

- Visualise incisura and ischial tuberosity.
- Place needle over the inferior aspect of the ischium.
- Enter at the 6 o'clock position, relative to the incisura.



4

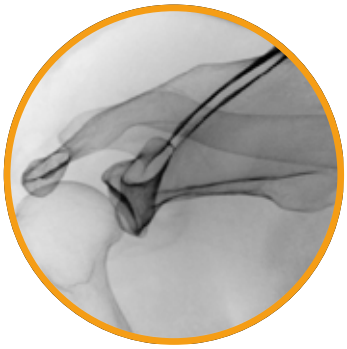
- Maintain intermittent contact with the anterior ischial surface during advancement towards first lesion target for the obturator nerve.
- Avoid superficial direction of needle travel.



5

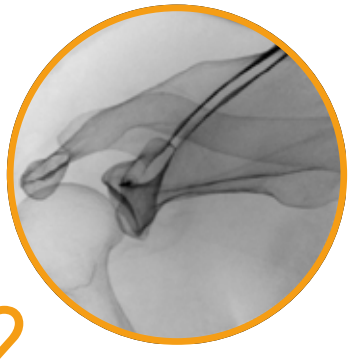
- Retract probe approximately 1 cm inferior.
- Perform lesion at the second obturator nerve target position.

SHOULDER



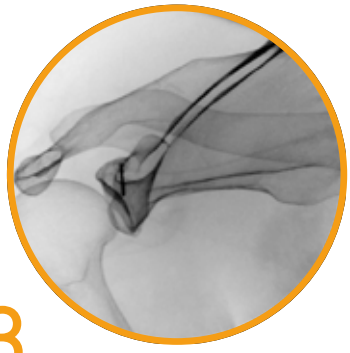
1

- Patient in prone position, hand palm affected side pronated.
- Obtain AP view to visualise shoulder girdle.
- Then rotate approximately 15°-40° ipsilateral oblique, decline approximately 15°-40° caudal to visualise spinoglenoid notch.



2

- Position introducer on the posterior osseous rim of the glenoid fossa, lateral and superior to the spinoglenoid notch (first suprascapular nerve target).
- Stay in the upper ⅓ – ½ of the glenoid fossa on the most lateral border.
- Perform the testing and lesioning.



3

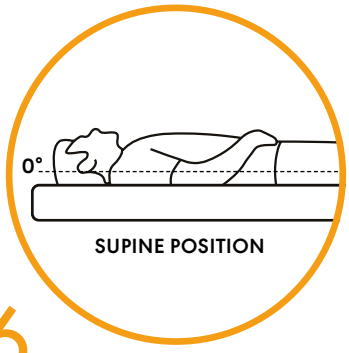
- Remove the probe from the introducer and replace with stylet.
- Reposition the introducer inferiorly 3-4mm from 1st position, lateral and inferior to the spinoglenoid notch (second suprascapular nerve target).
- Perform testing and lesioning.

4

- Maintain C-arm angles and translate to center over the head of the humerus.
- Place introducer inferior to the tubercle where it begins to taper into the humerus on the most lateral border (first axillary nerve target).

5

- Remove the probe from the introducer and replace with the stylet.
- Reposition tip of introducer towards the most inferior and lateral border of the greater tubercle (second axillary nerve target).



6

- Reposition patient to supine position!
- Probes must be kept sterile, ensure grounding pad is still adhered!

7

- PA view to visualise shoulder girdle.
- Rotate 15° ipsilateral oblique, then 15° cephalic tilt to visualise coracoid process inferior to clavicle and medial to glenoid fossa.

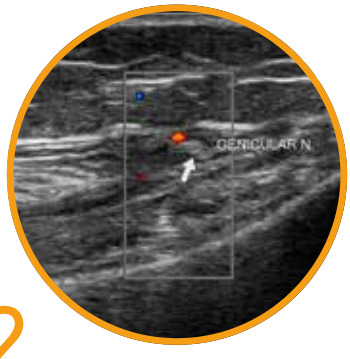
8

- Position introducer at the mid-point of the coracoid process.
- Depth at least 2 cm to avoid increased risk of superficial skin burns.

KNEE US GUIDED

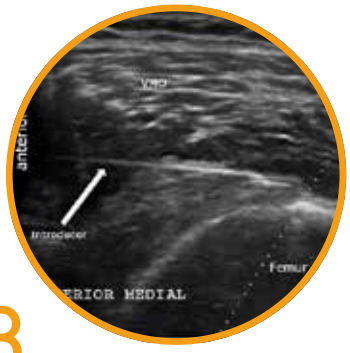
1

- Patient in supine position, affected knee elevated.
- For Superior Lateral and Superior Medial Genicular Nerve: align transducer in coronal orientation over the joint line.
- Move cephalad to metaphyseal/ diaphyseal junction femur.



2

- Identify genicular nerve and artery, located near the periosteum.
- If neurovascular bundle is poorly visualised, use metaphyseal/ diaphyseal junction as bony landmark for introducer placement.
- Mark skin at midpoint transducer.

