

## Scans for children with brain tumours

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Scans are used to give a detailed image of the brain.

Scans are used during diagnosis of brain tumours and for monitoring the tumour during and after treatment.

Your child may have a brain scan so that doctors can see whether a tumour is present and, if it is, its size and position.

The two scans that are most commonly used are CT scans and MRI scans.

### **In this fact sheet:**

- CT scans: including scan procedure
- Answers to some common questions you may have about CT scans
- MRI scans: including scan procedure
- Answers to some common questions you may have about MRI scans
- How to prepare your child for a scan

**Our series of animations includes one on scans in children. Watch/listen to them here: [thebraintumourcharity.org/jake](http://thebraintumourcharity.org/jake)**

## **CT scans**

CT stands for 'Computerised Tomography'. You may also hear doctors referring to CAT scans - these are the same thing as CT scans.

CT scans use x-rays to build up a 3D image of the inside of your child's head. It uses the X-rays to take several cross-sectional pictures of their head. These 2D picture 'slices' are then stacked together, using a computer, to make the 3D image.

### **What happens during a CT scan?**

- Before the scan, your child will need to take off glasses, hair clips, earrings, removable dental braces or anything in the head or upper neck area that has metal in - in other words, anything that might get in the way of the area being scanned
- Occasionally your child may be given an injection of a fluid called a 'contrast medium'. This helps to give a more detailed image (picture) of the brain on the scan. This can be into the arm or back of the hand.
- If your child is very young or anxious, they may be given oral sedation to calm them and make them sleepy, or they may be given a general anaesthetic for the scan, so that they do not move.
- The scanner is shaped like a doughnut or ring, with a round hole in the middle – this is where your child's head will go.
- Your child will lie on the 'treatment table' part of the scanner.
- The medical staff will take a bit of time to get your child into the right position.
- You can stay with your child during the scan, as long as you are not pregnant, nor likely to be pregnant. You will be asked to wear a protective apron.
- Staff will leave the room, but will be nearby and able to see and hear your child. Your child will also be able to hear the medical staff (and you, if you cannot stay in the room).

- During the scan, your child will hear a humming from the scanner and louder clicking sounds when it is taking pictures. It sounds a bit like a noisy washing machine on a spin cycle.
- The table will move in and out of the scanner a number of times during the scan.
- It is important that your child lies very still during the scan. This is so the pictures of their brain are not blurred
- After the scan, your child would usually be allowed to go straight home.

If your child has had an anaesthetic or sedative, they will need to be fully awake before you can take them home. This could take up to a couple of hours after they have had their scan.

Before your child has a CT (or MRI) scan, you should let the doctors know if your child:

- Is very frightened of having a scan or has become distressed having one in the past
- Has any allergies
- Is on any medication
- Has had a recent illness

## **Other common questions about CT scans**

### **Is the scan painful?**

No, but if your child has a contrast medium injected, this may make your child feel hot or flushed, have a metallic taste in their mouth, or feel as if they have urinated (though they haven't). This feeling usually lasts only for about a minute.

Very rarely, some people have reported feeling cold after having the contrast medium.

Your child may have a 'cannula' (tube) inserted into their hand to give the contrast medium, or it may be given in the arm, so this area could be a bit sore. A cream can be rubbed into your child's skin 30 - 60 minutes beforehand to numb the area to help with this.

## **How long does the CT scan take?**

The CT scan itself takes around 5-10 minutes. Your appointment will last longer, as time will be spent beforehand getting your child into the correct position ready for the scan.

If your child is worried about the scan and does not settle, it will take more time.

If your child needs to be sedated for their scan, this will also add time, as they will need to be seen by a doctor to give the sedative.

## **My child is claustrophobic - what can you suggest?**

If your child feels claustrophobic, it's a good idea to let the hospital staff know before the day of their scan.

They may be able to refer your child to a play therapist, who can help your child get used to, and cope with, the small space.

If necessary, your child may be given a sedative to help calm them before the procedure, but you'll need to ask in advance if you think your child may need one.

