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“ TRUS-Guided Biopsies With TRUS-MRI Image Fusion : Pros and Cons. ”

The accuracy of multiparametric MRI has greatly improved the ability of localising tumour foci of prostate cancer. This property can be used to perform a TRUS-MR image registration, a new technological advance, which allows for an overlay of an MRI onto a TRUS image to target a prostate biopsy towards a suspicious area. Three types of registrations have been developed: cognitive-based, sensor-based and organ-based registration.

Cognitive registration consists of aiming at a suspicious area during biopsy with the knowledge of the lesion location identified on multiparametric MRI. Sensor-based registration consists of tracking in real time the TRUS probe with a magnetic device, achieving a global positioning system which overlays in real time prostate image on both modalities. Its main limitation is that it does not take into account prostate and patient motion during biopsy. Two systems (Artemis and Uronav) have been developed to partially circumvent this drawback.

Organ based registration (Koelis) does not aim at tracking the TRUS probe, but the prostate itself to compute in a 3D acquisition the TRUS prostate shape, allowing for a registration with the corresponding 3D MRI shape. This system is not limited by prostate/patient motion and allows for a deformation of the organ during registration. The pros and cons of each technique and the rationale for a targeted-biopsy only policy are discussed.

### LEARNING OBJECTIVES:

1. To learn the physical principles of TRUS-MRI image registration.
2. To become familiar with the different types of registration (cognitive, sensor based, organ-based).
3. To learn about the accuracy of TRUS-MRI image registration-based prostate biopsies.
4. To understand the potential applications of TRUS-MRI image registration to guide focal therapy.

### PANEL DISCUSSION:

Are we ready for the standardisation of MRI to manage prostate guided biopsy in routine clinical practice?