

A photograph of a middle-aged man with short, light-colored hair, smiling warmly. He is wearing a grey zip-up cardigan over a light-colored button-down shirt and blue jeans. He has a black backpack with a red interior and binoculars hanging from his neck. He is leaning on a rustic wooden fence. The background shows a rolling landscape with green fields and distant hills under a bright sky.

**Permanent Seed
Prostate Brachytherapy**
Patient Information

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This booklet has been produced in conjunction with the Prostate Brachytherapy Centre in Guildford



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Introduction

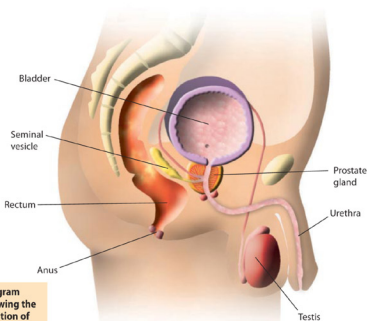
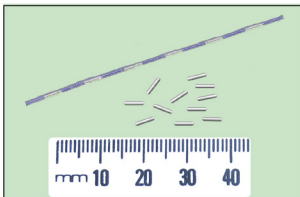


Diagram showing the position of the prostate.

Permanent Seed Prostate Brachytherapy

is a technique for treating prostate cancer, using tiny radioactive seeds of Iodine-125 (I^{125}) that are inserted permanently into the prostate gland. 'Brachy' means close and, in this treatment, the radioactivity is inserted directly into the cancerous organ. This is unlike conventional external beam radiotherapy, where it travels through the body tissues before reaching the prostate gland. Brachytherapy provides a higher, more localised radiation close to the prostate and minimises the effects on the surrounding tissues, such as the rectum and bladder.



Loose radioactive seeds and seeds stranded together shown with a ruler

The seeds are tiny canisters of Titanium (4.5mm long by 0.8mm diameter) which contain the radioactive isotope Iodine-125. The half-life of radioactive Iodine-125 is approximately 60 days, which means that most of the radiation is released from the seeds into the prostate gland over the first 3 months. They continue to be biologically active for about 9 months in total. After that, they become effectively inactive.

The modern day techniques for brachytherapy were developed in the mid-1980s with the arrival of sophisticated ultrasound probes. These devices enable the accurate implantation of seeds into the prostate, allowing high doses of radiation to be delivered to the cancerous gland.

There are now long-term results from patients who were treated up to 20 years ago, which show that this form of treatment is highly effective in treating and curing patients with early prostate cancer.

Brachytherapy appears to be as effective as other conventional treatments, such as surgery (radical prostatectomy) or external beam radiotherapy, but with a lower side-effect profile (see Table 1).

However, brachytherapy is not the only effective treatment for prostate cancer and some patients may be better suited by other methods

Table 1: Relative complication rates from local control treatments for prostate cancer.

Clinical Decision Making: Early Prostate Cancer.				
Site	Prostatectomy	External beam radiotherapy	Brachytherapy	External beam radiotherapy and brachytherapy
Rectal	+	+++	+	++
Sexual (impotence)	+++	++	+	++
Urinary				
Incontinence	+++	+		+
Retention	+	+	+++	+++

Increasing number of +s indicates increasing complication rates.

Jani and Heilman 2003 *Lancet* **361** 1045-1053

Patient selection

Patients ideally suited for brachytherapy are those for whom there is a good chance that their cancer is confined to the prostate and has not spread outside of the gland. Occasionally, where it is thought there is a higher likelihood that the prostate cancer may have spread to the tissues surrounding the gland, patients may be offered a shortened course of external beam radiotherapy prior to undergoing a brachytherapy implant. This combination therapy allows a greater margin of tissue around the prostate to be treated.

For more information on radiotherapy, please read *A Patient's Guide to External Beam Radiotherapy*, which should be available at your hospital or may be viewed and downloaded from the internet at:

www.prostatebrachytherapycenter.com

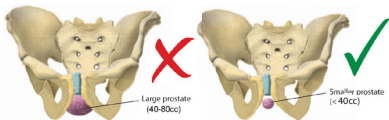
The brachytherapy team will advise you whether your prostate cancer is suitable for treatment by brachytherapy. Suitable patients will normally have the following characteristics:

- The **PSA** (Prostate-Specific Antigen) level should ideally be less than 20ng/ml at the time of their diagnosis.
- The **stage** of the cancer should be either T1 or T2 on rectal examination, indicating a prostate cancer confined to the gland.

- The **grade** of the cancer should ideally be a Gleason score of 7 out of 10 or less.

Patients with higher grade or stage of prostate cancer may be successfully treated with a combination of hormone therapy, external beam radiotherapy and a brachytherapy implant. This combination approach provides the highest radiation dose to the prostate whilst limiting the dose to the surrounding organs. This may provide a better outcome for patients than being treated with external beam radiation alone.

- Patients with severe urinary symptoms, such as a very weak stream or difficulty emptying their bladder, will be offered a simple Laser procedure to create a channel through the prostate. This can be done either before or at the time of the volume study. (see page 7)
- Ideally, the prostate should be relatively small – less than 60cc. If the gland is too large, areas of the prostate may be shielded by the bony skeleton, preventing an adequate implant being performed. In such cases patients will be offered treatment (androgen deprivation) to shrink the prostate prior to brachytherapy.



Illustrations showing how the pelvic bones can shield parts of larger prostate glands, preventing adequate implantation of radiation seeds to the whole gland.

The assessment visit

Once referred for brachytherapy you will need an assessment as to your suitability for this treatment option for your prostate cancer.

