



Interventional pain management technique with OEC Elite CFD^{*}.

Experience of Pr. Jean-Pierre Van Buyten, Head of A.Z. Nikolaas Pain Center (Belgium)

*Ergo C configuration.

The Pain Center is an independent department of the A.Z. Nikolaas Hospital located on the second floor of the main building. It has been designed to welcome the patient in a cozy and calm environment.

The multidisciplinary team performs needle-based treatments that may consist of various therapeutic modalities used alone or together. Physical rehabilitation and psychological support complete the therapeutic care pathway of the patient.

The doctors performing the procedures are always assisted by a nurse dedicated to pain management procedures. The staff is trained to optimize the field of view of the anatomy to be treated and maneuver the C-arm. Located between the interventional rooms, an administrative assistant registers the patient, organizes the agenda and manages the patient's follow up report.

The Pain Center recently acquired an OEC Elite CFD C-arm to equip one of its interventional pain management rooms. The team chose this system for image quality and low dose control. Additionally, they can perform fluoroscopic imaging guidance without support from additional staff.

The center receives patients from Belgium, the Netherlands and northern France, and can treat up to 40 patients per day.

Pr Van Buyten, Head of A.Z. Nikolaas Pain Center, explains why he needs high image quality and anatomical coverage for interventional techniques.

ease of use, image quality, and radiation-dose management.

What is the challenge for fluoroscopy in needle-based treatments?

We work without direct visual control and we need to see what we are doing. Fluoroscopy is, therefore, our eyes. We always work in continuous low dose mode, with collimation, thus obtaining a very good image of the cortical bony landmarks and the needle. When we inject contrast media, we can easily identify the shape of the nerve and predict the spread of the drugs we want to give.

The challenge is that unlike bone, the nerve is radiotransparent. In order to position the needle tip in the right location, we use a specific technique called the 'tunnel vision' technique.

The needle entry point is defined by palpation, confirmed with fluoroscopy, and marked over the patient's skin. The C-arm is then angulated to get a true AP view of the nerve to be treated using bony anatomical landmarks. When the C-arm angle is correct, the needle is angulated under fluoroscopic imaging guidance until it appears as a dot and not as a line. The needle axis is then aligned with the detector axis, providing a 'tunnel vision' of the needle. Once this dot is obtained, the C-arm is moved to a lateral position and the needle is pushed into the nerve under fluoroscopic imaging control. Contrast media is injected and flows along the nerve. The fluoroscopic image that shows the shape of the nerve confirms that the needle is in place ready for the treatment.

It may consist of various interventional procedures such as epidural injections, intrathecal therapy, nerve blocks, neuromodulation or physiotherapy, and psychological support.

Interventional pain management involves treating the nerve either at the level of the central nervous system, or more locally at its root, injecting drugs, or applying radiofrequencies. These needle-based procedures require fluoroscopy guidance. Our center chose the OEC Elite CFD because of its

Do you need to maneuver the C-arm to get specific views during treatment?

In our work, we need a perfect knowledge of the anatomy and we are used to translate two dimensions into three dimensions. Based on two planar images (the antero posterior and lateral fluoroscopy views), we must mentally translate the anatomy into volume. We can have patients with standard anatomies, but most of the time they have either undergone arthrodesis surgery, or are suffering from skeleton deformity, and therefore have anatomies different from what we would expect. If we cannot see the structure very clearly, we need to

investigate the appropriate access for that patient.

The patient is placed on the examination table in prone position. For cervical treatment, the OEC Elite CFD C-arm is placed at the level of the patient's head. For thoraco-lumbar procedures, the C-arm is placed at the side of the patient, orthogonal to the patient table.

The OEC Elite CFD C-arm is positioned over the anatomy to be treated. A light tension is applied to all the brakes. When we need to change the view, the nurse moves the C-arm to reposition the detector to the area of interest. Because the C-arm is well balanced, it

stays in place after motion.

The most complex procedures in terms of imaging are those performed on the cervical vertebra area, and on patients who have undergone surgeries involving implants, such as arthrodesis. It is more difficult to find the path to direct the needle to the nerve. OEC Elite CFD image quality allows us to proceed with confidence to correctly position the needle tip for the injection.



