

Having fiducial markers inserted in the chest

Your doctor has requested that you have a procedure to insert fiducial markers. This factsheet explains what the procedure involves and the possible risks and complications you may experience. Your doctor will have discussed these with you. If you are still unsure about the benefits of having the procedure, please ask.

It is important that you fully understand what is involved before you sign the consent form.

What are fiducial markers?

Fiducial markers are gold seeds about the size of a grain of rice.

How are fiducial markers inserted?

Using only a tiny incision, the doctor inserts a small gold marker into your body. This is carried out through the skin (percutaneously).

Other methods of insertion may also be used, such as through a scope that passes through the windpipe (bronchus). Your doctor will prescribe the best fiducial placement method for you and our staff will make the necessary arrangements.

Why do I need fiducial markers?

When a tumour is affected by movement, the insertion of internal fiducial markers into or near the tumour will be necessary. Soft tissue does not show up on x-rays, so the gold markers are used to act as a landmark. They are placed in or around the area to treat, to define the tumour's position within less than a millimetre. The CyberKnife radiotherapy system works by tracking the area to treat within the body by seeing it on x-ray images. Once the markers are in place, they do not need removal following your CyberKnife treatment.

Who has made the decision?

The consultant in charge of your case and the doctor inserting the markers will have discussed your situation, and feel that this is the best option for you. However, you will also have the opportunity for your opinion to be considered, and if after discussion with your doctors you do not want the procedure, you can decide against it.

Who will be inserting the markers?

A doctor called a radiologist will carry out the procedure. Radiologists have special expertise in using x-ray and scanning equipment, and also in interpreting the images produced. They will look at these images while inserting the markers and will be assisted by radiographers who will look after you throughout the procedure.



Where will I have the procedure?

This procedure is usually carried out in the x-ray (radiology) department, using either a CT or ultrasound scanner to guide the doctor.

How do I prepare for the procedure?

- Most cases can be carried out as a day case, although if you are unwell or have your procedure late in the afternoon, you may need to stay overnight as an inpatient.
- You will need to have had some blood tests a few days beforehand, and occasionally an ECG to check that you do not have an increased risk of bleeding. This is carried out in the Pre-Assessment Unit (APU) in The Markus Centre at Chelsea. The details of when to attend for these tests will be included in your appointment letter. If you are a private patient, your tests will be carried out in the Private Care Medical Day Unit (MDU) and you will be contacted to arrange an appointment.
- On the day, you must not eat for six hours before the procedure, although you will be allowed to have sips of clear fluids up until two hours before the procedure. The instructions for this will be included in your appointment letter.
- If you are taking aspirin, heparin, warfarin or any other medication, please make sure you let your doctors know about this before your procedure.

Can I bring a relative or friend?

We would like you to go home with someone after the procedure. You are welcome to bring a friend or relative with you, but they will not be allowed into the room while the procedure is taking place.

When you arrive at the hospital

- Please report to the Reuben Imaging Centre at Chelsea
- If you are a private patient, please report to PP Day Surgery Unit
- When you arrive, a nurse will greet you and the radiologist will explain the procedure and discuss it with you before you sign the consent form. If you have any questions, this is a good time to ask the radiologist.
- We will ask you to change into a hospital gown when you arrive and will place a small tube (cannula) in a vein in your arm so that you can be given fluids and receive medication
- The radiographers will carry out routine observations, such as taking your pulse and blood pressure.
- If you have any allergies, you must tell your doctors. If you have previously reacted to intravenous contrast medium (the dye used for kidney x-ray and CT scans) also let your doctors know.



What happens during a marker insertion?

- You will lie on the CT or ultrasound scanning table in the position that the radiologist has decided is most suitable. Occasionally this may mean lying on your front.
- You will have monitoring devices attached to your arm and finger. You may be given oxygen through small tubes in your nose by a radiographer who will be with you throughout the procedure.
- The radiologist will keep everything sterile and will wear sterile operating gloves. Your skin will be cleaned using antiseptic liquid, and you will have some of your body covered with a sterile theatre sheet.
- The radiologist will use the ultrasound machine or the CT scanner to decide on the most suitable point for inserting the needle. They will give you an injection of local anaesthetic which will cause some stinging initially then numbness. The needle will then be inserted into the area to be treated which is where we need the markers. This will be done more than once as we need four to five markers, although in some cases two can be inserted at once.

Will it hurt?

Most marker insertions cause minor discomfort. When the local anaesthetic is injected, it will sting to start with, but this soon wears off and the skin and deeper tissues should then feel numb. Later, you may be aware of the needle passing into your body, but this is generally done so quickly that it does not cause any discomfort at all.

There will be a nurse present throughout the procedure. If the procedure does become painful for you, then they will be able to arrange for you to have more local anaesthetic or pain relief.

How long will it take?

Every patient's situation is different and it is not always easy to predict how complex or how straightforward the procedure will be. It may be over in 30 minutes, although it could be up to an hour.

What happens afterwards?

- You will be taken to a day case bed to be monitored for two hours
- It is important that you lie flat for two hours
- Nurses will carry out routine observations, such as taking your pulse and blood pressure
- You will generally stay in bed for four hours, until you have recovered
- You will need a chest x-ray before you go home
- All being well, you will be allowed to go home either on the same day or occasionally the day after the procedure, depending on the time of day of the procedure and your speed of recovery.



Are there any risks or complications?

Percutaneous insertion is a very safe procedure but as with any medical treatment, there are some risks or complications that can arise:

- If you are having markers inserted in your lung, then it is possible that air can get into the space around the lung. This happens in about a quarter of all cases (one in four people). This generally does not cause any real problem, but if it causes the lung to collapse (a complication known as a pneumothorax) then the air may need to be drained, either with a needle or a small tube, inserted into the skin. This may result in an overnight admission to hospital, or it may be minor, needing no further treatment.
- If a pneumothorax occurs, this may cause a delay to the CT planning scan organised for a week later, as we will need to assess how the lung has re-inflated before we start planning your treatment. The medical team will contact you if this is the case, to organise further chest x-rays and alter appointments as necessary.
- If you are having markers inserted superficially in the chest area, such as near a rib or the sternum, your risk of lung collapse is very low, and the recovery time following the marker insertion will be quicker than that outlined above.
- Unfortunately, not all marker insertions are successful. This may be because, despite taking every possible care, it is more difficult than anticipated to position the markers correctly, or by doing so it would cause you harm. The radiologist carrying out your procedure may be able to give you some idea as to the chance of achieving a satisfactory result.

Despite these possible complications, the marker insertion is a required part of the radiotherapy planning and delivery for some treatments on CyberKnife. Your doctor will not request it unless it is absolutely necessary.

Some of your questions may have been answered in this factsheet, but you should make sure you are satisfied that you have received enough information about the procedure before you sign the consent form.

Contact details

If you have any questions or concerns about your procedure, or you are unable to attend for this appointment, please call your clinical oncologist or one of their team:

Your consultant oncologist
Tel:
Radiology Department:	0207 808 2575
CyberKnife Lead Radiographer:	0207 811 8468
CyberKnife Reception, Chelsea:	0207 811 8467
CyberKnife Unit, Sutton:	0208 661 3256



Further information

The Royal College of Radiologists
For general information about radiology departments.
Website: www.rcr.ac.uk

The Royal Marsden Help Centre for PALS and Patient Information can provide further general information and support. Call in or phone: 0800 783 7176 (Freephone)

Alternatively, please call:

The Royal Marsden Macmillan Hotline: 020 8915 6899
(available 24 hours a day, 7 days a week)

