

## CASE STUDY

# Increase throughput in MR

– The benefits of using EasyTech on knees and heads

Routine use of KneeLine+ and NeuroLine+ for a smoother workflow –

The GIE VAR OUEST private center in Ollioules, France, has a Vantage Orian with M-Power V4.5 MRI scanner. Most of their work is based on musculoskeletal exams (knees) and neurological exams (heads).

### Abstract

These two techniques are used with the aim of having reproducibility of the exams in the case of longitudinal follow-up and reduced idle time between the sequences, making for a smoother workflow.

### Technique

#### <sup>SURE</sup>VOI Knee and KneeLine+

The <sup>SURE</sup>VOI Knee and KneeLine+ application allows you to automatically adapt and center the volume of interest (VOI) of the positioning of the mapping (MAP), center of the Shimming and three plane locator (axial, sagittal and

coronal). The application also detects when the knee is incorrectly placed in the Iso-center and asks to recenter it.

**<sup>SURE</sup>VOI Knee:** Using a 3D image as a Locator, the region of the knee to be scanned is determined as well as its volume of interest for the MAP and the pre-calibration (Shim). <sup>SURE</sup>VOI Knee also detects zones where it should deposit presaturation zones in order to limit fold-over artifacts. Thanks to anatomical recognition, the VOI detects whether or not the knee scan positioning is correct and operator needs to recenter a patient or not.

If necessary, the VOI can be verified, and the orientation and positioning can be adjusted in the Scan Plan (Locator) window (Figure 1).

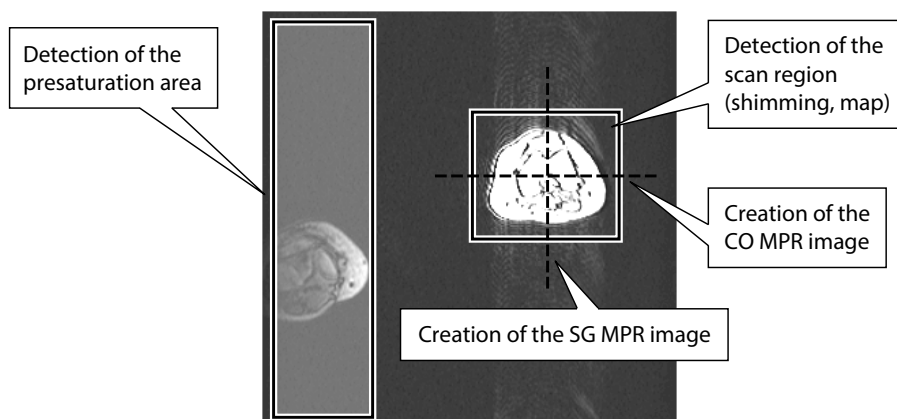


Figure 1

**KneeLine+:** When operator scans standard planes of knee, this application allows you to automatically define them more easily than before. 3D image acquisition is used to obtain the three planes (axial, sagittal and coronal) once you have adjusted the angle of a knee.

If necessary, the orientation and position of the detected standard planes can be adjusted by performing a positioning operation in the Scan Plan (Locator) window (Figure 2).

The protocol used on the site uses the KneeLine+ "locator", followed by the acquisition of four sequences (three kinds of PD Fat Sat planes and one sagittal T1) (Figure 3).

