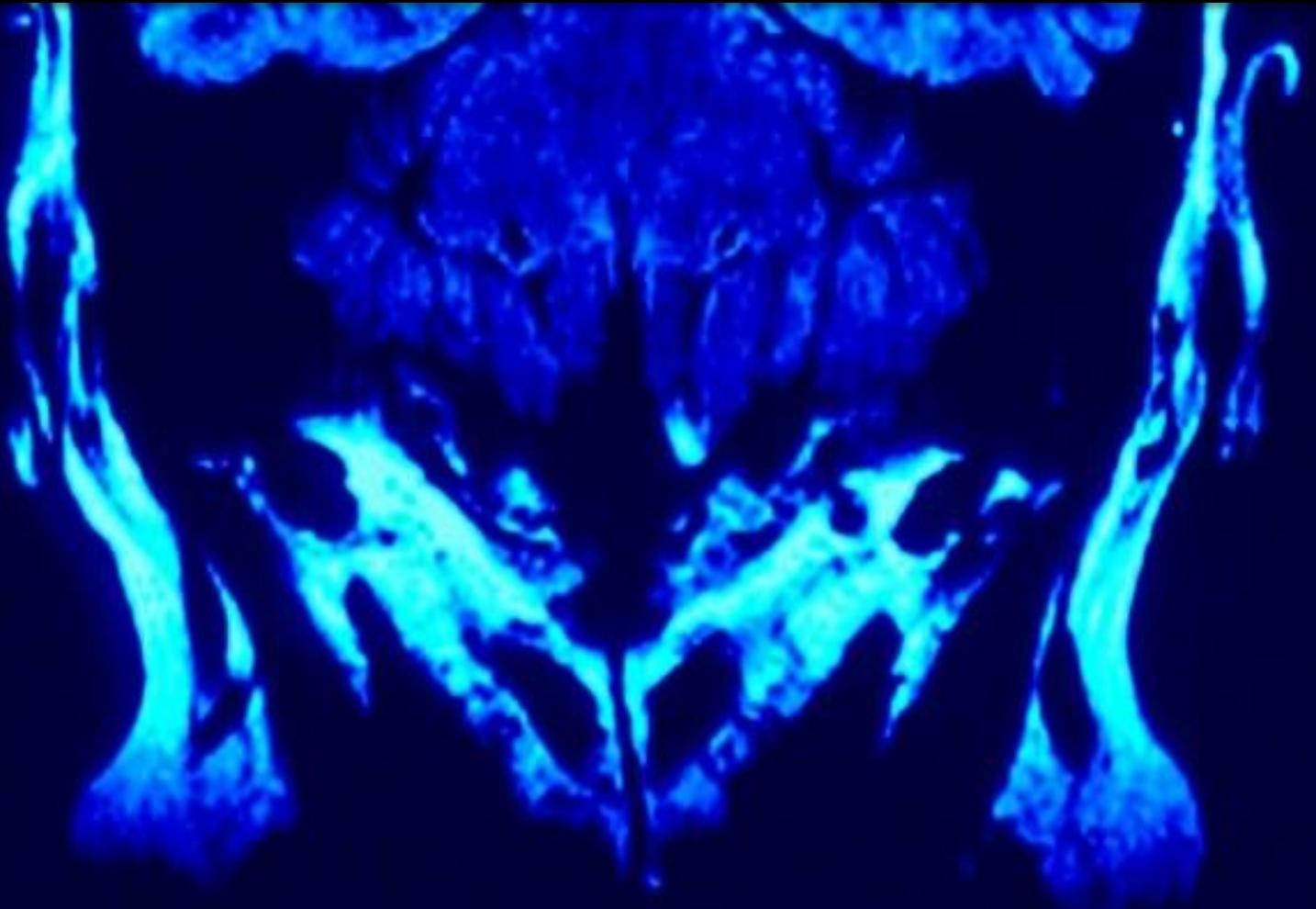
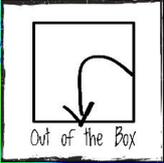


Medical Imaging





Medical Imaging

Medical imaging is used by doctors to produce images, both on the inside and the outside of the body. These images, which can be produced by many different methods, can be used to help diagnose, treat and monitor disease in patients. These scanning methods include the following: ultrasound, X-ray, CT, MRI and PET.



Ultrasound

Computer generated images are produced using reflected sound waves. These sound waves are given out by a probe and reflected back to the probe from organs and other internal parts of the body.

