

3D ULTRASOUND GUIDED MINIMALLY INVASIVE PROSTATE THERAPY AND BIOPSY

Aaron Fenster, PhD, FCCPM
Robarts Research Institute, University of Western Ontario
London, Ontario, Canada

The prostate biopsy procedure is plagued by high false negative rates (up to 34%) as early-stage prostate cancer (PCa) is generally not visible on ultrasound. As a result, a negative biopsy does not rule out a diagnosis of PCa, as many tumors are missed on initial biopsy. In such circumstances, patients will undergo multiple repeat prostate biopsy (RPBx) to find undetected PCa. In a repeat biopsy, the physician must either avoid previously biopsied tissue (in cases of prior negative biopsy) or target the same anatomical site for patients with non-diagnostic, atypical small acinar proliferations (ASAP).

3D TRUS is hypothesized to be superior to 2D TRUS for accurate guidance and recording of the prostate biopsy procedure. Patients undergoing RPBx might benefit most from the hypothesized improvements, as previous Bx core locations can be viewed in 3D and used to guide a RPBx. Accuracy is also important when suspicious findings exist on other diagnostic imaging modalities, such as MRI or PET, are used to direct a TRUS-guided biopsy.

In this paper, we describe a new method to guide prostate biopsy procedures using 3D ultrasound. This new approach allows us to guide the biopsy to specific 3D targets in the prostate, record the biopsy locations in 3D, and register the intra-biopsy procedural 3D ultrasound image with an MR image to guide the biopsy to specific locations in the prostate.

Learning Objectives

1. Understanding the limitations of conventional 2D ultrasound guided prostate biopsy
2. Understanding the issues related to performing the prostate biopsy procedure with 3D US guidance
3. Understanding the issues related to the use of MR in conjunction with 3D US to guide the prostate biopsy procedure