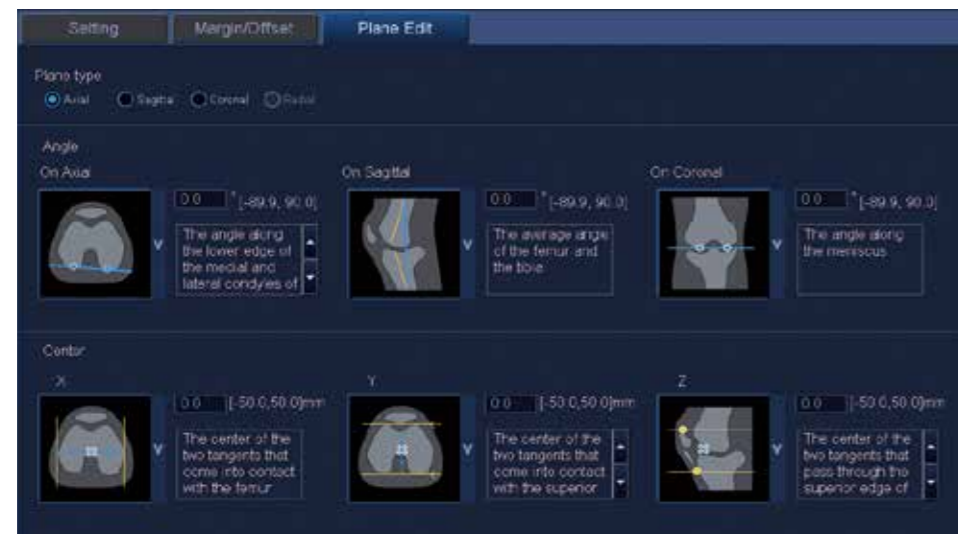
The first results show the efficiency of this technique from the point of view of both the Reproducibility of lesion follow-up and a smooth workflow. In fact, the sequences automatically follow on from each other without wasting time.

Operator can prepare the next patient (registration and preparation). Where musculoskeletal time exposures are concerned, they have increased performance, with on average 1.5 more patients per day.



**Testimony:**  
**Frédéric MARTIN,**  
**Referring MRI technician**  
**GIE VAR OUEST, Ollioules**

*"After 2 or 3 days of adaptation, the team has utmost confidence in the AI automatic positioning techniques, which allow them to concentrate on other, more rewarding tasks, such as post-processing tasks. Exam time is optimized and no time is wasted. Today, 85% of knee exams are performed using this technique"*



**Figure 2**

No	Comment	Time	Plan	Mode
1000	LOC DRT	00:29		
2000	CORO DP FATSAT	02:17	E	
3000	AX DP FATSAT T...	01:21	E	
4000	SAG DP FATSAT	02:27	E	
5000	SAG T1	02:00	E	

