Chapter 2
CT and MRI Scans: Different Types of Images

Both CT scanners and MRI scanners can 'slice' the body in various directions. Horizontal scans are the most commonly used. Horizontal scans can be compared with slicing off the top of a boiled egg. To get an idea of what a horizontal CT or MRI slice is like, trace your index finger from one ear to the other, passing your cheeks and the tip of your nose along the way. This equals a horizontal MRI slice of your head and brain. When an MRI or CT scan of the head is performed, the entire head and brain are sliced in this direction.

However, the body can be sliced in two other directions, as well. The first direction involves dividing the body into left and right halves. The middle slice scanned in this direction will be a slice directly dissecting the patient's nose (see image on the next page). To get an idea of what this type of scan is like, place your index finger on your forehead and now trace it down across the bridge of your nose, mouth and chin. This is the second direction in which the MRI and CT scanners produce slices of the head and brain. The third direction involves dividing the body into front (anterior) and back (posterior) halves. To get an idea of what this involves, trace your index finger from one ear to the other across the crown of your head. CT and MRI scans often involve slicing the brain from various directions.

Not only are scans performed from various directions, but also there are several types of scans, as well. Patients will mainly notice that with both CT and MRI scans of the brain, images are produced both before and after the patient is injected with a type of fluid. In certain patients, this injected fluid can provide additional information. Generally, the fluid is intravenously administered through the elbow fold, after which it spreads over the body's blood vessels. This helps doctors visualise abnormalities in the vessels in question. In addition, the injected fluid can help doctors determine whether any vessels are leaking.

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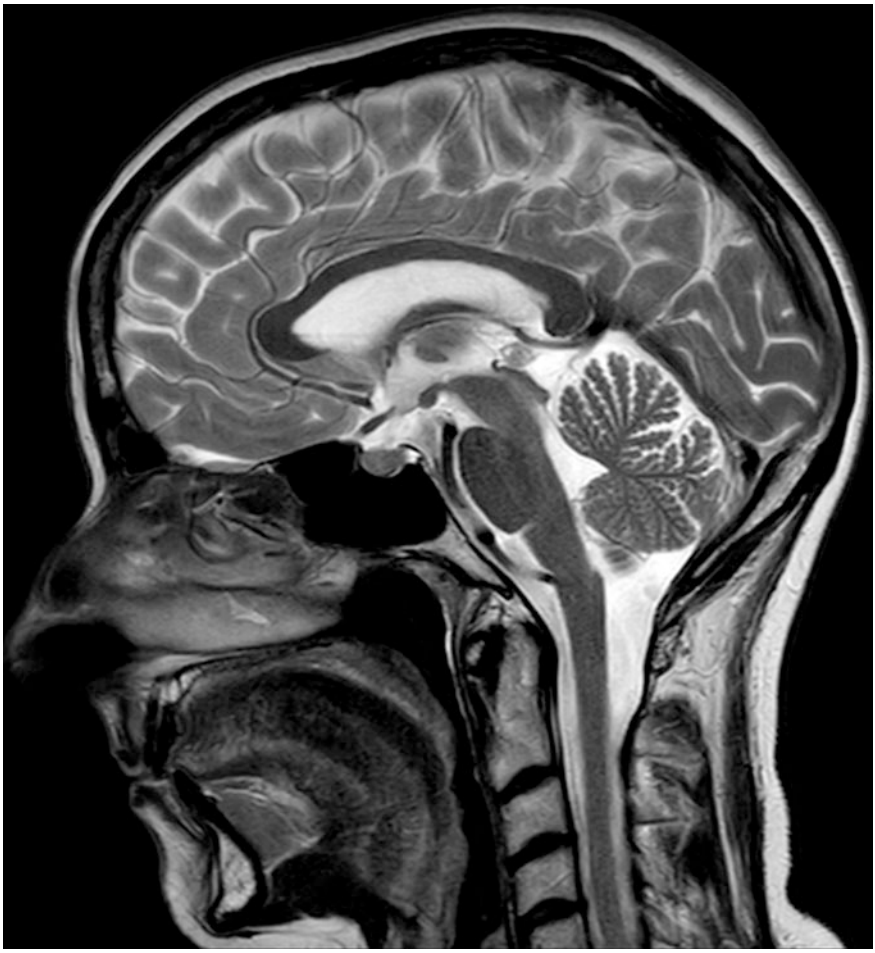

Normally, cerebral blood vessels are well insulated, so they do not leak. Some diseases of the brain may cause the vessels to springs leaks. If this is the case, the injected fluid leaks will be able to be seen in a CT or MRI scan of the brain. Scans made before and after the injection of the fluid will be compared to identify small leaks.

MRI scans often involve the performance of quite a few scans. An MRI scan can be compared to a music album featuring a series of songs. Each type of MRI scan takes 1–5 min to complete, and all songs taken together, a regular MRI scan will take about 15–30 min to complete. The various individual MRI scans will each provide unique information about the brain.

The image on the previous page shows an MRI image produced using a technique which is sensitive to water. Such MRI images are also known as 'scans'. When the brain is irritated, the amount of water may increase in places where one would not normally expect there to be much water. This type of MRI scan is good at visualising this. Pictured on the next page is an MRI scan produced using a technology which is sensitive to blood vessels. Over the years, dozens of clever types of MRI scans have been developed. An MRI scan of the brain often involves between 4 and 7 different types of MRI scan. What types of MRI scan a patient will be subjected to is determined on the basis of the patient's symptoms.

With CT scans, it is easier to try and remember what white, grey and black stand for. The various shades of grey are determined by the amount of X-ray radiation the various body parts block. Bones block a great deal of radiation. As a result, they show up white on CT scans. Air does not block any radiation; therefore, it shows up black on CT scans. Muscles and brain appear light grey, while fat appears a very dark grey. Water is a shade of grey somewhere between the shades of grey associated with muscles and fat. Although the order of greyness is fixed, it is sometimes vital that shades of white be rendered less white, and shades of black less black—for instance, to render small skull fractures more visible. In order to better visualise such fractures, the bone of the skull will be rendered less white.

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