The BRAIN TUMOUR CHARITY

Research | Awareness | Support

Radiotherapy for adults with brain tumours

When you're diagnosed with a brain tumour, radiotherapy is one type of treatment you may have.

Radiotherapy, or radiation treatment, uses controlled doses of invisible, high energy beams of charged particles.

These are targeted at the tumour to destroy the tumour cells, while causing as little damage as possible to surrounding healthy cells.

Radiotherapy may be used where surgery isn't possible, or after surgery to kill any remaining cells. It can also be used to prevent a tumour from returning or slow down the growth of the tumour.

Please see other fact sheets for information about specialist types of radiotherapy - Proton Beam Therapy (PBT) and Stereotactic Radiotherapy (SRT).

In this fact sheet:

- What happens if I'm given radiotherapy?
- What are the side-effects of radiotherapy?
- Answers to other questions you may have about radiotherapy to the brain

What happens if I'm given radiotherapy?

Before you're given radiotherapy treatment, a lot of planning and preparation is needed. This is to make sure the treatment is as effective as possible whilst minimising the side-effects.

Before radiotherapy treatment

Planning

Your radiotherapy treatment is very carefully planned by a team of medical specialists to make sure it reaches and destroys as many tumour cells as possible, while avoiding as much healthy tissue as possible.

The team will consist of specialists, always including a clinical oncologist (specialising in radiotherapy), a radiographer (trained in using x-ray equipment) and a medical physicist (who you would not usually meet, but who specialises in radiation).

First, you'll have a radiotherapy planning scan. This is usually a CT (Computerised Tomography) scan, but sometimes is an MRI (Magnetic Resonance Imaging) scan .

For more information, see the *Scans for adults with brain tumours* webpage and fact sheet.

The scan creates a 3D image of your tumour, showing its shape and location within the brain. Together, the image and measurements from the scan help your medical team make precise plans about where to target the radiotherapy.

Sometimes an additional imaging machine, called a simulator, is used either to plan simple brain treatments or to check the complex treatment planned from the CT scan.

All efforts will be made to avoid more critical areas of the brain. These areas include the brain stem (responsible for functions such as breathing and heart rate); the optic nerve (which helps you see); and the cochlear in the ear (to reduce long-term hearing loss).

Sometimes it's impossible to avoid more critical areas of the brain without compromising treatment.

So depending on your tumour and its location, you may need to be given radiotherapy which includes one or more of these areas.

As well as helping to plan the area to be targeted, the scan also helps the medical physicist plan the doses of radiation and how the treatment should be 'staged'.

This means how many sessions of radiotherapy will be needed and how much radiation needs to be given at each treatment session. This is important as it makes sure the normal cells have time to recover before the next dose of radiation.

Treatment mask

It's important to lie very still during treatment, so that the radiotherapy is directed at the right part of the brain.

To help you stay still, you'll have a treatment mask designed and made especially for you to wear each time you have treatment.

It's made specifically to fit your head and fixes to the treatment couch to hold your head in the same position and place each time you have radiotherapy.

How the mask is made:

- Your mask may either be made in the 'mould room' or the room where you have your planning CT scan at the hospital.
- It will take about 30 minutes to make the mask, though you should allow more time for the whole process.
- Different hospitals use different materials to create the mask.

  This may mean having a Plaster of Paris impression taken of your face to make a Perspex mask.
- More commonly, centres use a thermoplastic material to make the mask. This is a plastic that goes soft and mouldable in warm water.
- The thermoplastic mesh is warmed in water to make it soft.
- The mesh is then smoothed onto your face, so that the final mask is an exact replica of the size and shape of your head.
- It will feel warm as it sets and has sometimes been described as a bit like having a warm flannel pressed onto your face.
- Gaps will be made for your eyes, nose and mouth, so you're always able to breathe easily.
- The mask only needs to be worn during the planning and when you have radiotherapy. You don't need to wear it at other times.

To see a video of how a radiotherapy mask is made, see the Cancer Research UK video: ***bit.ly/radiotherapy-mask***

Radiotherapy mask being made

Images reproduced with the kind permission of Cambridge University Hospitals NHS Foundation Trust

Once the mask is made:

- Your radiographer (a specialist in giving radiotherapy) will make ink marks on the mask. These are used to help position you more easily each time you have radiotherapy treatment and will make the process smoother.
- If you're having craniospinal (whole brain and spine) radiotherapy, you may also have some very small markings put on your skin to line up the rest of your body.

