

Radiotherapy

Radiotherapy, or radiation treatment, uses controlled doses of high energy beams to destroy tumour cells whilst causing as little damage as possible to surrounding 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 progression of tumour.

Stereotactic radiotherapy or SRT is a different type of radiation treatment - it delivers radiation beams in a highly focused way to the site of the tumour, but is only suitable for certain types of tumours. This is not discussed in this factsheet. (For information about this type of radiotherapy, see the Stereotactic radiotherapy fact sheet).

In this fact sheet:

- How radiotherapy treatment is planned
- The treatment mask
- The treatment procedure
- After treatment
- Answers to some common questions that you may have about radiotherapy.

This fact sheet is relevant to brain tumours in adults - for fact sheets and other resources for children, please see

www.thebraintumourcharity.org

Planning

Your radiotherapy treatment is very carefully planned by a team of medical specialists to ensure that it reaches and destroys as many of the tumour cells as effectively as possible, whilst avoiding as much of the healthy tissue as possible.

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

Usually an additional CT (Computerised Tomography) scan and sometimes an MRI (Magnetic Resonance Imaging) scan are needed to plan the treatment. (For more information, see Scans fact sheet). The scans create a three-dimensional image showing the shape and location of the tumour, allowing for more precise planning.

Together, the image and measurements from the scan help the medical team plan your treatment. 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.

Treatment mask

It's important that you stay very still during the treatment so that the radiotherapy is directed to the correct part of the brain. To help you stay still, you will have a treatment mask designed and made specifically for you to wear each time you have treatment.

During the planning stage, your radiographer may make ink marks on the mask to help position you more easily each time you have treatment.

You can breathe easily in the mask, but some people do find wearing it claustrophobic.

How the mask is made:

- Your mask may either be made in a 'mould room' or in the room where you have your CT scan for planning your radiotherapy treatment at the hospital. It normally takes around 30 minutes to make the mask.

- 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. Other centres use a thermoplastic material to make the mask - this is plastic that goes soft and mouldable in warm water.
- Whichever way your mask is made, you will be able to breathe normally the whole time, but it may feel warm as the material sets.
- 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.



Thermoplastic radiotherapy mask being made

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

To see a video of how a radiotherapy mask is made, see the Cancer Research UK website:

www.cancerresearchuk.org/cancer-help/type/brain-tumour/treatment/radiotherapy/about-brain-tumour-radiotherapy

Treatment

Your treatment is planned to suit your individual needs, so may be different to the treatment of other people you may meet. An example of a typical plan is once daily treatments, Monday to Friday, with a break at the weekend. Each treatment is called a 'fraction'.

During treatment you will lie on the treatment couch wearing your mask. The mask helps keep you in position and has marks on it that help the radiographers, who give you your treatment,

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to position you correctly. This may take a few minutes as they need to be sure that the radiotherapy is given to the correct area. Your radiographer will attach the mask to the treatment couch for the duration of the treatment (fraction).

There are a number of different types of radiotherapy machine - some may move around you during treatment, whilst others look more like a CT scanner. (*For more information about CT scanners, see the Scans fact sheet.*)

Before the radiotherapy machine is switched on, staff will leave the room. This is to prevent over-exposure to radiation as they give a number of treatments each day. They will be nearby though and are watching you the whole time. They can also hear you should you need them.

How long does the treatment take?

It varies depending on your individual treatment plan, but each treatment ('fraction') can take anywhere from between a few seconds to a few minutes. As it's so important for the radiotherapy to go to the right place, staff will spend some time positioning you beforehand.

The period of time over which your radiotherapy is spread varies from person to person, but it's common for it to last for around 4-6 weeks. Simple treatments are usually much shorter - a few days to 2 weeks.

Why is the treatment given in several small doses rather than one dose?

The full dose of radiation that needs to be given to you will be carefully calculated, depending partly on the size, type and location of the tumour. The dosage is then usually divided into a number of smaller doses called fractions. There are two main reasons for this.

The first of these is that the sensitivity of a cell to radiation depends on where it is in its growth cycle. By giving radiotherapy in several doses it ensures that the tumour cells will receive radiation whenever they are 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 whilst still causing damage to the tumour cells.

Will the treatment be painful?

No, you can't feel radiotherapy and you won't feel any heat from it either. You will hear the machine though, which can be quite noisy.

Will I need to stay in hospital for my treatment?

Generally, you'll be given radiotherapy as an outpatient, which means going into the hospital for each radiotherapy treatment ('fraction'). If you are having radiotherapy as an outpatient, you will be able to go home after each session. If you're in hospital for another treatment, you can return to your ward.

There is the possibility, however, that you'll need to stay in hospital overnight, for example if you are also having another treatment, such as chemotherapy, or if you are unwell.

After treatment

It is likely that you will experience some side-effects. Many of these will be temporary and gradually fade once the treatment has finished, although others can be long-term or permanent. This will depend on the dose and length of treatment you have had and will differ according to the area of the brain that has received radiotherapy.

Will I be radioactive after my treatment?

No. The radiation comes from the machine and does not stay inside your body. You do not need to take special precautions when you leave the hospital - it is safe to be around others, including children.

What are the typical side-effects?

