Percutaneous trauma surgery

Philips MultiDiagnost Eleva with 3D-RX

Who/where
Dr. Eddy Brugman, Head of Interventional Radiology
Dr. Guy Putzeys, Senior Orthopedic Surgeon, specializing in Trauma

Department of Interventional Radiology/ Angiography, Medical Imaging Service, St. Maarten Campus, AZ Groeninge (Groeninge General Hospital), Kortrijk, Belgium. 1094 bed supraregional hospital

Challenge
Percutaneous reduction and stabilization of complex fractures

Solution
MultiDiagnost Eleva with 3D-RX

The AZ Groeninge (Groeninge General Hospital) is a 1094-bed supraregional hospital spread over four campuses. The surgical specialties in the St. Maarten campus include orthopedics, urology and interventional radiology.

When the dedicated cath lab equipment in the St. Maarten campus needed to be renewed in May 2009, it was replaced by a Philips MultiDiagnost Eleva system.

According to Dr. Eddy Brugman, Head of Interventional Radiology, this was the logical choice under the circumstances, as the MultiDiagnost Eleva not only provides the necessary cath lab facilities but, as its name implies, it is a multifunctional system and can be used for a wide range of other applications, allowing optimum utilization of resources.

A multifunctional R/F system

The MultiDiagnost Eleva is a C-arm based radiography/fluoroscopy system with a high-resolution flat detector. The C-arm has a wide aperture, offering excellent access to the patient for interventional procedures, and can rotate a full 180° around the patient. This provides an almost unlimited choice of projections, with coverage from head to toe. The rotation also provides the input for acquiring high-quality 3D data sets with CT-like reconstruction and cross-sectional imaging, opening up new perspectives to support treatment.

Major advantages in trauma surgery

In addition to vascular interventions, the first applications were in vertebroplasty and sinus examinations. However, Dr. Guy Putzeys, a senior orthopedic surgeon specializing in trauma, soon recognized that the system offers major advantages in trauma surgery. The availability of cross sectional imaging and live fluoroscopy in a single system meant that fractures could be assessed immediately, making the procedures faster, cheaper and more efficient. With increasing experience it is becoming possible to perform an ever-increasing range of procedures percutaneously, rather than by open surgery.

"The MultiDiagnost Eleva was the logical choice."

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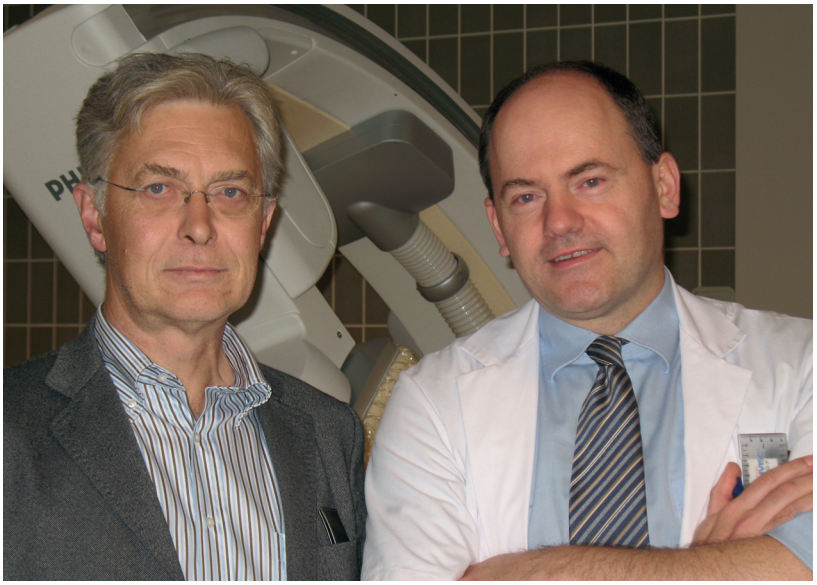


Dr. Eddy Brugman (L) and Dr. Guy Putzeys (R)

Some intra-articular fractures can only be assessed by CT (3D) images acquired before the procedure. Because some degree of exploration was necessary, almost all procedures involved open surgery under fluoroscopy guidance. Until recently, only 2D images from the mobile fluoroscopy unit were available during the procedure itself, and these did not always provide the accuracy needed for precise positioning. Any malreduction or malpositioning of the osteosynthesis material could only be detected on the postoperative CT scan. This could mean that a second procedure would be required, which would be stressful for the patient and time-consuming for the surgical team.

"3D imaging opens up new perspectives to support treatment."

Rapid access to 3D images offers new treatment possibilities

With the MultiDiagnost Eleva, the progress of the surgical procedure can be followed in real time, and the immediate availability of 3D images often renders open surgery unnecessary. This makes it possible to perform an ever-increasing number of surgical procedures percutaneously, with epidural anesthesia. The results can be checked immediately and, because the procedure is minimally invasive, the patient can usually go home the same day. This is less stressful and more convenient for the patient, increases the patient throughput and enhances the efficiency of the department. The procedures require close teamwork between the surgeon, the radiologist, the anesthetist, the radiological technician and the surgical assistant. The radiologist operates the imaging system, makes the necessary settings and creates multiplanar reformatting. High-quality 2D and 3D images are available within seconds.

