

# Understanding Your Scans (X-ray, Ultrasound, MRI, CT)

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When your surgeon orders a scan, it can feel like alphabet soup – X-ray, ultrasound, MRI, CT. Each one is a different tool that shows a different thing, a bit like the difference between a photograph, a video and a 3D model. None of them is simply “better” than the others; the right choice depends entirely on **what we need to see**. Knowing what each scan is good at takes a lot of the mystery out of the instructions you’re given, and helps you understand why we sometimes ask for more than one.

## Why different scans? Each one sees something different

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The single most useful thing to understand is that every type of scan is suited to a particular kind of tissue. Bone, tendons, ligaments, cartilage and nerves all show up differently – and no single scan shows all of them perfectly. An X-ray is superb for bone but almost blind to a tendon; an ultrasound shows a tendon beautifully but can’t see deep inside a joint. So when we pick a scan, we’re really asking a question: *is the problem in the bone, or in the soft tissues, or both?* The answer decides the tool.

That’s also why you might have one scan, then be sent for another. It usually doesn’t mean anything was wrong with the first one – it means we’ve narrowed down the question and now need a different kind of picture to answer it.

## X-ray – the picture for bone

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An X-ray is the quickest and most familiar scan, and it remains the first test for most bone problems. It passes a small amount of radiation through the area and the dense bone shows up clearly white, which makes it excellent for spotting **fractures (broken bones), arthritis, the alignment of bones, and dislocations**. It’s fast, inexpensive and widely available, and the radiation dose is small.

Its limitation is the flip side of its strength: X-rays see bone well but show **soft tissues** – tendons, ligaments and cartilage – only as vague grey shadows. So a normal X-ray doesn’t rule out a soft-tissue injury; it simply tells us the bone looks intact, which is often exactly the reassurance we need first.

## Ultrasound – a live view of soft tissues near the surface

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Ultrasound uses high-frequency **sound waves** rather than radiation, so there's no dose at all. A small probe is moved over the skin with a little gel, and it's particularly good at showing **soft tissues that sit fairly close to the surface** – tendons, **ganglion cysts**, pockets of fluid, and inflammation.

Its special trick is that it works in **real time**. Because we can watch the picture live, we can ask you to move your hand or shoulder and **watch a tendon glide** as it happens – something a still image can't show. This makes it very useful for tendon problems around the wrist, hand and shoulder. The main thing to know is that ultrasound is **operator-dependent**: the quality depends on the skill of the person holding the probe, and it can't see deep inside a joint or through bone.

## MRI – the detailed all-rounder for soft tissue and bone

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An MRI uses a strong **magnet** (no radiation) to build remarkably detailed pictures. It is the all-rounder, because it shows **both soft tissue and bone** in fine detail – **ligaments, cartilage, nerves, bone marrow, and even hidden fractures** that don't show on a plain X-ray. When we're planning surgery or chasing a problem that the other scans can't quite pin down, MRI is often the deciding test.

A few practical things are worth knowing so it isn't a surprise:

- It takes **longer** – usually around **20 to 40 minutes** – and you need to lie fairly still for clear images.
- You lie inside a **tunnel**, and the machine is **noisy**, making knocking and banging sounds while it works. You'll be given earplugs or headphones.
- If you're **very claustrophobic**, please tell us beforehand – there are ways to make it easier, and sometimes a different machine or a mild sedative can help.
- If you have **certain metal implants** (such as a pacemaker, or older metalwork), let us know. Many implants such as plates and screws are perfectly safe, but we always check first, so mention anything you have.

## CT – 3D detail for complicated bone

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A CT scan takes **many X-rays from different angles** and a computer builds them into detailed cross-sections, and even a **3D model**. Like a plain X-ray it is built around bone, but with far more detail – which makes it superb for **complex fractures** (where bone is broken into several pieces) and for **planning surgery in three dimensions**. For tricky breaks around the wrist, elbow or shoulder, a CT can show exactly how the fragments sit so we can plan the repair precisely. The trade-off is that it uses **more radiation than a plain X-ray**, so we order it when that extra detail genuinely changes the plan.

## A different kind of test – nerve studies

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Not every test is a picture. If the concern is a **nerve** – numbness, tingling or weakness – we may arrange **nerve conduction studies or an EMG**. Rather than photographing the body, these measure how well the nerves and muscles are actually **working**, by sending tiny electrical signals along a nerve and recording the response. It answers a different question entirely. You can read more on our **nerve tests and conduction studies** page.

## Putting it together – what to expect

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The reassuring bottom line is that **the team chooses the scan based on exactly what we need to see**, and most scans are quick and painless. An X-ray or ultrasound is often all that's needed; an MRI or CT comes in when we need finer detail or a surgical plan. Whatever you have, the **results will be explained to you** in plain language, alongside what they mean for your treatment.

If you'd like, these are good questions to ask:

- *What is this scan looking for, and which tissue does it show?*
- *Will I need anything else after it, and roughly how long will it take?*
- *Is there anything I should mention first – claustrophobia, metal implants, or being pregnant?*
- *When and how will I get the results explained?*

There are no silly questions here. Understanding why a particular scan was chosen often makes the whole process feel a good deal less daunting.