



# Fast and clear interventional spine procedures

Philips MultiDiagnost Eleva with 3D imaging

## Who/where

Dr. Jean-Baptiste Martin,  
diagnostic and interventional radiologist

Olivier Sanchez,  
manager of Radiology Department

Sandra Brenn, radiographer

Clinique Générale-Beaulieu, Geneva,  
Switzerland

## Challenge

Improve the results and rapidity of spinal interventions.

## Solution

The MultiDiagnost Eleva with 3D-RX works very well for performing spine interventions.



Mr. Sanchez in the control room area of the interventional room

Founded in 1899, the Clinique Générale-Beaulieu in Geneva, Switzerland is the first clinic in "la Suisse Romande" to obtain ISO 9001 certification. It is a member of the "Swiss Leading Hospitals" group and employs 380 people. A total of 134 beds are available. Nearly 600 specialized physicians work at this facility. The hospital has six nursing units, seven operating theaters, one reanimation center, as well as six internationally prominent specialty centers. These include the Institute of Nuclear Medicine, the Center for Robot-assisted Laparoscopy Surgery and the Institute of Radiology. The latter is equipped with some of the most sophisticated imaging technology available, including a 1 Tesla Open MRI, a 3 Tesla MRI and two Philips MultiDiagnost Eleva fluoroscopy systems with Flat Detector.

# PHILIPS



Dr. Jean-Baptiste Martin,  
diagnostic and interventional radiologist



Olivier Sanchez,  
manager of Radiology Department

### **A new dimension for interventional fluoroscopy**

The hospital purchased two Philips MultiDiagnost Eleva fluoroscopy systems because of their broad versatility and unique features that they offer for diagnostic and interventional procedures.

Philips MultiDiagnost Eleva is a multi-purpose tilt C-arm system that provides exceptional performance across a wide range of applications – from vascular diagnostic procedures, vascular and non-vascular interventional procedures to routine RF examinations. It is an X-ray system that offers fully integrated 3D reconstructions, while the patient is lying on the table or even in an upright, sitting or standing position.

### **3D-RX offers new insight into spine pathology**

This new application is known as 3D-RX which stands for Three-Dimensional Rotational X-ray. This option acquires a set of fluoroscopic images by rotating the C-arm through 180 degrees. In just a few seconds it creates 3D impressions of complex spine anatomy which provides extra insight into pathology during and after interventional spine procedures.

During the purchasing phase of the Philips MultiDiagnost Eleva, Dr. Jean-Baptiste Martin, diagnostic and interventional radiologist at the

hospital, was very enthusiastic about the 3D functionality. He was already familiar with this feature from the Philips Integris Allura system at the University Hospital Geneva, where he performs spine interventions as well. In September 2007 the Philips MultiDiagnost Eleva at the Clinique Générale-Beaulieu was equipped with the 3D-RX option. Right from the beginning, the results of examinations that were carried out with 3D-RX far exceeded his expectations.

### **Decreasing CT workload and enhance interventional procedures**

The Radiology Institute decided to install two Philips MultiDiagnost Eleva systems. Olivier Sanchez, manager of the radiology department says, “The MultiDiagnost Eleva with its flat detector is a very multifunctional X-ray system. In our “Blue Room” we started by using the MultiDiagnost Eleva to perform spine interventions. One of the most demanding examinations that Dr. Martin performs is vertebroplasty. He often operates on several different levels of the spine within one examination. We perform a high number of these time-consuming interventions. The MultiDiagnost Eleva worked very well for these procedures and that convinced us to purchase another MultiDiagnost Eleva for the “Red Room”.”



The MultiDiagnost Eleva with Flat Detector in the interventional room

## “That convinced us to purchase another MultiDiagnost Eleva.”

“The second MultiDiagnost Eleva system is equipped with the urology package (with a special divided urology-table) and a second ceiling suspended X-ray tube. All of our radiologists and radiographers are very happy with the systems.” Having the 3D-RX option on the MultiDiagnost Eleva for spine interventions is crucial for Sanchez. With this function he hopes to decrease the load on the CT scanner.

Sandra Brenn, radiographer, works in the “Blue Room” and feels responsible for the comfort of the patient and for keeping procedures running smoothly without any disturbances.

Brenn manoeuvres the MultiDiagnost Eleva in near automatic mode. When Dr. Martin is performing the examination, Brenn “blindly” assists by positioning the C-arm and table in the right position. She says, “When Dr. Martin wants to have a 3D run, it is very simple to prepare the system. And when the rotation is finished, the 3D reconstruction is displayed on the monitor within just a few seconds. It is so fast!”

### Useful interventional tool

Dr. Martin is a renowned interventional radiologist. As one of the editors of “Interventional Spine Newspaper,” he shares his knowledge with colleagues all over the world. In Clinique Générale-Beaulieu he performs thousands of procedures per year to relieve

patients from their pain. Dr. Martin carries out the full range of spine interventions, including infiltrations, nucleotomia, discographies, thermal ablation RF, and vertebroplasties. Many of these interventions require additional CT imaging to evaluate the results of the procedure.

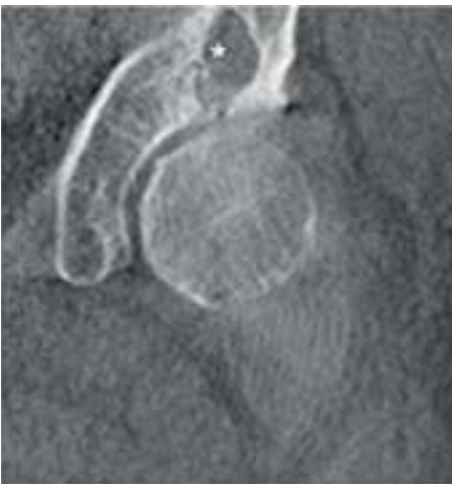
## “The 3D reconstruction is displayed on the monitor within just a few seconds.”

Having the 3D-RX option of the MultiDiagnost Eleva in the examination room enables Dr. Martin to get an idea about the effect of the procedure while the patient is still present. This option also helps him during the intervention, especially for cement



The MultiDiagnost Eleva with Flat Detector in the interventional room

“The 3D-RX confirmed the needle position.”



Coronal view of hip joint with fracture

implantation and nucleoplasty.

Dr. Martin says, “This week I did a vertebroplasty case of the pelvic ring and I was in trouble because of the needle position and injection. The 3D-RX confirmed the needle position inside sacral ala, permitting injection of PMMA (Polymethyl methacrylate) and control.”

#### **Virtual artifact-free images**

Dr. Martin is impressed by the image quality of the 3D-RX option. A patient with pain in her right hip joint was examined using 3D-RX on the Philips MultiDiagnost Eleva. Although the left hip already had a prosthesis, the coronal slice images clearly showed the cause of the pain in her right hip with hardly any artifacts in the image.



MPR of a discography

Dr. Martin expresses his enthusiasm:  
 “Despite of the prosthesis in the other hip,  
 I clearly can see the fracture in this hip joint!”

Another example is the use of 3D-RX just before a radiofrequency ablation of the disc between C6 and C7. Before the treatment, Dr. Martin injected a small amount of contrast (similar to discography) and a 3D-RX run was performed in less than 2 minutes during the procedure. The results are shown in the images above.

The top-left image shows the needle in the 3D rendering and the other images show the contrast in a multiplanar reconstruction. Dr. Martin says, “The images gave me a clear indication of the degree of the disc disease. The bottom-left image shows an enlarged disc-space and the contrast is increasing behind the vertebra revealing a left posterolateral herniation and a Dallas score 3.”

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