## **Can I stay with my child during their CT scan?**

Yes, as long as you are not pregnant. If you are, you could ask a friend or relative to stay with your child while you wait outside the room.

Whoever stays in the room with your child will be given a lead apron to wear to protect them from the X-rays.

## **Can my child breathe normally during the CT scan?**

Yes, it's fine for your child to carry on breathing quietly (normally) during their scan.

## **Are CT scans dangerous?**

CT scans are used only when they are considered necessary, with the benefits outweighing the risks. Radiation is used, but it is kept at a very low dose.

More information about sedation, general anaesthetics and preparing your child for a scan can be found in later sections of this fact sheet.

## **MRI scans**

MRI stands for Magnetic Resonance Imaging. This scanner uses magnetic fields to build up a 3D image of the brain. It does this by taking pictures from several angles around your child's head to build up a detailed image. It can give lots of different kinds of information about the tumour and surrounding brain tissue.

Due to its use of powerful magnets, staff will check that your child does not have any metal on their body (e.g. jewellery, zips, metal belt buckles or clasps on clothing, wrist watches, hair clips).

They will also check anything metal that is in your child's body. Screws, plates and pins from operations should be OK, but some things, such as pacemakers or infusion pumps, may mean your child cannot have an MRI.

### **What happens during an MRI scan?**

- Your child will need to take off glasses, hair clips, belts, dental braces or anything with metal before the scan.
- Your child is likely to be given an injection of a fluid called a 'contrast medium'. This helps to give a more detailed image (picture) of the brain on the scan.
- The contrast medium could be given to your child before, or part way through, the scan.
- If your child is very young or anxious, they may be sedated before they have a scan. This involves giving them a drug which calms them and makes them feel sleepy.

If they are very young or a baby, they may be given a general anaesthetic, so that they do not move.

- The scanner is an open-ended tunnel. The body part being scanned will be in the middle. For brain tumours, this usually means that your child's head and shoulders will be in the tunnel.

Occasionally they may need their spine scanned, in which case their spine will be in the middle of the scanner and their head may be near or out of the other (open) end.

- Your child will lie on a motorised bed. A frame may be placed over their head. This helps pick up the signals to make sure the image is clear.

- The bed will be moved into the scanner so that your child's head is in the right place.

Staff will stay with your child whilst they move the scanner, and will not leave if your child is upset.

- When the staff do leave the room, they will continue to monitor your child closely as they are able to see and hear your child. Your child will also be able to hear the medical staff.
- You can stay with your child during the scan, but let the radiographers know if you are within the first three months of pregnancy.
- You will also need to remove anything metal, and if you have anything metal in your body, you may not be allowed into the room. You will be asked to fill in a safety questionnaire about this.
- The scan is very noisy. It makes loud knocking and clanging sounds. Your child will be given headphones and/or earplugs to wear during the scan to reduce the level of the noise.
- If you stay in the room, you will also be given headphones or earplugs.
- Most children's hospitals can play music or a DVD to entertain your child during the scan.

You could take your child's favourite DVD or music CD with you and ask the hospital to play it during your child's scan.

- It is important that your child lies very still during the scan. This is so the pictures of their brain are not blurred.
- After the scan, and if your child has not been sedated, your child will usually be allowed to go straight home.

If your child was sedated, or given a general anaesthetic, the hospital staff will first check that they have recovered and it is safe for them to go home.

This could take up to a couple of hours after they have had their scan.

## **Other common questions about MRI scans**

### **Is the scan painful?**

No, but your child may feel coolness at the site of injection of the contrast medium. This usually only lasts for a minute or two.

(A different contrast medium is used for in MRI scans from CT scans.)

Your child may have a 'cannula' (tube) inserted into their hand to give the contrast medium, or it may be given in the arm, so this area could be a bit sore. A cream can be rubbed into your child's skin 30 - 60 minutes beforehand to numb the area to help with this.

## **How long does the MRI scan take?**

The scan itself can take between 30 and 60 minutes.

Your appointment, however, will be longer, as time will be spent beforehand explaining the scan to your child and going through the safety questionnaire with you. It will also take some time getting your child into the correct position ready for the scan.