Set-up for cervical spine procedures

Corticoids injection into the L4 lumbar nerve



Transforaminal placement of the needle

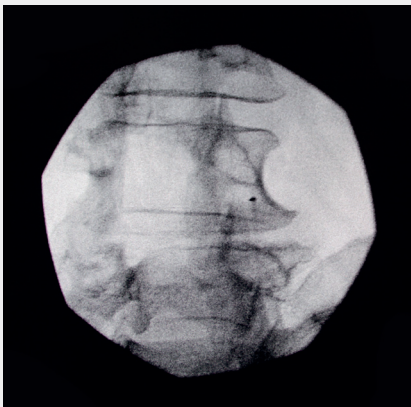


Fig. 1. Antero-Posterior view showing the dot shape of the needle positioned using the tunnel vision technique. The partial scotty dog shape is due to the laminectomy of the L4.

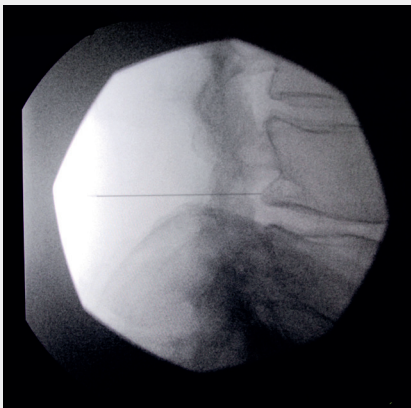


Fig. 2. Lateral view showing needle insertion into the neuroforamen.

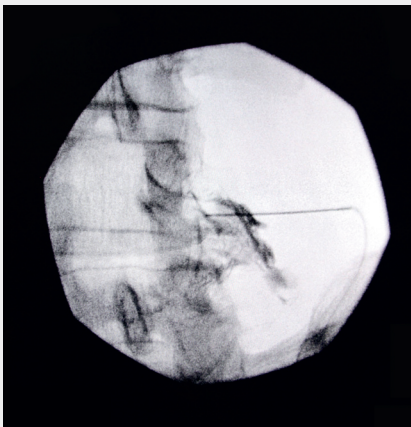
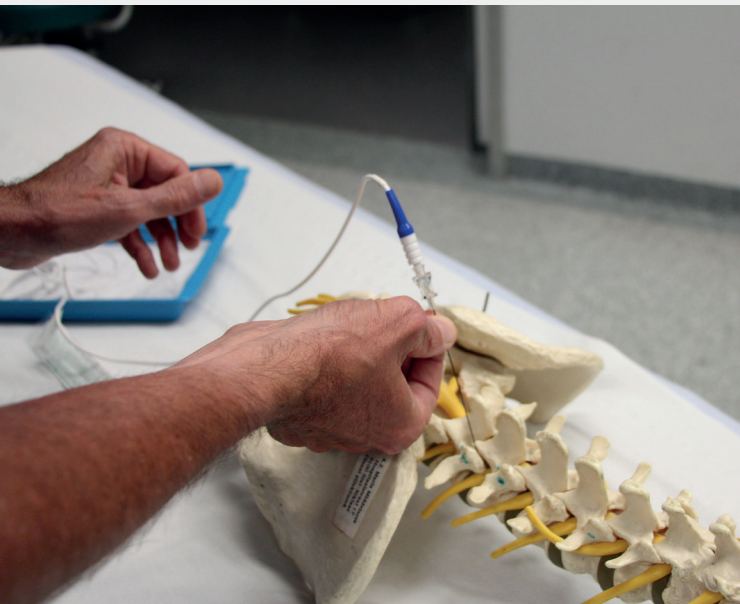


Fig. 3. Contrast media injection showing nerve root shape at the tip of the needle.

Radiofrequency treatment



Transforaminal placement of the needle with the probe connected to the RF generator. The RF protocol differs as a function of the localization of the nerve (lumbar or cervical).

The treatment includes heating the nerve. The heat reduces the conductivity of the neurotransmitters of the nerve, reducing the sensation of pain. The procedure is performed by inserting a dedicated needle into the point to be treated with the tunnel vision technique, inside which is inserted a probe conducting the RF sequence. In the lumbar area, the treatment is performed by placing the probe into three needles positioned along the nerve.

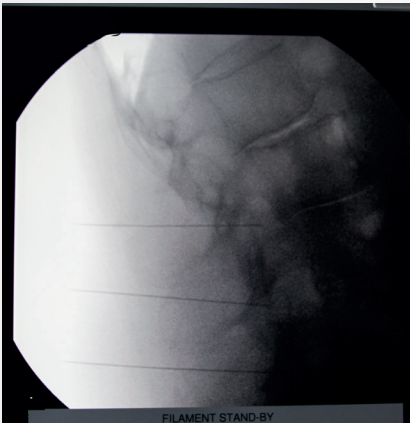


Fig. 1. Lateral view of lumbar medial branch RF treatment. The fluoroscopy image shows the three needles.