During radiotherapy treatment

Your treatment is planned to suit your individual needs, so may be very different to the treatment of other people you may meet.

During treatment:

- You'll lie on the radiotherapy bed with the radiotherapy machine above you.
- Medical staff will take some time positioning you to make sure the radiotherapy goes to the correct place.
- During the positioning, the radiographer will place your mask over your head and attach it to the table to prevent you from moving. This will stay on for the duration of the individual treatment, which is called a fraction.
- Before the radiotherapy machine is switched on, the medical staff will leave the room.

  This is to prevent giving any radiation to people who don't need it.
- The medical staff will be nearby though and easily able to hear, see and speak to you. You'll also be able to hear and speak to them.
- There are a number of different types of radiotherapy machine. Some may move around you during treatment, while others look more like a CT scanner. (See the *Scans for adults* fact sheet.)

- Hospitals will often allow you to take a CD along, so you can listen to your music while you're having radiotherapy.
- Once the treatment is finished, the medical staff will come back into the room. They'll detach the mask from the radiotherapy table and remove it, so you can sit up and get off the table.
- The medical staff will keep your mask until the next treatment session.

How long will treatment take?

Treatment times will vary, depending on your individual treatment plan.

Each session of radiotherapy (fraction) generally lasts only a few minutes, though it can be as short as a few seconds.

Your appointment as a whole will take considerably longer, due to the medical staff spending time positioning you to make sure you're in the right place.

If you're having radiotherapy to the brain and spine (known as craniospinal radiotherapy), it can take a bit longer.

An example of a typical radiotherapy plan is treatment once a day, Monday to Friday, with a break at the weekends.

The period of time over which your radiotherapy is spread will also depend on your treatment plan, but it's common for it to last for around 4 to 6 weeks. Simple treatments are usually much shorter - a few days to 2 weeks.

Before the treatment begins, your medical team will be able to tell you how many sessions you'll need, how often and over what period. They'll also be able to give you a guideline for how long each visit to the hospital should take.

After radiotherapy treatment

Generally radiotherapy is given as an outpatient, so you'll be able to go home after each session. Occasionally, if you feel unwell, you may have to stay in hospital overnight. If you're in hospital having another treatment, such as chemotherapy, you can go back to your ward.

Once the whole course of treatment is complete, you can take your treatment mask home, if you want to.

Some people use them to hang their earrings, headphones or hats on. They can help friends and family understand the treatment you've gone through.

Following treatment, you'll have regular check-up appointments to monitor the effects of the radiotherapy on your tumour and any side-effects you may get.

You're likely to experience some side-effects. Some of these will be temporary and gradually clear once the treatment has finished. Others may be long-term.

What are the typical immediate side-effects of radiotherapy?

Radiotherapy works because it does the greatest damage to rapidly dividing cells, such as tumour cells. However, it can also affect any normal cells within the treatment area, particularly those which also divide rapidly.

Rapidly dividing cells include skin cells, cells lining the mouth and the digestive tract, plus blood cells in the bone marrow. These areas, therefore, tend to have the most common side-effects.

You may find it helpful to ask your doctor about the side-effects you might experience.

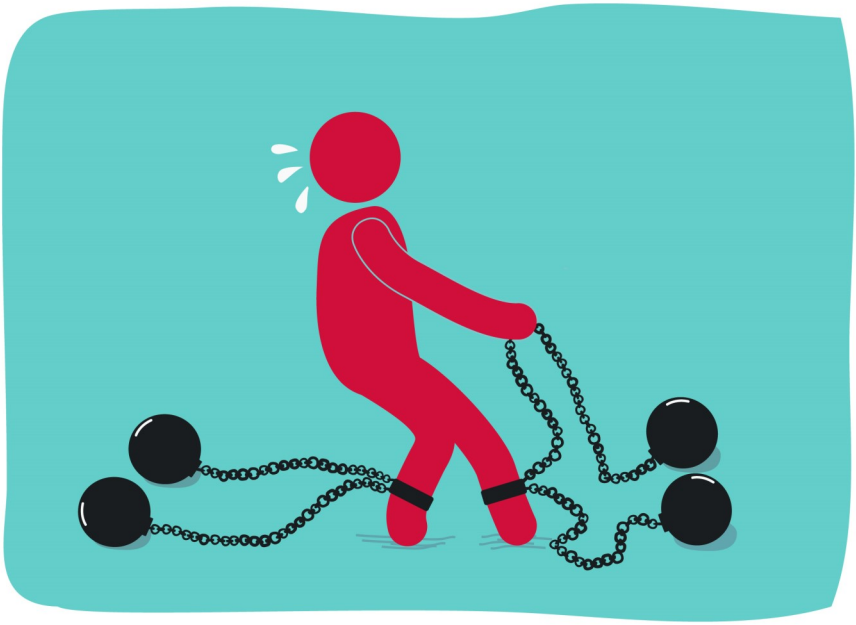
Generally, the more immediate side-effects will gradually disappear within around 6-12 weeks after treatment finishes.