If your child is worried about the scan and does not lie down and keep still, it will take more time.

If your child needs to be sedated for their scan, this will also add time, as your child will need to be seen by the doctor who is giving the sedative.

## **My child is claustrophobic - what can you suggest?**

Although the 'tube' of an MRI scanner is longer than in a CT scanner, the scanner is open-ended, so your child would never be completely enclosed while having their scan. However, depending on which part of the body is being scanned (head or spine) and also the size of your child, it may still feel enclosed to your child.

Often a mirror can be placed so your child can see out of the scanner, which can help to make it feel less claustrophobic. And newer machines are wider than older style ones.

If you think your child is still likely to feel claustrophobic, let the hospital staff know, as soon as possible before the day of the scan.

It is much better for the medical team to be aware of a problem, so they can deal with it before it happens, than for your child to become upset during a scan and it having to be stopped.

They may be able to refer your child to a play therapist, who can help your child get used to, and cope with, the scanner and its noises.

Alternatively, your medical staff will be able to arrange for your child to have a sedative or a general anaesthetic, to make sure that your child does not become overly anxious nor move.

## **Can I stay with my child during their MRI scan?**

You can be in the scanning room with your child while they have their scan, but you should let the radiographers know if you are within the first trimester (i.e. first three months) of pregnancy.

You will need to remove anything metal, such as your wristwatch or jewellery.

You will also need to remove any items in your pocket that have metal on, such as credit cards or other cards with a magnetic strip - the powerful magnets in the scanner can affect their working.

There is usually a locker outside the scanning room to put your belongings in.

You will also be asked to fill in a safety questionnaire and, if you have anything metal in your body, you may not be allowed into the room.

During the scan, you may wish to place a hand on your child's leg to provide reassurance that you are there with them.

## **Can my child breathe normally during the MRI scan?**

Yes, it's fine for your child to carry on breathing quietly during their scan.

They may be asked to hold their breath a few times during the procedure to prevent the image from blurring, but this will be explained to them and it will only be for a few seconds each time.

## **My child has braces on their teeth - is this a problem?**

Having an MRI scan while wearing braces is not dangerous. However, as braces could affect the quality of the scan image, your child's braces may need to be removed, if it is possible. This will be discussed with you by your child's health team and undertaken, if necessary, before the day of the scan.

## **Are MRI scans dangerous?**

MRI scans are completely safe. There are no risks associated with them, although they are not suitable for some people who have metal in their body (for example, skull plates).

This will depend on where the metal is, what type of metal it is, how long it has been there (so how much scar tissue has formed round it), whether it is an implant and whether it is adjustable or not.

Very rarely, the contrast medium can affect the kidneys, particularly if the kidneys are not working as they should. It is, therefore, important to tell you child's medical team if your child has any kidney problems.



## **Important information if your child has an adjustable shunt**

Some children with a brain tumour will have had a tube called a 'shunt' inserted into their head to drain excess fluid from the brain.

If your child has a shunt that is adjustable:

- Keep a note of the settings of your child's shunt.
- It will need to be reset after an MRI scan, as the magnetic field can change the settings.
- Check with the medical team that the correct levels have been reset after the scan.
- Put the settings on a medical alert bracelet, so medics can access them should they need them and you are not there.

## **Resources**

There are several resources that may help to prepare your child:

### **Animations**

#### **Ask Jake about .... Scans**

The Brain Tumour Charity has an animation about a boy called Jake, who has a scan for a brain tumour.

Originally designed for children, we have found that people of all ages find it useful to watch to understand what happens.

***[thebraintumourcharity.org/understanding-brain-tumours/resources/animations-explaining-brain-tumours/](http://thebraintumourcharity.org/understanding-brain-tumours/resources/animations-explaining-brain-tumours/)***

### **Videos**

If you want to show your child actual scanning machines, the charity 'What? Why? Children in Hospital' has two videos of a child being shown the scanning equipment and the procedure being explained:

#### **What happens when my child has a CT scan?**

***[whatwhychildreninhospital.org.uk/video-happens-in-ct](http://whatwhychildreninhospital.org.uk/video-happens-in-ct)***

#### **What happens when my child has an MRI?**

This also lets you hear the sounds of an MRI scanner.