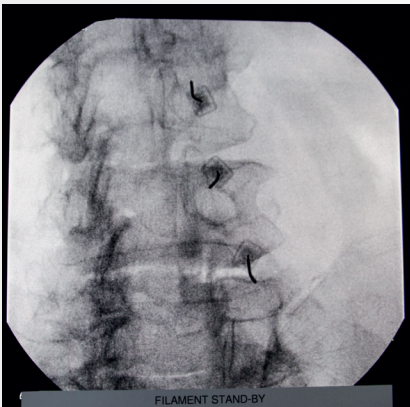


Fig. 2. Ap view of lumbar medial branch RF treatment. Fluoroscopy image of tunnel vision view of the three needles and electrodes.



I trained with the pioneers of pain therapy in Belgium early on in my anesthesiology career, beginning in the early 1980's. I was attracted by the therapeutic techniques, and the contact with the patient.

Patients coming to me have complicated medical and psychological issues related to their pain. Some have high pain tolerance thresholds, while others struggle to function. Our goal is to treat their pain holistically so that they can lead a more normal life.

With these interventional techniques we can help patients fight the pain. We believe that these therapies are a better alternative than opioid treatments because of the risk of addiction. To that end, I participate in many awareness and educational programs promoting interventional pain management and procedures. I work with the Flemish Pain Relief Association VAVP, and the European Continuing Medical Training (ECMT) program for neuromodulation techniques. I also coach in a pain center in Kuwait to develop these techniques.

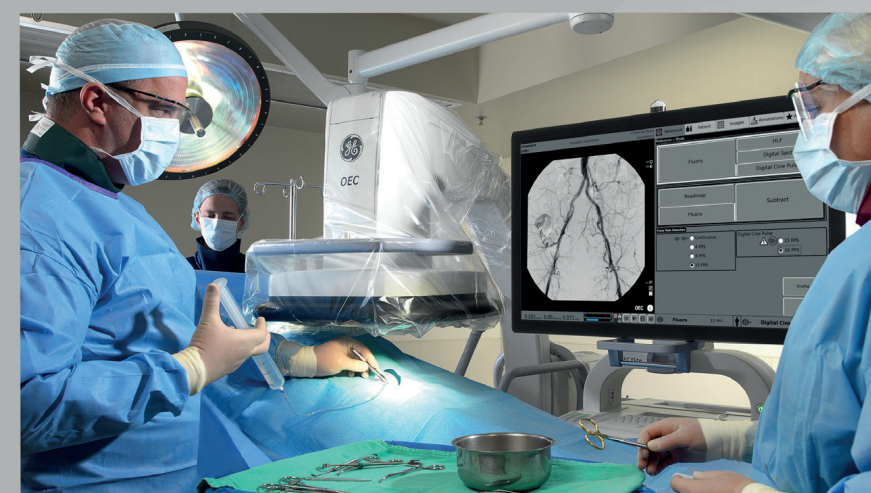
I expect that in the future there will be more and more interventional techniques of neurostimulation of the peripheral nerve. As long as there is surgery, there will be algology.

Any surgery done in an innervated zone presents a risk of chronic pain. For example, 15% of patients undergoing inguinal hernia surgery which is a common surgical procedure, have chronic pain after the operation. After a mastectomy, 30% of the patients have neuropathic pain. After thoracotomy for lung intervention, 50% of the patients have post-operative pain. We see more and more facial pain because facial and cosmetic surgery procedures are increasing. The same goes for knee replacement surgery. Many of our patients come to us for back pain intervention after surgery.

Also, it is important that we manage the radiation dose to the staff as we work with fluoroscopy every day. I therefore chose to equip the room with the OEC Elite CFD C-arm with a new detector that is designed to provide excellent image quality at low dose. We also acquired an ImagiQ2 table (Stille, Sweden) that helps to optimize radiation dose management with its high transparency. We are trained to practice ALARA fluoroscopy: we take few images, use the collimation, the laser aimer, and bring the detector closer to the patient. We are very comfortable using the OEC Elite CFD C-arm for our interventional procedures.

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The statements by GE's customers described here are based on their own opinions and on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist, i.e. hospital size, case mix, etc., there can be no guarantee that other customers will achieve the same results.



OEC Elite CFD

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