

## **ESTRO MOBILITY GRANT (TTG) REPORT**

**Title of the report: Implementation of Voluntary Breath Hold  
Technique for left breast radiotherapy**

**HOST INSTITUTE:**  
Royal Marsden Hospital, Sutton, United Kingdom

**DATE OF VISIT:**  
5-16 March 2018

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Royal Marsden Hospital is one of the first hospitals which has implemented voluntary Deep Inspiration Breath Hold Technique (vDIBH) in a daily clinical practice. Their approach to this technique is unique, very simple and with no additional costs or investment in additional equipment, and therefore it is possible to copy their work onto our Department.

As we are a new and developing Department with limited resources, our goal is to be able to provide heart-sparing radiotherapy for every left-sided breast cancer patient. So far we have been treating only breast cancer patients in University Medical Centre Maribor, and we wish to be able to provide voluntary DIBH to our patients as well.

My primary goal was to learn how to train patients to breathe during the CT simulation and to learn the procedure of treatment delivery and treatment verification. It was also of great importance to me to see the whole procedure and gain some practical experience for better understanding.

With this technique, patients voluntarily hold their breath while radiotherapy is delivered. Heart is pushed down and away from the radiotherapy field and, therefore, amount of radiation delivered to cardiac structures is significantly reduced. Voluntary breath-hold (VBH) uses the distance moved by the anterior and lateral reference marks (tattoos) away from the treatment room lasers in breath-hold to monitor consistency at CT-planning and treatment setup. Light fields are marked on a patient and then used to monitor breath-hold consistency prior to and during radiotherapy delivery.

At the Pre-treatment Unit, I worked together with their radiographers during the CT simulation. Training the breathing technique with patients was of great benefit to further understand the principle of VBH. Method is to ask the patient to take a deep breath in and hold it. The first step is to hold breath for 5 seconds, before building up in 5 second intervals to 20 seconds. Patients are instructed to breathe in and breathe out twice before asking them to hold their breath for up to 20 seconds. This approach ensures patient relaxation and helps breath-hold consistency, which is of crucial importance for successful treatment delivery. Radiographers mark the position of the anterior and lateral tattoos in relation to the lasers in breath-hold to help establish reproducibility. Everything is measured and written down in patient setup sheet.

Regarding the radiotherapy treatment planning, the process is the same as for a standard breast patient.

At the Treatment Unit, I was able to take part in treatment delivery. The basic principles for VBH are reproducibility and consistency. Working together with experienced radiographers and with patients, I was able to strengthen and further develop my knowledge gained through CT simulations, better understand patient setup, treatment delivery and verification. I was also able to discuss outcomes of this technique, patient experience and satisfaction. Patients find this method more comfortable, in comparison to other breath hold techniques, such as ABC System.

Throughout discussion with all other members of radiotherapy team, they emphasised that the data collected demonstrate a VBH technique is safe. The level of stability of individual breath holds, breath hold-to-breath hold variation, and the results of the dosimetric verification of the radiotherapy delivery are acceptable.

In a two week period, it was possible to see enough clinical cases and to overcome the challenges of such a technique.

In conclusion, I hope that the knowledge gained in Royal Marsden Hospital will help us successfully implement vDIBH technique in our daily clinical practice.

Special thanks to Dr Anna Kirby who made this visit possible and every radiographer who unselfishly conveyed their knowledge to me.

*References:*

**Voluntary Breath-hold Technique for Reducing Heart Dose in Left Breast Radiotherapy**

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**Voluntary breath-holding for breast cancer radiotherapy is consistent and stable**

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