The role of the therapeutic radiographer

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With the ever-increasing complexity of the radiotherapy patient pathway the notion of advanced practice may be considered increasingly inherent in the role of therapeutic radiographer, notably with the continued drive towards adaptive radiotherapy. Current drivers for advanced therapeutic radiographer practice have seen blurring of boundaries between traditionally clinician-defined aspects of the patient pathway and the ones by therapeutic radiographers. With the inevitable and not too distant reality of real-time online adaptation of the patient plan at the point of delivery, the role of the therapeutic radiographer will likely further evolve, with the requirement for knowledge and skills associated with dosimetry, and ultimately approval of the treatment plan and increasing ownership of the patient treatment prescription.

What is radiotherapy?

Every year there are approximately 360,000 newly diagnosed cancer patients in the UK, with more than half dying from cancer.1 Radiotherapy plays a key role in cancer management.2 The Society and College of Radiographers (SCoR) defines radiotherapy as: “The use of ionising radiation, usually high energy x-rays to kill cancer cells and shrink tumours.”3 Its aim is to irradiate the entire tumour and any related microscopic disease to a high dose while minimizing damage to the surrounding normal tissues. Radiotherapy is one of three main modalities in the treatment of cancer where it can be used alone or in combination with surgery and/or chemotherapy. Used mostly to treat malignant cancers and other benign diseases or conditions, studies have shown that 50% of cancer patients could benefit from having radiotherapy as part of their anti-cancer treatment strategy.4

Radiotherapy is delivered most commonly by external beam radiotherapy (EBRT) and/or with internal radiotherapy treatment, also known as brachytherapy. EBRT is delivered using high energy ionising radiation generated by a linear accelerator (linac, figure 1).5 A machine that moves around the patient and delivers highly accurate and targeted radiation to the treatment region from one or more directions.

The role of a therapeutic radiographer

The delivery of medical radiation is a highly specialised field and requires the expertise of a radiographer. In the UK, there are nearly 30,000 radiographers registered with the Health and Care Professions Council (HCPC).6 There are two main branches of radiographers: diagnostic and therapeutic. Diagnostic radiographers make up the majority of registrants, with 15% of UK radiographers identifying as therapeutic.7

The title of therapeutic radiographer is protected under the HCPC in the UK.8 Internationally however, there is no agreed consensus to the title. Therapeutic radiographers are often recognised as radiologic technologists in the USA, medical radiation technologists in Canada, and radiation therapists in Europe and Australia.9

Therapeutic radiographers are allied health professionals responsible for the radiotherapy planning and treatment of patients with malignant or benign disease. They use their expert knowledge of radiation protection, anatomy, physiology and pathology in order to evaluate and assess diagnostic images for the purpose of image acquisition and accurate radiotherapy treatment delivery.

There are numerous complex processes in a typical radiotherapy patient pathway. Figure 2 shows a schematic block...
Radiotherapy is a complex process of treatment planning and treatment delivery and therapeutic radiographers are the only healthcare professionals qualified to plan and deliver radiotherapy guided by the ALARA principle (as low as reasonably achievable) under the Ionising Radiation Medical Exposure Regulations (IR(ME)R). They play a vital role in the treatment of cancer by managing the radiotherapy patient pathway through a number of steps including: patient identification; preparation of a treatment directive; patient positioning and immobilisation for planning and treatment; volume delineation from patient images; treatment planning and quality assurance; treatment delivery and verification; on and post-radiotherapy review and follow-up.

Therapeutic radiographers in pre-treatment are often involved in the scanning, planning and calculation of customised radiotherapy treatment plans. Patients are immobilised in a stable and reproducible position during the acquisition of planning imaging scans. The imaging data is then exported to a treatment planning system where a custom radiotherapy treatment plan is generated for each patient. Comprehensive quality checks and assurance processes are carried out to ensure all radiotherapy treatment plans are produced accurately according to departmental standards.

