

# SGRT for set-up and monitoring VMAT Total Body Irradiations

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## Introduction

Historically, patients undergoing Total Body Irradiation (TBI) 12 Gy in 6 fractions has been treated with static fields at a long distance (SSD 425 cm) to cover the whole body. Led blocks have been used to reduce the lung dose to an acceptable level. Recently, VMAT has been introduced as treatment technique for these patients and the lung dose is reduced in the plan optimization process.

## Methods

### *Treatment technique and immobilisation*

Varian TrueBeam linear accelerator is used for treatment. In order to cover the whole body the patient is positioned both head first and feet first supine. Around 10 isocenters are needed to get an acceptable dose distribution. Due to the many field junctions and long treatment time the patient setup and immobilisation is crucial for a correct dose delivery. The patient is fixed with a five-point thermoplastic mask and a whole body vacuum shell.

### *Patient setup*

The setup is made using a combination of laser guidance, surface guidance and several extended CBCTs. AlignRT is used for surface guidance. The patient is aligned in the vacuum shell so that tattoos and markers on the vacuum shell aligns. The postural video that comes with AlignRT gives a multi-angle real-time view of the alignment compared to the reference position from the CT-scanning. This is primarily used to align the arms, hands, legs and feet in a fast and accurate way. CBCT-images are acquired to cover almost the whole body and the patient position is corrected accordingly. Before the treatment starts, SGRT reference captures are acquired at the position of each isocenter.



Example of the use of postural video to position the body (observe the thumb).

### *Treatment*

The treatment starts from the head and the couch movement is only longitudinal between the isocenters. The SGRT reference captures are used to verify that the patient still is in the correct position after couch movement. SGRT is used with beam control, i.e. the beam will stop if the patient moves outside tolerance.

## Results and discussion

The use of AlignRT for VMAT TBI makes the setup time shorter and especially the positioning of extremities more accurate using the postural video function. Since the couch is moved several times during treatment the reference captures assures that the patient is still in its correct position verified by CBCT. Monitoring the patient during treatment gives a safer beam delivery as the beam will stop if the patient is outside tolerance.



Whole body phantom used for training, positioned in vacuum shell feet first supine.