Ultrasound can't be heard by humans because its frequency is higher than the upper human hearing limit. The scan creates an image of the inside the body using high frequency sound waves. This is particularly useful when scanning an unborn baby or guiding a surgeon to a particular place in the body during an operation. A lubricating gel is used to allow the probe to move easily across the skin.

Ultrasound scans don't present any risks or cause any side-effects in

patients. The sound waves are not a form of radiation and are harmless to patients and unborn babies.

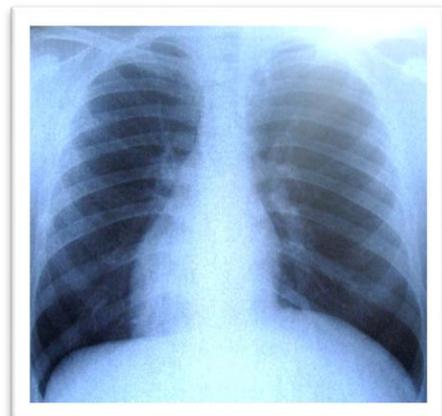
X-rays

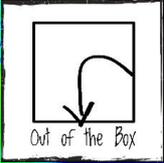
An X-ray is a very quick and painless way of taking pictures of inside the human body. It is very good at looking at bones and showing up breaks in the bone, even if they are only small. Although most X-rays are carried out in hospitals, some other places may also use them, such as dentists.

X-rays can't be seen by the human eye or felt as they pass through your body. They find it easy to pass through skin and tissue but much more difficult to pass through bone. On the image, bones show up as clear white whereas tissue, which makes up your different organs, show up as black.

Using X-rays can also reveal other problems with the body not just with bones. Heart problems, lung problems and some types of cancer can also be found using these scans. Some patients are given a substance before the X-ray which helps to show certain areas of their body more clearly during the scan.

Although X-rays are ionising radiation, your body only receives a small dose during the scan. The risks involved with having X-rays are thought to be very small.





Medical Imaging

CT/CAT scan

A computerised tomography (CT) scan also involves using X-rays and a computer to produce a very detailed scan of inside a human body. These types of scans are also known as CAT scans.

A CT scan is used by doctors to diagnose a range of different problems inside the body, including injuries to internal organs, strokes and diagnosing cancer. During the scan a ring spins around a small section of your body as it passes through.

This type of scan is quick and doesn't cause any pain. It is relatively safe, as the radiation levels which it exposes a human body to are small.

MRI

A magnetic resonance imaging (MRI) scan uses radio waves and strong magnetic fields to produce detailed images of inside the body. The MRI machine can be used to scan any part of the body and allows doctors to diagnose many different conditions.

The patient lies on a bed and is moved into the tunnel. Protons in the patient's body are aligned by strong magnets once in the scanner. Radio waves are used to change the alignment of these protons. The signals which are picked up during this process are used to create an image. The different tissues in a particular area of the body produce different signals.

The scan is safe and painless, however the scanning tunnel is quite small and this can be uncomfortable if a patient suffers from claustrophobia.

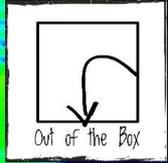
PET

A positron emission tomography (PET) scan produces a 3D image and can be used to see how certain parts of the body are working. It tracks a radioactive substance, called a radiotracer, as it passes through a patient's body.

Facts

- Medical imaging has dramatically reduced the amount of exploratory or unnecessary surgery being performed on patients.
- Using one or more of these methods can be very effective in helping to work out exactly what is wrong with a patient.
- The first MRI scan was carried out on a patient in 1977.
- These imaging techniques can help doctors quickly work out how bad a patient's injuries are during an emergency situation.
- Ultrasound was first used for medical purposes in 1956.





Medical Imaging

Worksheet

1) Use the worksheet to find out what the following types of scan actually stand for:

- a) PET
- b) MRI
- c) CT

2) Find out and then explain why using an ultrasound scan on an unborn baby is much better than using a CT scan.

3) Find out some more information about a positron emission tomography (PET) scan.

a) What is it usually used for?

b) How can the doctors usually get the radiotracer into a patient's body?

4) Make a factsheet, which is aimed at patients, to help them to understand about a particular type of scan. You could include:

- What is the scan usually used for?
- How does it work?
- What will it feel like while having the scan?
- What are the potential problems which could happen during the scan?