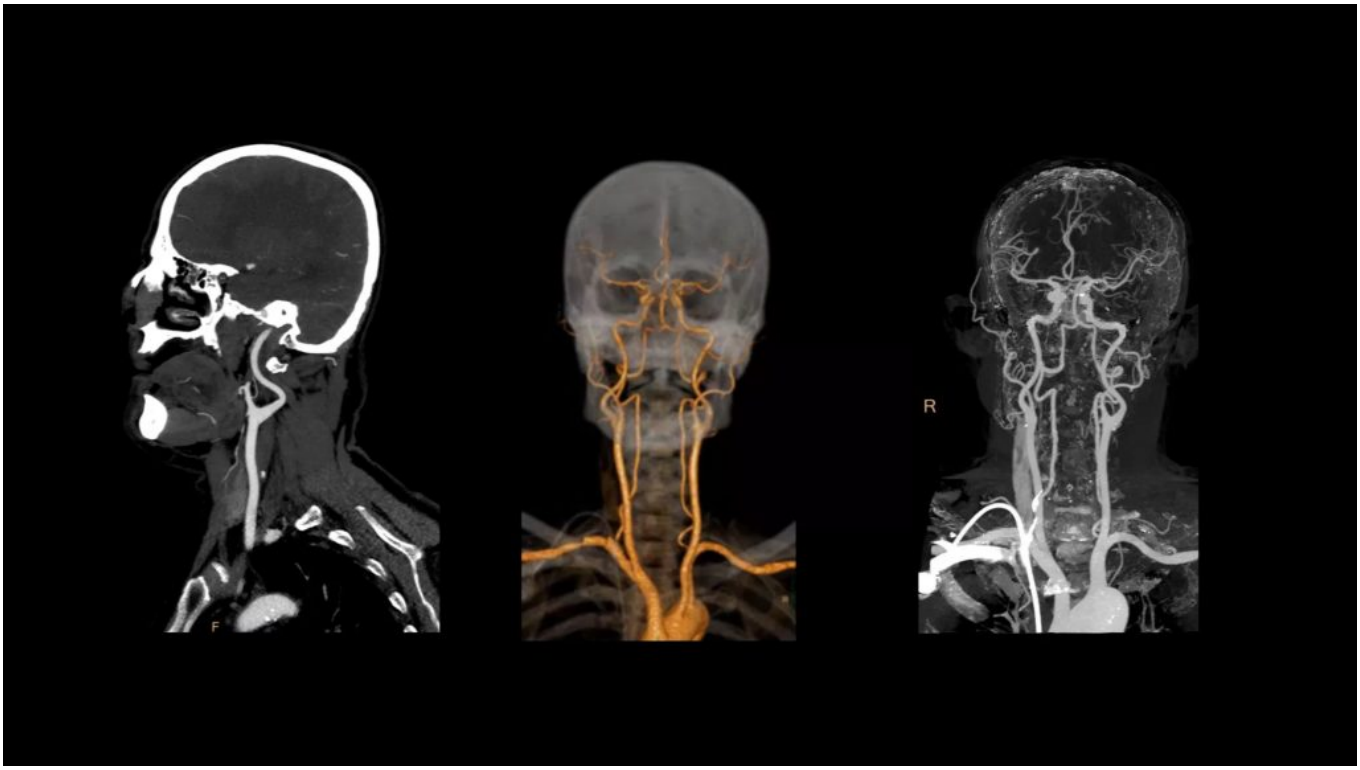
MRI, CT, Ultrasound or X-Ray: How to Choose the Right Imaging Test

31 JAN 2023 · 5 MIN READ



There is no single best scan. There is only the most appropriate examination for the clinical question. MRI, CT, Spectral CT, ultrasound, X-ray and DEXA each show different aspects of the body.

The clinical question comes first

Choosing the right imaging test begins with the problem being investigated. Is the concern bone, cartilage, tendon, nerve, lung, blood vessels, cancer, inflammation, organ structure, fracture risk or treatment guidance? The answer determines the modality, protocol, contrast use and level of detail required.

MRI

MRI is often preferred for the brain, spine, nerves, bone marrow, cartilage, discs, tendons, ligaments, pelvic organs, liver, breast and prostate. It does not use ionising radiation. Its diagnostic value depends heavily on sequence selection, field of view, slice thickness, motion control and interpretation.

