

Head and Neck Positioning Device for Radiotherapy

Radiation-translucent Platform for Multi-Landmark Setup in Head and Neck Radiotherapy

Precise radiotherapy treatment of cancer in the head, neck, and brain have increased survivability. Despite the success of precision radiotherapy treatments some consequences, such as off target radiation effects, still persist. Off target radiation is typically a result of insufficient patient positioning. Because of the flexibility in the neck, accurately setting up the entire length of the neck in radiotherapy is a difficult obstacle to overcome. Researchers at Virginia Commonwealth University have developed a first of its kind active setup system that independently positions a patient's head from the rest of the body to ensure accurate positioning of the entire neck.

The technology

The novel invention is an active patient positioning system (APPS) that can accurately setup patients with a mostly-plastic mechanical system capable of 6-D positioning. The construction of the APPS device allows it to be used with common radiotherapy imaging techniques while allowing accurate setup with sub-millimeter precision. The system may be coupled with commonly used position tracking systems, where position setup information can be relayed to the device for fast and easy patient setup. This device allows more precise radiation treatment that focuses on the desired area more effectively, mitigating overexposure to nearby sensitive, healthy tissues. This is extremely crucial during radiotherapy of the head and neck and of the brain, as surrounding tissues are critical for everyday quality of life.

Active Patient Positioning System (APPS)

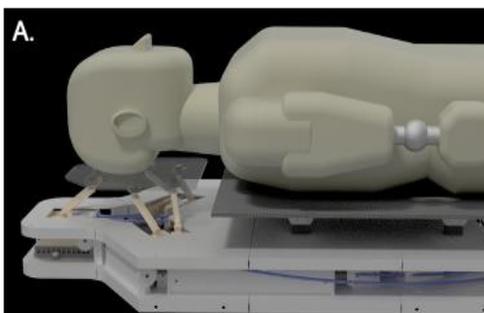
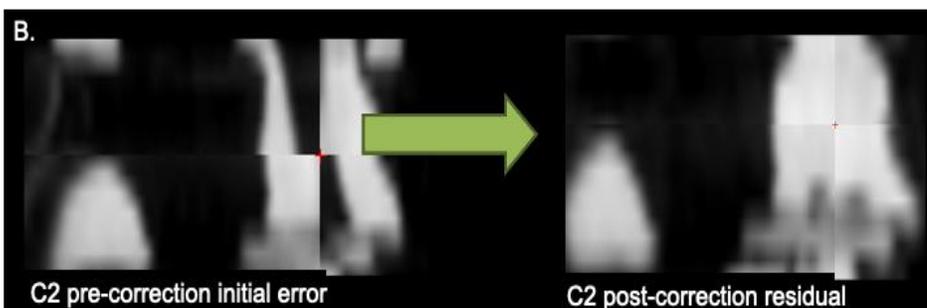


Figure 1. Shown in part (a) is a typical clinical set up of a patient undergoing radiotherapy with the Active Patient Positioning System (APPS) positioned below the patient's head. Shown in part (b) is the initial error during radiotherapy caused by patient movement during radiotherapy and the corrected residual after using APPS.



Benefits

- » More effective radiation treatment
- » Add-on system to existing treatment table
- » Compatible with popular motion monitoring systems
- » Repositions patient's head independently from rest of body

Applications

- » Head and neck (or brain) radiotherapy
- » High accuracy motion tracking procedures such as physical therapy and robotic guidance
- » Positioning system that compensates real-time motion with a mechanical table

Patent status:

Patent pending: [US20190015685A1](https://patents.google.com/patent/US20190015685A1).
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License status:

This technology is available for licensing to industry for further development and commercialization.

Category:

Biomedical

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