



Client Profile

Established in 1952, Saint Luke's Hospital in Dublin, Ireland expanded in 2010 to form the Saint Luke's Radiation Oncology Network (SLRON) by adding two additional centers in Dublin.

We treat more than 4,500 new patients per year across the three sites. There are, on average, 190 cases per year in the network requiring bolus for both photon and electron treatments. In addition, we offer brachytherapy treatment with surface mould solutions for patients requiring a more customized approach.

Adoption of 3D Printing

Historically, 3D printing has been difficult to implement and integrate with clinical software, requiring significant effort and/or prior 3D printing experience. Today, 3D printing is an area that is becoming more affordable and clinically accepted by organizations with no prior printing experience. The Adaptiiv solution allowed us to overcome the aforementioned challenges through simple and easy to use technology.

Although we have one fully equipped mould room, we were thrilled to hear that a 3D printing solution from Adaptiiv would complement our current mould room service and offer customized bolus and brachytherapy mould capabilities across all sites (Figure 1).



Figure 1. Adaptiiv provided training to help start SLRON's 3D printing bolus program.

Custom Bolus for Complex Cases

Our initial plan was to use the Adaptiiv solution to create customized bolus for complex cases that current bolus typically struggled to deliver what was desired by our Radiation Oncologist. For example, any case that previously required wet gauze would immediately benefit from 3D printed bolus because the fit on the patient would be more consistent and uniform in density throughout treatment.

Adaptiiv's solution eliminated the need to use wax or wet gauze to create complex boluses that are extremely difficult and time-consuming to produce and can be easily damaged. See Figure 2 for examples of the first 3D printed boluses created at SLRON.



Figure 2. First 3D printed boluses created at SLRON: Upper left: breast; Upper right: vulva; Bottom left: nose; Bottom right: neck..

Seamless Integration with TPS

The main reason we decided to go with the Adaptiiv solution was because it was designed with a radiotherapy workflow in mind and fully integrated directly with our treatment planning system. Figure 3 below highlights how the Adaptiiv solution seamlessly integrates with the existing radiation therapy workflow:



Figure 3. An overview of how the Adaptiiv Solution integrates within radiation therapy workflow.

Clinical Benefits

Our first patient was treated using Adaptiiv's solution with a customized bolus placed between the legs that could only be previously achieved using wet gauze. In comparison to wet gauze, the time required to fabricate the Adaptiiv bolus was dramatically decreased as there was no need to wet sheets of gauze and manually place them in the region required to achieve planned treatment. Reviewing the imaging after the first treatment, the coverage, uniformity, and fit of the 3D printed bolus was superior to the typical experience of using wet gauze.

To date, each bolus printed at SLRON has been well received by clinicians, patients, and our treatment staff who find it easy to place (especially compared to wet gauze). Above all, the 3D printed boluses have been very comfortable for the patient during treatment.

Future Use and Collaboration Opportunities

Now that we have the clinical workflow in place for creating 3D printed boluses, our plan is to move on to using more modules offered by Adaptiiv, particularly the Modulated Electron Bolus and HDR Surface Brachytherapy modules. In addition, we look forward to collaborating directly with Adaptiiv to explore ideas and develop new directions for their solution.



"Adaptiiv has enabled us to confidently tackle situations where we would normally struggle to apply bolus. The benefit has already been seen in reduced setup times, improved patient comfort and reproducibility. The ability to print the precise bolus required for electrons or photons is a powerful tool in an RT department."

CIARAN MALONE, MEDICAL PHYSICIST
SAINT LUKE'S RADIATION ONCOLOGY NETWORK, DUBLIN, IRELAND