Diagnostic – Detailed Information

Diagnostic Radiographers have a key role to play in the diagnosis of disease, and are responsible for the examination of patients using radiation, ultrasound or magnetic fields. In addition, radiographers are involved in interventional procedures such as the removal of kidney stones and the insertion of stents to widen blood vessels

As images produced on an X-ray film are two-dimensional it is often necessary to take two projections to gain further information about the third dimension. Here we can see two images taken at 90 degrees to each other to demonstrate the anatomy of an elbow joint.

Besides demonstrating anatomy, radiographers also use images to show subtle pathological changes and changes in function of organs.

Diagnostic Radiographers also use a range of radiopaque 'dyes' or contrast agents to demonstrate soft tissue organs such as the arteries (angiogram), bowel (barium studies) and kidneys (Intra-Venous Urogram) which would not normally show up on a standard x-ray examination.

Modern developments in imaging technology, such as ultrasound (US), Magnetic Resonance Imaging (MRI) and other specialised imaging techniques have resulted in radiographers extending their knowledge and skills beyond the 'simple' x-ray examinations.

MRI uses the magnetic properties of hydrogen atoms to produce images in multiple planes and without the use of harmful ionising radiation. It is of great value in imaging, amongst other things, the central nervous system (brain and spinal cord). It is also used to image joints as it can demonstrate soft tissue detail as well as bone abnormalities and is excellent for sports injuries. It is likely that within the near future it will become the imaging modality of choice for many other disorders. However, the strong magnetic field used in MRI means some patients, such as those fitted with a pacemaker, must not be referred for MRI.

Ultrasound has become one of the essential services on offer by imaging departments. It uses ultra-high-frequency sound to produce cross-sectional images of the body. Images are produced in real-time. If required the image can be frozen on the screen so that a detailed examination can take place.

Ultrasound cannot be used in the diagnosis of lung or bone pathology as the sound waves need a fluid interface through which to travel. Likewise information from abdominal examinations can be lost by gas in the bowel. However, because the fetus is contained within amniotic fluid it can be well demonstrated, as in this image. Ultrasound is also very good at measuring blood flow and associated pathologies. Like MRI, ultrasound is non-ionising and can produce pictures in multiple planes. Unlike MRI, Ultrasound examinations are relatively inexpensive.

CT is an imaging technique whereby cross-sectional images of the body are produced and like conventional radiography uses X-rays. However rather than using photographic film the X-ray beam impinges on an array of detectors as it

emerges from the patient. The information is computer processed. Computer image enhancement allows very small differences in attenuation to be detected which, are not possible with conventional radiography.

The radionuclides used in Radio Nuclide Imaging (also known as Nuclear Medicine), emit gamma rays as they decay and are used to label particular pharmaceuticals, which will go to the organs to be imaged. For example a diphosphinate preparation is chosen where bone is the organ to be visualised.

When compared to other imaging modalities the resolution of the images is poor and the anatomical information is limited. However, the major advantage of RNI is that it can detect certain conditions (e.g. bone tumours) at a much earlier stage than other imaging modalities. Also, RNI is good at demonstrating the function of certain organs, for example the heart and the kidneys.

Patients

Radiographers deal with patients of all types and ages, from the very young to the elderly as well as patients with special needs such as visual or hearing impairment. They also examine patients with a variety of conditions, such as patients with a range of injuries or those who are terminally ill. Each patient requires the radiographer to perform a prompt assessment of their needs, both emotional and physical. It is during their training that students develop the skills to cope with these and other situations. All programmes of study in Diagnostic Radiography will help you to develop the skills to do this.

Diagnostic Radiographers don't only work within the imaging department. Sometimes the patient is too ill to come to the department for an examination. In these cases, the radiographer will have to go to the patient.

When a Diagnostic Radiographer first qualifies much of their time may be spent working in the accident and emergency department dealing with injured patients and liaising with other clinical colleagues within the hospital. This often necessitates trips to the operating theatre to offer radiographic advice and assistance during the repair of broken bones.

Career Developments

Radiography is a fast moving and continually changing profession. For example, the opportunity now exists for Diagnostic Radiographers to take post-graduate qualifications, which will enable them to report on the images produced, deliver intravenous injections and conduct barium enema examinations.

Other graduate radiographers chose to take post-graduate courses to specialise in areas such as MRI, ultrasound and nuclear medicine. Radiographers don’t only practice within the NHS some work within private health care or abroad, Australia is a popular choice.

At senior level, radiographers are also accountable for capital and revenue expenditure and human resource management. Other radiographers go into teaching or research and manufacturers also employ radiographers as application specialists.