Common side-effects of radiotherapy include:

Tiredness

You're very likely to feel tired during your treatment and, as the weeks of radiotherapy go on, this tiredness could increase.

This may be because your body is using its resources to repair any damage to healthy cells caused by the radiotherapy, or because of all the journeys to and from the hospital.



3 in 5 people we spoke to reported fatigue and, of those, 40% said they were severely affected by it.

Unfortunately, the feeling of tiredness doesn't go away immediately once the treatment stops and could continue for a number of weeks.

Let yourself rest or nap when you need to and don't feel you must fight the tiredness. Try to plan rest breaks into your days even if you're not feeling tired.

Health teams now encourage all patients to do at least 30 minutes gentle exercise every day to minimise radiotherapy-induced fatigue. This could be a gentle walk.

For more information, including practical tips on coping with fatigue, see the *Fatigue* webpage and fact sheet.

Hair loss

Unfortunately, you will lose some hair during radiotherapy, and this can be quite distressing for you.

Generally, your hair will only be lost from the places where the radiotherapy beam enters and leaves your head. If, however, you have whole brain radiotherapy, you're likely to lose hair from your whole head. You can talk to your radiographer about where you're most likely to lose hair.

Knowing that there'll be some hair loss means that you can plan ahead.

Take a picture of how you usually wear your hair, so that a hairdresser can shape a wig. You could also keep a lock of your hair to match the colour and texture.

Some people have found gradually cutting their hair shorter, or even shaving it all off, before the start of treatment can help it feel less of a shock.

Hair loss usually starts around 3 weeks after treatment starts. Most hair loss is temporary, and will begin to grow again 2-3 months after finishing treatment.

Re-growth is often not as thick as it was before, and your hair may not be the same colour or texture. For example, it may be curly, when it was straight before. For some people, hair loss can be permanent.

There are many styles of wig that you can choose from, including synthetic (monofibre) and human hair wigs. And also lots of places that sell hats, bandanas or wigs and hairpieces as practical suggestions for coping with hair loss.

See the *Resources* section later in this fact sheet for details.

Skin sensitivity

During or a few weeks after radiotherapy, some people develop changes to their skin in the area being treated, i.e. on your scalp.

These can be like sunburn (red, blotchy and itching) in people with pale skin, and darkening of the skin in those who have darker skin.

As your skin will be more sensitive after radiotherapy, you should take care to protect it from strong winds and the sun. Always wear suntan lotion and a sunhat with neck protection when you're outside.

Usually, the sensitivity will fade in the month or so after treatment, but you should keep using high factor sunscreen long-term on the areas of the skin that have had radiotherapy.

This is because radiotherapy can permanently destroy the pigment-producing cells in your skin. These cells enable you to tan and protect you from sunlight damage and developing skin cancer.

Your health team will be able to give you further guidance if you develop skin sensitivity.

Feeling sick (nauseous)

If you have radiotherapy to the lower part of your brain, you may feel sick or actually be sick following treatment.

This can start from around an hour after treatment and last some weeks. Your doctor can give you anti-sickness tablets to manage this.

Reduced appetite

Feeling sick and tired can make some people temporarily lose their appetite during radiotherapy. This can lead to weight loss.

You may find it easier to eat several smaller snacks throughout the day, rather than three 'regular' meals. Or ask your health team if they can refer you to a dietitian.