When patients arrive for the first day of treatment, therapeutic radiographers will verify the patient’s position and assess the position of anatomy prior to the delivery of treatment. During each subsequent appointment, therapeutic radiographers will evaluate patients’ fitness for treatment and advise them daily on side effect management during and post treatments. Therapeutic radiographers always ensure the care provided is safe, effective and appropriate, while always keeping quality patient care at the forefront of their work. They also have an active role in the training and development of students, as well as maintaining their continuing professional development through various training activities or academic courses.

Education and training
Radiotherapy is a relatively young field that has made huge strides forward in the past few decades. As such, there is a diverse and varied stratification of education levels, titles and roles across many different countries around the world.

In the UK, various higher education institutes and universities offer radiotherapy training as a Bachelor of Science degree (BSc) or an accelerated postgraduate diploma (PgDip) course. The training curriculum is developed using a competency framework that covers both standard didactic and clinical placements. The training period varies based on the programme but is an average of three years for the BSc and two years for the PgDip programme. Students study a range of subjects from basic radiation physics, basic oncology, anatomy and physiology, to patient side effect management and the fundamentals of radiobiology. Upon the completion of their undergraduate programme, newly qualified therapeutic radiographers are required to register with the HCPC in order to practise in the UK. After registration, therapeutic radiographers are required to partake in continuing professional development (CPD) activities over the course of their career in order to fulfil their professional obligations, and may be selected for audit by the HCPC providing evidence of their learning activities.

With regards to training in Europe, an initiative by the European Society for Radiotherapy and Oncology (ESTRO) Radiation Therapist (RTT) committee, proposed the establishment of a common European Qualifications Framework (EQF) to benchmark therapeutic radiographer/RTT education. This benchmark established at EQF level 6 aims to ensure that all appropriate educational programmes meet the benchmarks and are consistent with the ESTRO core curriculum for RTT training. A few of the major components of this framework require graduate RTTs to work at the required level of competency and be able to adapt to future developments in the field. The goal is to install critical thinking, reflective practice, problem solving, examination of practice and decision making based on evidence-based practice. With the ease of mobility across the European Union, the benchmark was established as a concrete in order to eliminate practice inconsistencies and reduce errors in the RTT education.

Career progression and advanced practice
In the last decade, there have been rapid changes and progressive developments in the technology used for planning and delivery of radiotherapy. Intensity modulated radiotherapy, volumetric modulated arc therapy and adaptive radiotherapy are now commonly implemented for clinical use. With the introduction of advanced radiotherapy technology, this has increased the complexity of the treatment process resulting in a shift in types and levels of responsibility between clinicians, physicists and therapeutic radiographers. It provides an opportunity for therapeutic radiographers to extend their roles and scopes of practice.

Addressing recommendations from the Department of Health, a four-tier career/workforce structure was introduced in the UK giving therapeutic radiographers the opportunity to progress from novice to expert and achieve advanced/consultant-level practice (figure 3).

In 2007, the National Radiotherapy Advisory Group suggested that 80% of the radiotherapy workload could be completed by therapeutic radiographers in an extended scope of practice. Advanced practice roles, when implemented due to service needs, have the potential to accelerate workflow and ensure a seamless radiotherapy pathway with fewer time constraints to impact on waiting times.

On this basis the ability to define the role of a therapeutic radiographer as anything other than ‘advanced’ will be challenged both on a practical and legislative level in relation to IR(ME)R. The SCoR defines an advanced practitioner as:
“An individual who as significantly developed their role and who consequently has additional clinical expertise in a defined area of practice... making appropriate clinical decisions related to their enhanced level of practice [which] directly impact[s]...the patient care pathway.”

**About Mount Vernon Cancer Centre**

Mount Vernon Cancer Centre is one of the leading centres for incorporating therapeutic radiographer advanced practice in the country. Advanced practice is actively embraced, with the aim of streamlining the patient pathway in order to deliver a high quality patient-centred service in a more resourceful and innovative way. The centre continues to develop radiographer-led services in many areas of the patient pathway (figure 4).

**References**