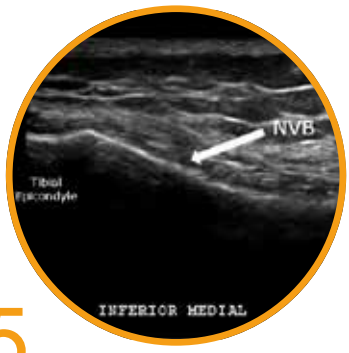


3

- Turn transducer to an axial orientation, confirm 50% depth of femur.
- Anaesthetise skin, advance introducer AP in plane to the nerve or 50%.
- Turn transducer in coronal plane and verify introducer tip is near nerve or junction.

4

- For Inferior Medial Genicular Nerve: align transducer in coronal orientation over the joint line.
- Move caudal to metaphyseal/ diaphyseal junction tibia.



5

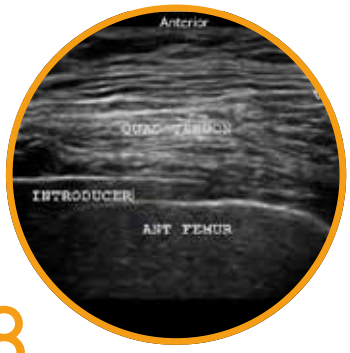
- Identify genicular nerve and artery, located near the periosteum.
- If neurovascular bundle is poorly visualised, use metaphyseal/ diaphyseal junction as bony landmark for introducer placement.
- Mark skin at midpoint transducer.

6

- Turn transducer to an axial orientation, confirm 50% depth of tibia.
- Anaesthetise skin, advance introducer AP in plane to the nerve or 50%.
- Turn transducer in coronal plane and verify introducer tip is near nerve or junction.

7

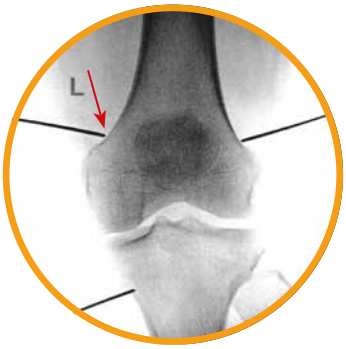
- For the Suprapatellar Plexus, align midpoint transducer in sagittal orientation, 5 cm proximal to the superior pole of the patella.
- Then turn 90° to visualise femur and quadriceps tendon.
- Measure down to the depth of the fat pad.



8

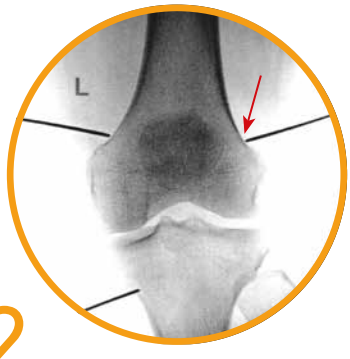
- Anaesthetise skin and insert the introducer in plane to midline of the femur/quadriceps tendon, just superficial to the periosteum.

KNEE FLUORO



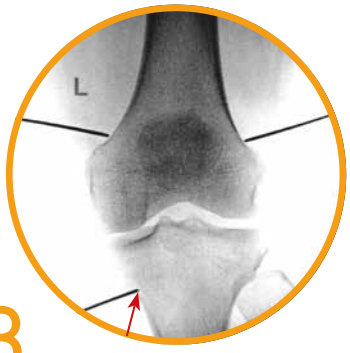
1

- True AP image of the knee, patella in centre.
- Identify target for Superior Medial Genicular Nerve where the medial femoral shaft meets the epicondyle.
- Insert introducer (gun barrel) till bony contact.



2

- True AP image of the knee, patella in centre.
- Identify target for Superior Lateral Genicular Nerve where the lateral femoral shaft meets the epicondyle.
- Insert introducer (gun barrel) till bony contact.



3

- True AP image of the knee, patella in centre.
- Identify target for Inferior Medial Genicular Nerve where the medial tibial shaft meets the epicondyle.
- Insert introducer (gun barrel) till bony contact.

4

- True AP image of the knee, patella in centre.
- Identify target for the nerve from rectus intermedius (suprapatellar plexus), 5 cm above the upper patella border.
- Insert introducer (gun barrel) till bony contact.

5

- Control the depth of final placement with lateral image (epicondyles superimposed).
- Adjust the needle tip to be halfway across diaphysis.