***[whatwhychildreninhospital.org.uk/video-happens-in-mri](http://whatwhychildreninhospital.org.uk/video-happens-in-mri)***

## **Apps**

The University Hospitals of North Midlands NHS Trust, in partnership with Siemens, has produced a free, interactive app that shows what it is like to have an MRI scan, including being able to see from inside the scanner. It can be downloaded from Google Play or the Apple App store.

An associated video showing other imaging techniques, including CT as well as MRI scans and scanning equipment, can be found at:

***radiologyforkids.com***

## **What happens if my child is being sedated?**

If your child is under a certain age, they may be given a sedative before a scan. This is medicine that makes them sleepy, so that they lie still.

(The age at which this is given will depend on the hospital your child is being treated at, but will usually be under 3-5 years.)

Older children tend not to sedate well with 'oral medication'. In other words, they don't go to sleep if given sedation medicine by mouth.

So if your child is older than five years and cannot stay still, they may be given a small, top-up dose of another sedative medicine, such as lorazepam or levomepromazine, by injection.

Cream will be rubbed onto their skin before the injection is given to numb the area.

Sedation can be given by a trained children's nurse or a doctor (anaesthetist), who will monitor your child during and after the scan until it is safe for them to go home.

## **Before sedation**

There are various things you can do to help prepare your child for sedation:

- Reduce the sleep they have the night before  
e.g. by letting them go to bed an hour later and waking them up an hour earlier.
- Make sure they don't eat or drink anything for a few hours before the sedation.

## **After sedation**

If your child was sedated for their scan, they may feel or be sick and not feel like eating very much in the 24 hours afterwards.

They will not be let out of hospital until it is considered safe for them to leave.

Once home, the main thing is that you encourage your child to drink to make sure they are hydrated.

Clumsiness and tiredness are relatively common after sedation and are not a cause for concern.

However, you should be cautious of which activities they do for 24 hours after sedation.

Although medical staff will check that it is safe for your child to go home, if you find that they are very difficult to wake once you have returned home, ring your doctors or NHS 111. This is rare.

## **What happens if my child is having a general anaesthetic?**

For MRI scans, which usually take a bit longer, are noisy and more claustrophobic, your child may need a general anaesthetic.

This is because the length of time that sedation lasts is less predictable than a general anaesthetic, so a general anaesthetic may be needed to keep them safely asleep for the duration of the scan.

This could be the case if they are particularly anxious or have pain and are unable to stay still, or, for example, if they have learning difficulties and don't understand what is happening.

If your child is having a general anaesthetic before their scan, their health team will give you specific information about what will happen and how to prepare. However, the following is a general guide:

### **Before a general anaesthetic**

- Do NOT give your child anything to eat or drink for a number of hours before their anaesthetic.

The doctor will tell you the latest time your child can have anything to eat or drink. (This is to make it less likely they will be sick and choke whilst unconscious).

- On the day, doctors will assess whether it is safe for your child to have the anaesthetic, based on whether they are well enough

e.g. if your child has a bad cold, they will not be able to have an anaesthetic.

- If your child is fearful of needles, the medical team can put a cream on the area where the anaesthetic needle goes in to make it go numb - usually about an hour before the injection.

(If the scan is delayed for any reason, the numbing effect of the cream can wear off. You may need to ask for the area to be wiped and a second dose to be given.)

## **During a general anaesthetic**

- During a scan under general anaesthesia, your child will be closely monitored by an 'anaesthetist', a specialist doctor who is qualified to give anaesthetic drugs.

## **After a general anaesthetic**

- Your child will be monitored by their health team until it is safe for them to go home.
- Your child could feel sick and disorientated for up to 24 hours afterwards.

Don't be worried if your child does not feel like eating much over the next day or two, so long as they are drinking.