For more information, see the *Diet* webpage and fact sheet.

Myelosuppression

(slowing of the production of blood cells by the bone marrow)

Radiotherapy can temporarily slow the production of blood cells by the bone marrow.

Low blood cell counts are usually not severe enough to cause major problems. When there is a break from treatment for a few days, blood cell counts usually recover.

However, the low levels can sometimes lead to anaemia, increased risk of infection and/or bleeding, such as bruising or nosebleeds.

If you've had radiotherapy to the brain and spine, or if you're also having chemotherapy, you're more at risk of these effects.

Worsening of symptoms

Radiotherapy to the brain can cause swelling in the treatment area. This swelling increases the pressure in the head, so can sometimes make symptoms worse before they get better.

Your doctor might give you steroids to try to prevent this. Your symptoms usually get better in time.

See the *Steroids for adults with brain tumours* webpage and fact sheet for more information.

Your health team will discuss possible side-effects with you before you have treatment. Feel free to ask them any questions at any time if you have concerns.

Will there be any long-term side-effects of radiotherapy?

Once the whole course of treatment is complete, you'll have regular check-up appointments to monitor the effects of your radiotherapy treatment. Generally, side-effects, apart from hair loss, will gradually disappear within around 6-12 weeks.

It's important to know that radiotherapy is given in a way designed to limit the chance of permanent side-effects as much as possible.

Very few people develop long-term difficulties.

Occasionally, some side-effects can be longer-term or develop later in life. Your health team will talk through any side-effects with you before any treatment is given.

Long-term effects of radiotherapy could include impacts on:

Cognitive skills

Cognitive skills include thinking, memory, learning, concentration, decision-making and planning. They also include processing skills, such as recognising and making sense of information from your senses, particularly sight and hearing.

If a large part or the whole of your brain is treated, there is a long-term risk of cognitive impairment.

For further information, see the *Cognition and brain tumours* webpage and fact sheet.

Vision

If the radiotherapy is delivered near to your eyes, there's a chance of developing a cataract in the lens of the eye several months or even years later. Cataracts can make your vision cloudy, blurred or dim. However, they can usually be easily treated with a simple, small operation.

Hormonal effects

Radiotherapy treatment that includes the pituitary gland at the base of the brain can affect the production of the various hormones that the pituitary controls.

This can cause a variety of symptoms related to functions such as body temperature, growth, salt and water balance, sleep, weight and appetite.

As part of your follow-up after radiotherapy, you may have blood tests to check your hormone levels, but if you notice any new symptoms, you should discuss them with your doctor.

Second tumour

Radiotherapy can cause changes that, over a long period, can lead to a second tumour developing.

However, the benefits of having radiotherapy far outweigh the risks, and only a small number of people will develop a second cancer because of the treatment they've had.

Long-term side-effects can take months and sometimes years to develop.

Other frequently asked questions

Will the treatment be painful?

No, you can't see or feel the radiotherapy beams and you won't feel any heat from it either.

You'll hear the machine though, which can be quite noisy.

The Brain Tumour Charity animation about radiotherapy for children includes a sample of the noise. ***thebraintumourcharity.org/jake***

Will I be radioactive after my treatment?

No. The radiation comes from the machine and does not stay inside your body. You don't need to take special precautions when you leave the hospital. It's safe to be around others, including children.

Will I need to give up work?

It's likely that you'll need to take some time off work during treatment and for at least a little while afterwards.

Precisely when you go back to work must be your decision. It's important that you don't feel pressurised to go back too soon and that you do what feels right for you.

Some people find it helpful to return to work as soon as possible, as it gives them something else to focus on. For others, it's months before they feel ready.

Your health team may be able to signpost you to organisations that can help you return to work, or contact The Brain Tumour Charity for information.

For more information, see the *Employment resources* webpages and downloadable resources.

Why is the treatment given in several small doses instead of one large dose?

The full dose of radiation you need will be carefully calculated, depending partly on the size, type and location of the tumour.

The dosage is then divided into a number of smaller doses called fractions. There are two main reasons for this.

The first is that the sensitivity of a cell to radiation depends on where it is in its growth cycle.

Giving radiotherapy in several doses means that the tumour cells will receive radiation when they're in their most sensitive stage.

The second reason is to allow healthy cells to recover between treatments.