You may find it helpful to ask your doctor about the side-effects you might experience. Some of the common side-effects include:

Tiredness

It is very common to feel tired during your treatment and, as the weeks of radiotherapy go on, you may feel progressively more so. This may be because your body is using its resources to repair any damage to healthy cells caused by the radiotherapy. It may also be because of all the journeys you are making to and from the hospital. Unfortunately, the feeling of tiredness does not immediately stop once the treatment stops, but may continue for a number of weeks afterwards. Let yourself rest or nap when you need to without feeling that you must fight the tiredness. You may also find a short, gentle walk from time to time helpful. (*For further information, see the Fatigue management fact sheet.*)

Hair loss

You will lose some hair during radiotherapy, but this will only be from the places where the beam enters and leaves your head. If, however, you have whole brain radiotherapy, you are likely to experience hair loss from your whole head.

Hair loss usually starts around 2 or 3 weeks after treatment. 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 some people, hair loss may be permanent.

Hats and wigs or hairpieces are some practical suggestions for coping with hair loss. *Information about where to find these is in the Resources section of this fact sheet.* You can talk to your radiographer about where you are most likely to lose hair.

Feeling nauseous

If you have radiotherapy to the lower part of your brain, you may feel nauseous or actually be sick following your treatment. This can start from around an hour after treatment, and last some weeks. Your doctor or, in some centres, your therapeutic radiographer can give you anti-sickness tablets to manage this.

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Skin sensitivity

During or a few weeks after radiotherapy, some people develop changes to their skin in the area being treated. These can be a bit like sun burn (redness, 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 and always ensure you wear a sunhat with neck protection when you are outside.

Usually, the sensitivity will fade in the month or so following treatment, but you should continue to use high factor sunscreen long-term on the areas of the skin that have received radiotherapy. This is because, in addition to radiotherapy increasing the risk of developing skin cancer in itself, it also can permanently destroy the pigment-producing cells in your skin. These enable you to tan and protect you from sunlight damage. Your health team will be able to give you further guidance if you develop skin sensitivity.

Generally, side-effects other than hair loss gradually disappear within around 6-12 weeks. If you're concerned about any of your side-effects, please talk to your health team about them.

Will there be any long-term effects?

Once the whole course of treatment is complete, you will have regular check-up appointments to monitor the effects of your radiotherapy treatment.

It is important to know that the way radiotherapy is given is designed to limit the chance of permanent side-effects as much as possible, and very few people develop long-term difficulties.

Cognitive impairment

If a large part or the whole of the brain is treated, there is a long-term risk of cognitive impairment (changes to your memory and ability to think clearly). *(For further information, see Cognition and brain tumours fact sheet).*

Vision

If the radiotherapy is delivered near to your eyes, there is 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. This can have caused 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.

Cancer

Radiotherapy can cause changes that, over a long period, can lead to cancer, and a small number of people will develop a second cancer because of the treatment they've had. However, the risks of having radiotherapy are far outweighed by the benefits.

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

Will I need to give up work?

It's likely that you'll need to take some time out of work during treatment and for at least a little while afterwards. Precisely when you go back to work must be your decision - it is important that you don't feel pressurised to do so 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.

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.

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.

Cancerwigboutique.com

This is an online directory that lists numerous companies selling wigs and headwear.

Chemotherapy Headwear

Sells a range of hats and headscarves for people experiencing hair loss following chemotherapy.

www.chemotherapyheadwear.com / 01483 901403

Direct Wigs

Sells a range of both ladies' and gents' wigs, hair pieces and headscarves.

www.directwigs.co.uk / 01793 632152

4myhead.com

Online shop for hats, scarves and wigs for cancer patients.

www.4myhead.com / 07505 028 099

The Institute of Trichologists

Gives information about hair grafts

www.trichologists.org.uk

You can get free synthetic wigs on the NHS if:

- you're under 16, or under 19 and in full-time education
- you're a hospital inpatient
- you're a war pensioner and the wig is for your accepted disablement and you have a valid war pension exemption certificate

You're entitled to help if you:

- get Income Support
- get Income-based Jobseeker's Allowance
- get Income-related Employment and Support Allowance
- get Universal Credit
- get Guarantee Credit element of Pension Credit
- are named on or entitled to an NHS tax credit exemption certificate
- are named on a valid HC2 certificate

Ask your clinical nurse specialist or staff at the hospital you are being treated at for more information.

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What if I have further questions?

If you require further information, any clarification of information, or wish to discuss any concerns, please contact our Support and Information Team:

Call: 0808 800 0004

(free from landlines and most mobiles:
3, O2, Orange, T-mobile, EE, Virgin and Vodafone)

Email: support@thebraintumourcharity.org

Join our online forums at:
thebraintumourcharity.org/forums

About us

The Brain Tumour Charity makes every effort to ensure that we provide accurate, up-to-date and unbiased facts about brain tumours. We hope that these will add to the medical advice you have already been given. Please do continue to talk to your doctor if you are worried about any medical issues.

We are the UK's pre-eminent brain tumour charity. We fund scientific and clinical research into brain tumours and offer information and support to those affected, whilst raising awareness and influencing policy.

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 fundraising, leaving a gift in your will or giving in memory, please visit us at thebraintumourcharity.org, call us on 01252 749043 or email fundraising@thebraintumourcharity.org

About this fact sheet

This fact sheet has been written and edited by The Brain Tumour Charity's Support and Information Team. The accuracy of medical information has been verified by a leading neuro-oncologist. Our fact sheets have been produced with the assistance of patient and carer representatives and up-to-date, reliable sources of evidence. If you would like a list of references for any of the fact sheets, or would like more information about how we produce them, please contact us.



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Your notes

**Saving lives through research,
information, awareness & policy**



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