"Increased throughput and enhanced efficiency thanks to faster procedures."

According to Dr. Guy Putzeys, the major advantage of the MultiDiagnost Eleva is the rapid access to 3D images, opening up a new world of treatment possibilities and new challenges. For example, the new insights offered by the intra-operative 3D images can be very helpful in suggesting new, more effective methods of fixation, and in some cases even less stressful surgical approaches.

CT-like images at the touch of a button

A CT examination has long been an established practice in trauma cases, but has the disadvantages of restricted access to the patient and, above all, no possibility of simultaneous real-time fluoroscopy during surgery. Furthermore, the CT system is not always available for trauma cases and, even when it is, it necessitates moving the patient.

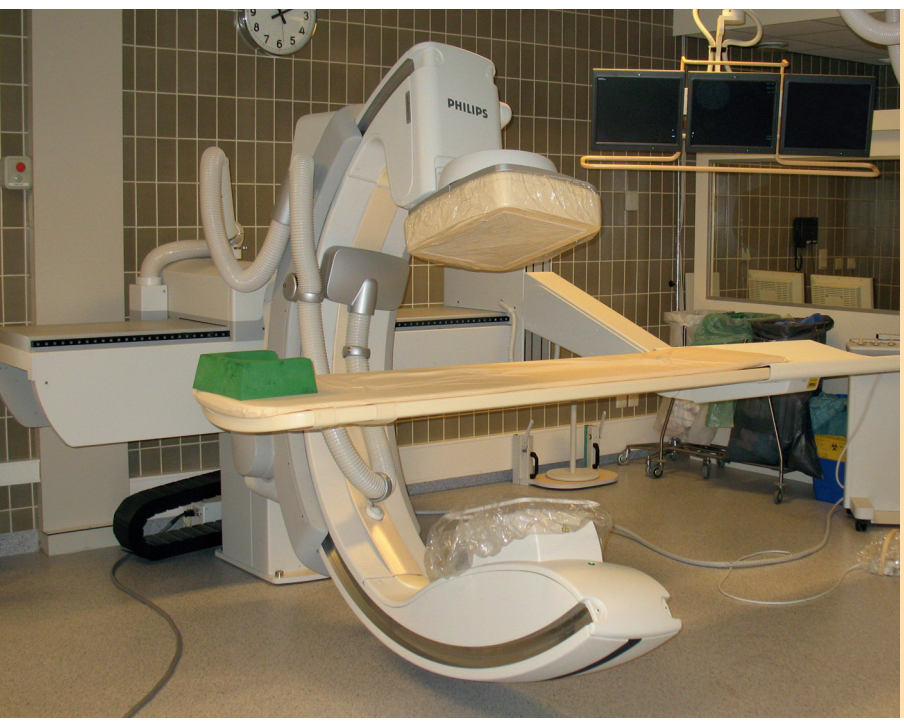
With the MultiDiagnost Eleva, the changeover from CT-like images to live fluoroscopy is made at the touch of a button, providing all the information needed for accurate repositioning and fixation during the procedure and, of course, access is much easier than it would be in a conventional CT system. Dr. Putzeys is very impressed by the MultiDiagnost Eleva and says: "I would insist on this system for operative treatment of these types of fractures where accurate reduction is imperative and where surgery can be done percutaneously."

Enhanced efficiency and cost-effectiveness

According to Dr. Putzeys, percutaneous interventions require a great deal of experience. The surgeon has to be able to operate under fluoroscopy. With intra-operative 2D fluoroscopy alone, incorrect repositioning or incorrect placement of screws in complex reconstructions may only be recognized on a postoperative CT scan. If necessary, the patient may require a further surgical procedure to correct the positioning.

"I would insist on the MultiDiagnost Eleva for these types of fractures."

With CT-like images available immediately, correct reduction and stabilization of fractures can be checked during the procedure, while the patient is still on the table, enhancing the efficiency and cost-effectiveness of the procedure.



The MultiDiagnost Eleva

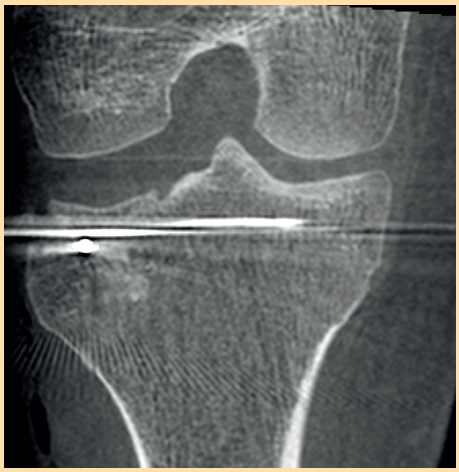
"3D imaging during the procedure opens up a new world of treatment possibilities and new challenges."

Case studies

Case 1

A 19-year-old male patient with an impaction fracture of the lateral condyle of the tibia. The fracture was wholly intra-articular.

Coronal MPR view pre-operative



Coronal MPR view post-operative

Case 2

A 21-year-old patient with a displaced calcaneus fracture. The 3D images provided new insights into the possibilities for fixation, resulting in the choice of an unusual position of the screw for optimum fixation.

Sagital MPR view pre-operative

Sagital MPR view post-operative

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