MODALITY OVERVIEW

CERVICAL

RECOMMENDED COOLIEF® COOLED RADIOFREQUENCY KIT: CRK-17-50-2 / CRK-17-75-2

RECOMMENDED COOLIEF® MULTI-COOLED RADIOFREQUENCY KIT: MCK2-17-50-2 / MCK2-17-75-2

THORACIC

RECOMMENDED COOLIEF® COOLED RADIOFREQUENCY KIT: CRK-17-75-5.5

RECOMMENDED COOLIEF® MULTI-COOLED RADIOFREQUENCY KIT: MCK2-17-75-5.5

LUMBAR

RECOMMENDED COOLIEF® COOLED RADIOFREQUENCY KIT: CRK-17-75-4 / CRK-17-100-4

RECOMMENDED COOLIEF® MULTI-COOLED RADIOFREQUENCY KIT: MCK2-17-75-4 / MCK2-17-100-4 / MCK3-17-75-4 / MCK3-17-100-4

SIJ

RECOMMENDED COOLIEF® COOLED RADIOFREQUENCY KIT: CRK-17-75-4 / CRK-17-100-4

RECOMMENDED COOLIEF® SINERGY® COOLED RADIOFREQUENCY KIT: SIK-17-75-4 / SIK-17-150-4

RECOMMENDED COOLIEF® MULTI-COOLED RADIOFREQUENCY KIT: MCK2-17-75-4 / MCK2-17-100-4 / MCK3-17-75-4 / MCK3-17-100-4

TRANSDISCAL

RECOMMENDED COOLIEF® TRANSDISCAL® COOLED RADIOFREQUENCY KIT: TDK2-17-150-6

HIP

RECOMMENDED COOLIEF® COOLED RADIOFREQUENCY KIT: CRK-17-150-4

SHOULDER

RECOMMENDED COOLIEF® COOLED RADIOFREQUENCY KIT: CRK-17-75-2

RECOMMENDED COOLIEF® MULTI-COOLED RADIOFREQUENCY KIT: MCK2-17-75-2

KNEE US GUIDED

RECOMMENDED COOLIEF® COOLED RADIOFREQUENCY KIT: CRK-17-50-4 * CRK-17-75-4

RECOMMENDED COOLIEF® MULTI-COOLED RADIOFREQUENCY KIT: MCK2-17-50-4 / MCK2-17-75-4 / MCK3-17-50-4 / MCK3-17-75-4

KNEE FLUORO

RECOMMENDED COOLIEF® COOLED RADIOFREQUENCY KIT: CRK-17-50-4 / CRK-17-75-4

RECOMMENDED COOLIEF® MULTI-COOLED RADIOFREQUENCY KIT: MCK2-17-50-4 / MCK2-17-75-4 / MCK3-17-50-4

DR A. TINNIRELLO

"We tried to constantly improve our knowledge and skills on the application of Cooled RF technique for patients struggling with chronic pain. Our results and patients' satisfaction increased as we perfected patients' selection criteria and defined every technical step. Following this step by step guide we hope to help you using this device in the safest and most effective way to achieve the best results for your patients."

Andrea Tinnirello MD, FIPP, ASST Franciacorta, Italy

DR ANDREA TINNIRELLO

Since completing a residency in anaesthesiology and intensive care in 2007, Dr Andrea Tinnirello has been involved in pain management, with a specific focus on minimal invasive techniques and interventional pain management procedures for chronic joint and spinal pain. The World Institute of Pain awarded him a Fellow of Interventional Pain Practice (FIPP) certification in 2016.

Dr Tinnirello currently practices in Northern Italy in two public hospitals in Iseo and Chiari. As head of a pain management service, which treats over 2000 patients every year, he performs nearly 200 radiofrequency treatments a year. Dr Tinnirello is particularly involved in radiofrequency denervation techniques for chronic knee, hip, shoulder and lumbar pain using both ultrasound and fluoroscopic guidance. He is a local consultant on palliative care, pain medicine and referral for intrathecal baclofen therapy for chronic spasticity guidance.

As a teacher at the University of Brescia's Anaesthesiology Residency Programme, Dr Tinnirello has fellows on a regular basis and has been involved in two residency theses and five theses for university master's degrees in pain medicine.

A member of the Italian National Anaesthesiology Society's (SIAARTI) study group on acute and chronic pain, Dr Tinnirello is helping in the development of national recommendations and guidelines on pain management. He has also published five papers on international pain management in various peer reviewed medical journals, in addition to presenting on the topic at international meetings.

DR T. HAAG

"Cooled RF offers the clinician a very powerful treatment option in a range of chronic pain conditions, which are often difficult to treat. In order to achieve the best possible outcome we need to bear in mind mainly 3 factors: making the right diagnosis, best evidence based treatments and a high level of technical expertise. Hopefully this step-by-step guide can make a valuable contribution towards achieving this goal."

Dr. Thomas Haag, Lead Consultant & Clinical Lecturer in Pain Management, Wrexham Maelor Hospital
Visiting Professor in Social and Life Sciences, Glyndwr University, North Wales, UK

DR THOMAS HAAG

Dr Thomas Haag qualified from the University of Tübingen (Germany) in 1996. After finishing his M.D., he completed a post-graduate rotation in anaesthesia and a pain fellowship in the UK. In 1997, he was appointed as a consultant at Wrexham Maelor Hospital in North Wales, where he currently leads a progressive multi-disciplinary pain service.

Widely regarded in the field of interventional pain medicine, Dr Haag frequently teaches national and international courses on the topic and co-presents on cooled radiofrequency techniques at an international cadaver workshop.

Dr Haag is committed to advancing the field of pain medicine and is currently involved in several research projects as principal and co-investigator. He has recently made a successful grant application for research into biomarkers in chronic pain which is due to start in September this year.

In 2018, Dr Haag was named a Visiting Professor in Biomedical and Life Sciences at Glyndwr University in North Wales – a role that sees him supervising and teaching MSc students.

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