CT and Spectral CT

CT is fast and provides high spatial resolution. It is particularly useful for the lungs, cortical bone, calcium, trauma, many abdominal conditions and vascular imaging. Spectral CT can also generate iodine maps, virtual monoenergetic images and material-specific reconstructions. These may provide additional information in selected oncology, vascular, abdominal and inflammatory applications.

Ultrasound

Ultrasound is dynamic and does not use ionising radiation. It is useful for many superficial tendons, joints, abdominal organs and blood vessels, and for image-guided injections. Its field of view and diagnostic performance depend on the body region, the clinical question and operator expertise.

X-ray and DEXA

X-ray remains valuable for fractures, alignment, arthritis and chest imaging. DEXA is the standard imaging test for bone mineral density and can also provide body-composition information, including estimates of fat and lean mass.

A practical guide

Disease does not always fit neatly into a single imaging category. The most appropriate test depends on the organ involved, the suspected pathology, the patient's risk factors and the specific clinical question. In many cases—particularly oncology, vascular disease and complex abdominal or musculoskeletal conditions—**more than one imaging modality may be required for a confident diagnosis.**

Referrers will often begin with the most appropriate first-line examination based on the patient's symptoms, clinical findings, urgency and medical history. The initial scan may answer the question directly, or it may identify an abnormality that requires more targeted imaging.

- MRI is often preferred for the brain, spine, nerves, bone marrow, joints, tendons, ligaments, cartilage and many pelvic and abdominal organs. It also has an important role in oncology, including breast, prostate, liver, pelvic and whole-body cancer imaging, as well as selected vascular examinations using MR angiography.
- CT or Spectral CT is often preferred for the lungs, cortical bone, calcium, trauma, acute abdominal conditions and detailed assessment of the chest, abdomen and pelvis. CT angiography is widely used for vascular assessment, while CT and Spectral CT can play an important role in cancer detection, staging, treatment planning and surveillance.
- Ultrasound is useful for dynamic tendon and joint assessment, superficial soft-tissue abnormalities and vascular Doppler imaging. It also has an important role in oncology, including assessment of the breast, thyroid, liver, testes, pelvic organs and lymph nodes, as well as guiding biopsies and other procedures.
- X-ray is often the starting point for fractures, joint alignment, arthritis, chest imaging and many bone conditions.
- DEXA is usually the preferred examination for bone mineral density, osteoporosis assessment, fracture risk and body-composition analysis.

No single modality is best for every condition. MRI may characterise soft tissue well, CT may better assess lung or calcium, and ultrasound may provide dynamic or vascular information. The strongest diagnostic pathway is often the one that combines the right examinations in the correct sequence.

How MBR Health chooses

The aim is not to perform the most impressive scan. It is to select the examination that can answer the question at the highest useful quality. In Australia, the typical referral pathway is driven by your treating physician. The referral and previous reports should be provided before the appointment so a preliminary assessment of the modality and protocol can be made.

Related Patient Guides

- PG0001 – Welcome to MBR Health: Advanced Medical Imaging and Regenerative Medicine
- PG0003 – Why Image Quality Matters in Medical Imaging
- PG0004 – What Happens After My Scan? Understanding Reports, Results and Follow-up
- PG0005 – Incidental Findings: What are They and Why They Matter

- PG0006 – Preparing for Your Appointment at MBR Health
- PG0007 – Patient Safety at MBR Health

Frequently Asked Questions

For other FAQs please visit our FAQs page

Can MRI see everything CT can see?

No. MRI and CT are complementary. MRI is excellent for many soft-tissue and marrow problems, while CT is often superior for lungs, calcium, cortical bone and rapid vascular assessment.

Is Spectral CT always needed?

No. Spectral information is useful only when CT is clinically appropriate and the additional reconstructions can help answer the question.

Why might I need more than one test?

Different tests answer different questions. A screening test may identify a possible abnormality, followed by a dedicated examination for diagnosis or treatment planning.

> **Important:** The correct imaging pathway depends on symptoms, risk factors, previous imaging and the referral question.

PATIENT GUIDE • PG-0002 [Patient information: *MRI vs CT vs ultrasound*]

Read this article online: https://mbrhealth.com.au/insights/mri-ct-ultrasound-or-x-ray-how-to-choose-the-right-imaging-test/
© 2026 MBR Health · mbrhealth.com.au