



## 200. Testing a new positioning system for external beam radiotherapy

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### Purpose

The aim of this work was to investigate the feasibility of using a new positioning system (Manufacturer TOTIM – Totally Immobile) for patients' set-up.

### Methods

The device consists of a sealed cushion with external cover in **microfiber** polyester containing a bag filled with two separate reagents mixed by hands during usage. These reagents develop an **exothermic reaction** producing **polyurethane foam**, which can be modelled around the patient's body. The beam's attenuation was investigated using a Varian TrueBeam STx **linear accelerator**, equipped with 120HD MLC for different **photon beams** energies. **We tested two different cushions: the TOTIM T30002 Jolly and the TOTIM T30006 Limb model.** The measurements were performed using a water equivalent phantom, with a IBA **Dosimetry Farmer ionization chamber** Type FC65-P positioned at **isocenter**, SSD=95cm and gantry angle at 180 degrees, the field size was defined at **10×10cm<sup>2</sup>**. Measurements were performed also with the Delta4 Phantom+ (ScandiDos, Uppsala, Sweden) in two different set-ups: with and without TOTIM T30006 Limb cushion to evaluate the attenuation in a quality assurance (QA) specific patient. The temperature values during the exothermic process at 60s intervals were monitored too.

### Results

During the exothermic reaction, an observed maximum of temperature (around 50° at 300s) comes before the **solidification** process, after that the temperature starts to decrease asymptotically (Fig. 1). The attenuation factor for both cushions was about 1%. The median dose deviation between measured and calculated dose using Delta4 Phantom+ was about 1.3%.

### Conclusion

**The easy use and the stability of solidification, the low absorption value make TOTIM devices an useful system of patient's immobilization.**