## **How long should my child NOT eat or drink before sedation or a general anaesthetic?**

You should get a letter telling you how long before sedation or a general anaesthetic that your child should not eat or drink, but the general rule:

- 6 hours for food, including milk
- 4 hours for breast milk
- 2 hours for clear fluids, such as water
- Make sure they drink up to this time, so that they are properly hydrated.
- This can include waking them in the night for a drink.

## **How long will we have to wait for the results?**

The radiography team will send a copy of the scan to your child's medical team in time for your next appointment, when you will be given the results.

How long this takes can vary. As many of these scans are very detailed, you are unlikely to get the results the same day. They can take up to a week.

This is because your doctors may need to discuss your child's scan with other members of the medical team.

In addition, even one simple scan, especially if it is an MRI scan, can produce hundreds of images, which need to be carefully interpreted. This can take time to do.

You should be told when you will get the results by your child's doctor, clinical nurse specialist or by the radiographer carrying out the scan.

## **What if I have further questions or need other support?**

You can contact our Information and Support Team in the following ways:

- Call 0808 800 0004 (free from landlines and most mobiles including 3, O2, EE, Virgin and Vodafone)
- Email: [support@thebraintumourcharity.org](mailto:support@thebraintumourcharity.org)
- Live Chat: Get in touch with us online via [thebraintumourcharity.org/live-chat](https://thebraintumourcharity.org/live-chat)
- Join one or more of our closed Facebook groups: [bit.ly/FBSupportGroups](https://bit.ly/FBSupportGroups)
- Website: [thebraintumourcharity.org/getsupport](https://thebraintumourcharity.org/getsupport)

## **Disclaimer**

This resource contains information and general advice. It should not be used as a substitute for personalised advice from a qualified specialist professional. We strive to make sure that the content is accurate and up-to-date, but information can change over time.

Patients must seek advice from their medical teams before beginning or refraining from taking any medication or treatment.

The Brain Tumour Charity does not accept any liability to any person arising from the use of this resource.

## **About this information resource**

The Brain Tumour Charity is proud to have been certified as a provider of high quality health and social care information by The Information Standard – an NHS standard that allows the public to identify reliable and trustworthy sources of information.

Written and edited by our Information and Support Team, the accuracy of medical information in this resource has been verified by leading health professionals specialising in neuro-oncology.

Our information resources have been produced with the assistance of patient and carer representatives and up-to-date, reliable sources of evidence.

We hope that this information will complement the medical advice you have already been given. Please do continue to talk to your medical team if you are worried about any medical issues.

If you would like a list of references for any of our information resources, or would like more information about how we produce them, please contact us.

We welcome your comments on this information resource, so we can improve. Please give us your feedback via our Information and Support Team on **0808 800 0004** or [support@thebraintumourcharity.org](mailto:support@thebraintumourcharity.org)

## **About us**

The Brain Tumour Charity is at the forefront of the fight to defeat brain tumours and is the only national charity making a difference every day to the lives of people with a brain tumour and their families. We fund pioneering research worldwide, raise awareness of the symptoms and effects of brain tumours and provide support for everyone affected to improve quality of life.

We wouldn't be able to make the progress we have without the incredible input we receive from you, our community.

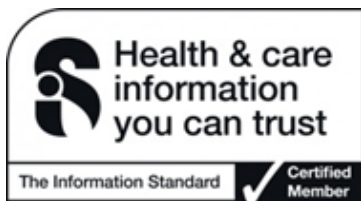
Whether it's reviewing our information resources, campaigning for change, reviewing research proposals or attending cheque presentations, everything you do helps to make the difference.

To find out more about the different ways you can get involved, please visit [thebraintumourcharity.org/volunteering](http://thebraintumourcharity.org/volunteering)

We rely 100% on charitable donations to fund our vital work. If you would like to make a donation, or want to find out about other ways to support us including leaving a gift in your will or fundraising through an event, please get in touch: Visit [thebraintumourcharity.org/get-involved](http://thebraintumourcharity.org/get-involved), call us on 01252 749043 or email [fundraising@thebraintumourcharity.org](mailto:fundraising@thebraintumourcharity.org)

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### **Your notes**



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