Cells that grow and divide quickly (tumour cells) are much more sensitive to radiation than non-dividing, resting (normal) cells. Having a gap between doses gives the normal cells time to recover while still causing damage to the tumour cells.

Resources

Wigs and other headwear

There are many different styles of wig to choose from, including synthetic (monofibre) and human hair wigs. You can also buy headscarves and other headwear.

You can get free synthetic wigs on the NHS if:

- you live in Scotland, Wales or Northern Ireland (via free prescriptions)
- you live in England and:
  - you're under 16, or under 19 and in full-time education
  - you're a hospital inpatient
  - your weekly income is low
  - you apply to the NHS Low Income Scheme and receive an HC2 certificate for full help with health costs
  - you have a valid NHS tax exemption certificate
  - you're a war pensioner, the wig is for your accepted disablement and you have a valid war pension exemption certificate.

People in England who are receiving treatment for cancer, the effects of cancer, or the effects of current or previous cancer treatment now get free prescriptions. This includes a prescription for a synthetic wig.

Disclaimer: The Brain Tumour Charity provides the details of other organisations for information only. Inclusion in this fact sheet does not constitute a recommendation or endorsement. The following list is not exhaustive.

Afrostyling
This is an online retailer selling wigs, extensions and other hairpieces.
afrostyling.com or 0161 870 2387

Annabandana
Selection of headwear that can be ordered online or by phone.
annabandana.co.uk or 01297 553747

Bohemia Fashions
Headwear for men, women and children with hair loss, including sleep caps and padded headscarves.
bohemiaheadwear.co.uk or 01582 750083

Chemotherapy Headwear
Sells hats and headscarves for people experiencing hair loss.
chemotherapyheadwear.com or 01483 901403

Direct Wigs
Online seller of both men and women's wigs, hair pieces and scarves.
directwigs.co.uk or 01793 632152

Hairware
Large selection of wigs, hats and other accessories. Approved by NHS for prescription wigs.
hairware.com or 0845 713017

My New Hair
Charity that provides support and advice for medical hair loss, plus a network of salons providing wig styling.
mynewhair.org

Little Princess Trust
Provides free real-hair wigs to young adults (male and female) up to the age of 24, who have lost their own hair through cancer treatment.
littleprincesses.org.uk or 01432 760060

Hero by LPT
Part of the Little Princess Trust, this service was set up in response to some boys not being comfortable receiving a wig from a charity called Little Princess Trust. It provides free real hair wigs to boys and young men up to the age of 24, who have lost their hair through treatment for cancer.
herobylpt.org.uk or 01432 760060

Hair4U
Offers free real hair wigs and a salon styling experience for young people aged 13-24 (male and female) nationwide. Set up by Teenage Cancer Trust.
teenagecancertrust.org/about-us/what-we-do/hair4u
or 0207 612 0370

WigBank
A network of wig banks around the UK that offer new and donated wigs for sale. People donate wigs they no longer need. The wigs are washed, disinfected, conditioned and sold from £20, with £5 going to a cancer charity of the buyers choice.
wigbank.com or 0131 336 5100

Wig-Wham
Provides a personal service for women to try on wigs in her private studio. Can offer evening and weekend appointments.
wig-wham.co.uk or 01785 823531

The Institute of Trichologists
Gives information about hair grafts.
trichologists.org.uk or 0845 604 4657

What if I have further questions or need other support?

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

0808 800 0004
(Free from landlines and most mobiles: 3, O2, EE, Virgin and Vodafone)

support@thebraintumourcharity.org

Live Chat
Get in touch with us online via
thebraintumourcharity.org/live-chat

Join one (or more) of our
closed Facebook groups:
bit.ly/FBSupportGroups

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're 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***

Your notes:

Your notes:

Your notes:

About The Brain Tumour Charity

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 a difference.
To find out more about the different ways you can get involved, please visit *thebraintumourcharity.org/volunteering*

We rely 100% on charitable donations to fund our work.

If you would like to make a donation, or find out more 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
call us on 01252 749043 or email
fundraising@thebraintumourcharity.org

Health & care information you can trust
The Information Standard Certified Member

Helplines Partnership MEMBER

Registered with FUNDRAISING REGULATOR

amrc ASSOCIATION OF MEDICAL RESEARCH CHARITIES

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