Coil: 18:Flax SPDR M  
Region: RHPF (0.0)cm  
08:34

**Figure 3**

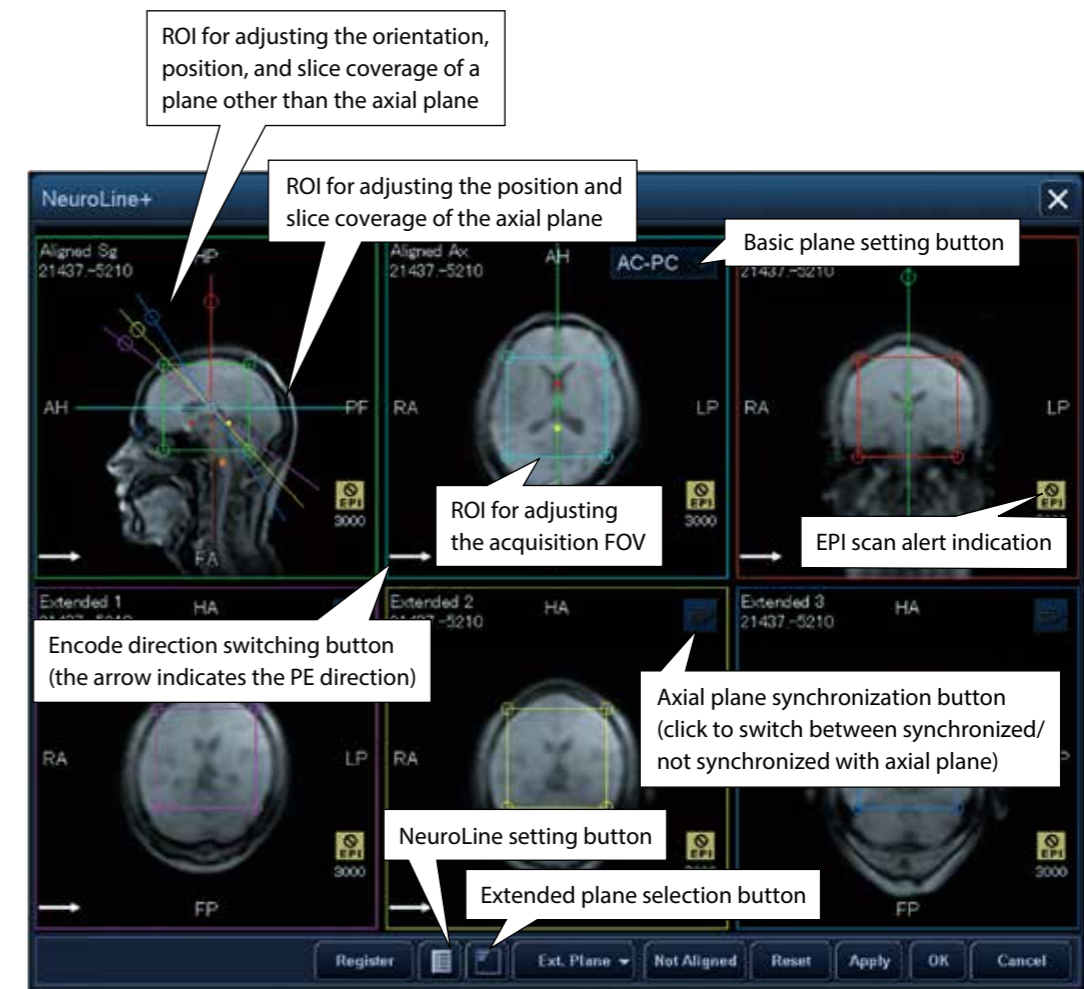
**NeuroLine+**

The NeuroLine+ application is used to automatically acquire the three orthogonal planes (axial, sagittal and coronal) as well as three other planes (that the site can program as it wishes).

**NeuroLine+:** The feature that helps with positioning for head sections is divided into three steps.

- (1) Launch of the head scan positioning help application to detect the plane of the head.
- (2) Display of the detection results to verify and adjust the position of the plane according to requirements.
- (3) If needed adjustment of the ROI scan positioning in order to apply the detected (or adjusted) results.

The planes are determined based on three standard planes: (1) the mid-sagittal plane, (2) the axial plane parallel to the AC-PC line or to the OM line and (3) the coronal plane. In addition, the plane that is perpendicular to the sagittal plane, and is obtained by adding offset values (quantities of rotation and parallel movement) to the horizontal axis plane, is determined as an extended plane. The offset values are retained for each extended plane. They are also updated every time the orientation or the position of the extended plane (the quantities of rotation and movement by comparison to the horizontal axis plane) is changed (Figure 4).



**Figure 4** NeuroLine+ window

The protocol used on the site uses the NeuroLine+ “locator”, followed by the acquisition of five or six sequences (Figure 5).

The first results show the efficiency of this technique from the point of view of both Reproducibility of longitudinal lesion follow-up and a smooth workflow. In fact, the sequences automatically follow on from each other without wasting time and the technician can take charge of the next patient (registration and preparation). Where neurological time exposures are concerned, they have increased performance, with on average 1 more patient.

In patients suffering from multiple sclerosis cases, the radiologist will not only be able to count the number of plaques but will also be able to compare their size because the sections will have been acquired in exactly the same plane in the follow-up exam.



Figure 5

The same applies for the follow-up of patients with tumor-like lesions. In this way, we can better assess the response to treatment.



**Testimony:**  
**Marie Dominique BOESPFLUG,**  
**Radiologist and Doctor**  
**GIE VAR OUEST, Ollioules**

*“Using this technique allows us to carry out **a real follow-up on patients with multiple sclerosis and brain tumors.** The reproducibility of the scan planes allows us to compare both the number of macrophages and their size. Measurements can also be replicated in the case of brain tumor treatment, and we can judge the effectiveness of the treatment. Today, 97% of exams for MS and tumors are carried out using this technique.”*

#### Clinical and Scientific Canon Medical support



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