Washington University in St. Louis
Office of Technology Management

DEFORMING DIAGNOSTIC TO RADIOTHERAPY IMAGES FOR THE INITIAL TREATMENT PLAN

Mutic, Sasa, Zhao, Tianyu

Maland, Brett

T-018603

Background: Prior to undergoing radiation treatment, the patient is required to undergo a simulation scan. This involves positioning the patient body on a platform that resembles the radiotherapy machine couch. Then the scanning computerized tomography (CT) or magnetic resonance imaging (MRI) device is used to acquire images to optimally plan a personalized radiation treatment plan for the patient; however, this procedure is redundant due to the already available CT and/or MR images acquired from the patient's initial diagnostic procedures. Additionally, two main issues arise following the use of simulation scans: 1. Differences between the couch tops used for simulation scan vs actual radiation treatment and 2. Differences in arm positioning during simulation scan vs actual radiation treatment, leading to valuable time wasted for the patient and clinical staff.

Technology Description: Scientists at Washington University have developed a technique that deforms the diagnostic CT and/or MR images acquired during the initial visits of the patient based on the desired position of the patient and structure of the radiotherapy machine couch. This enables the clinician to comfortably determine the correct patient position for efficient radiation treatment and saves the time of the patient and clinical staff. In addition, this approach would be particularly useful in developing countries that have a limited number of CT or MRI scanners but have a surplus of untreated patients awaiting radiotherapy.

Key Advantages:

- **Convenient for health caretakers who have a limited number of CT and/or MRI scanners**
- **Saves time for the patient and clinical staff**
- **Efficient; no redundancy; streamlined process**
- **Eliminates simulation scans for treatment planning**
- **Saves money for the patient and healthcare provider**