Quantitative Endoscopy for Improved Target Delineation in Planning Intensity Modulated Radiation Therapy for Head and Neck Cancer

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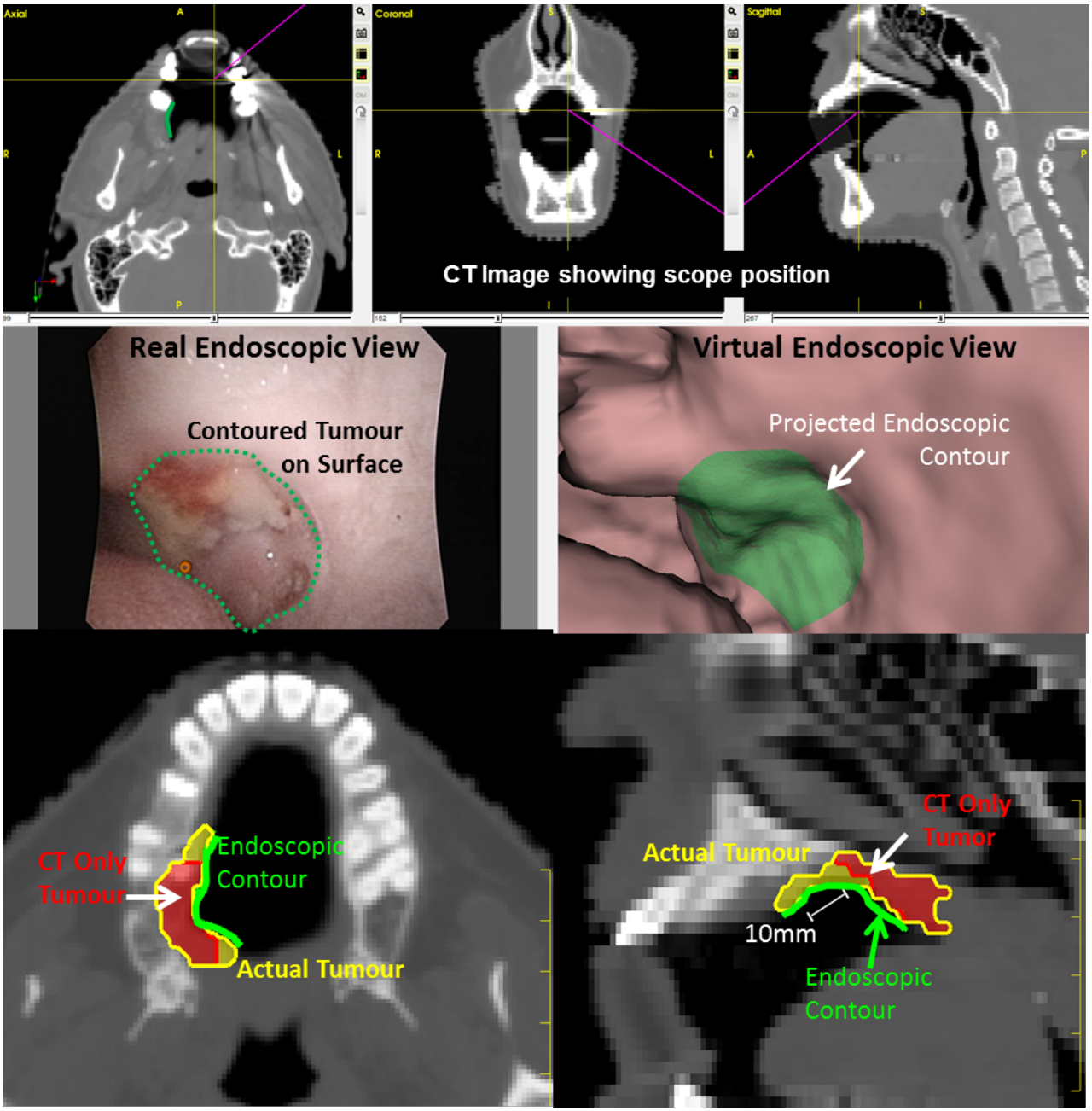
Technology description

Endoscopy-Enhanced Radiation Therapy Planning and Visualization
This technology enables the integration of clinical endoscopy examinations into radiation therapy planning and response assessment. 2D optical and 3D CT image sets are co-registered by tracking and registering the coordinates of an endoscope relative to the planning CT image set.

From here, users can perform several functions, including contouring on 2D images and display 3D dose levels on real-time video images. For many cancers, for instance, head and neck, esophagus, bladder, etc., superficial margins are often more clearly defined in the 2D optical image. With our system, users can contour lesions visible on the 2D image. These regions of interest are projected onto the 3D CT planning image, generating a 3D ROI that can be exported in a format compatible with any standard clinical treatment planning software.

For treatment response assessment, the system can import radiation dose from the treatment planning system. The dose can then be displayed on top of live 2D video, enabling the clinician to compare treatment response, such as tumor regression or normal tissue toxicities, to the delivered dose. This is an especially attractive feature for examinations of radiation proctitis following prostate treatments, and mucositis following head and neck treatments. Current testing on phantoms demonstrates a registration accuracy of ±1mm.



Publications

R.A. Weersink et al: Improving Superficial Target Delineation in Radiation Therapy with Endoscopic Tracking and Registration, Med. Phys, 38(12): 6458-6468, 2011.

J. Qiu et al: Displaying 3D radiation dose on endoscopic video for therapeutic assessment and surgical guidance, Phys. Med. Biol, 57(20): 6601-6614, 2012.

E. Chamma et al: Optically-tracked handheld fluorescence imaging platform for monitoring skin response in the management of soft tissue sarcoma. Journal of Biomedical Optics, 2015. 20(7).

Application area

Radiation treatment planning, brachytherapy delivery

Institution

University Health Network

Inventors

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