At your clinic visit, you may see either the consultant Urologist or Radiation Oncologist or you may need to attend for a further clinic appointment to see both consultants.

A general history may be taken as to previous illnesses, operations, medication, etc.

You will have a rectal examination carried out to assess the stage of the cancer. You will also undergo a painless transrectal ultrasound (TRUS) to assess the size of the prostate.

You will be asked to complete a short questionnaire to assess your urinary symptoms, and to come to the clinic with a comfortably full bladder. This is because a flow rate will be performed.

Discussion of the stage and grade of your cancer will take place, as well as your suitability for prostate brachytherapy.

Following your visit, if you are suitable for brachytherapy and are happy to proceed with this as a treatment option for your prostate cancer, the Brachytherapy Co-ordinator may then be able to schedule your dates.

The Procedure

Prostate brachytherapy may be carried out as a two-stage technique, with Stage 1 being **The Volume Study** and Stage 2 being **The Implantation Process** of the seeds, which is carried out approximately 4 weeks later.

Stage 1 – the volume study

This is a detailed transrectal ultrasound, normally performed as a day-case procedure under general anaesthetic. You should not drive for 24 hours afterwards and will need to be accompanied home by a responsible adult.

You will need to have bowel preparation the day before the procedure, to ensure that the rectum is empty, so that clear ultrasound images of the prostate can be obtained.

During the volume study, **aerated gel** is placed in the water pipe (urethra) whilst under anaesthetic. This will help to identify this structure during the procedure.

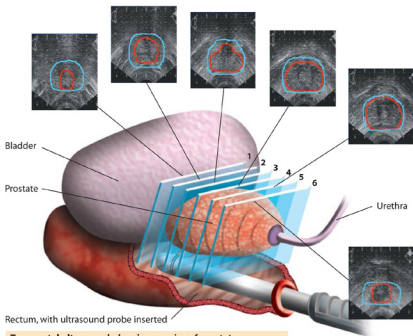
You may find that you pass some jelly from the penis after the scan and you may notice some slight discomfort during the first time that you pass urine.

The prostate volume is outlined on the ultrasound images, including the position of the urethra.

A three-dimensional model is then constructed by the brachytherapy planning computer and a dose plan produced. This plan will be unique to each patient and will determine the position and number of seeds needed.

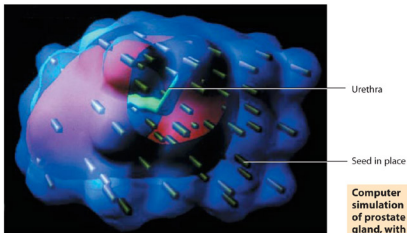
The seeds are then ordered for each individual patient.

Occasionally, if the prostate gland is too large (between 40-80cc), medication designed to reduce the size of the prostate gland may be necessary in order to shrink the prostate down to a size that will then be suitable for the seed implant.



Transrectal ultrasound, showing a series of prostate ultrasound images used to construct a 3-dimensional image of the prostate (volume study) and treatment plan.

Key: red line = prostate; blue line = limit of radiation to be delivered.



Computer simulation of prostate gland, with plan of 125 implants to give effective radiation.

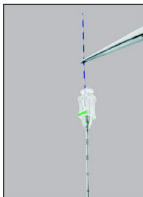
*Key:
green = urethra;
red = prostate;
purple = delivered radiation zone.*

Stage 2 – the implantation process

You will be admitted on the day of the procedure. As for the Volume Study bowel preparation would have taken place on the day before the implant.

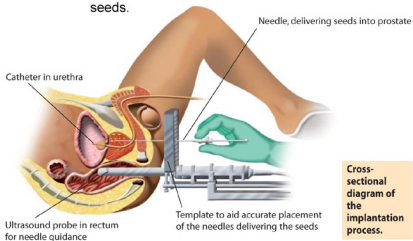
Prior to the implant you may be shown how to catheterise yourself in case you can't pass urine after the procedure.

The procedure is performed under a general anaesthetic in the operating theatre. Radioactive Iodine seeds are inserted under transrectal ultrasound guidance, using needles that pass through the skin between the legs behind the scrotum (the perineum).



Seed/needle preparation.

Each needle may deliver between 2-6 seeds and, normally, 20-30 needles are required to deliver between 80-120 seeds. Most of the seeds implanted are woven into a strand of absorbable material to help maintain their position and they will remain in place permanently. (The strand material "dissolves") X-rays are taken throughout the procedure, to check the position of the seeds.



Cross-sectional diagram of the implantation process.



Artist's impression of the Stage 2 implantation process.



Post-implant X-ray of seeds in prostate gland, with the ultrasound probe in the rectum.

A catheter is placed into the urethra whilst you are under anaesthetic. This remains in place overnight until the effects of the anaesthetic have fully worn off.

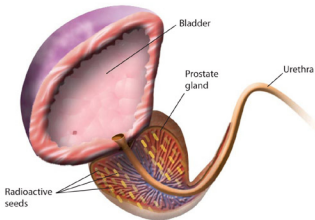


Illustration showing the seeds lying in the prostate gland after implantation.

Post-Operative Side-Effects

Immediate

Immediately after the operation, you may notice some bruising beneath the scrotum and tenderness between the legs.

Once the catheter has been removed, you may notice some discomfort when passing urine. You may pass seeds in the urine although this is uncommon and usually will happen within the first 24 hours following implant.

We will ensure that you are able to pass urine satisfactorily before you are discharged home.

A small number of patients will need to self catheterise after the procedure. This will be fully discussed prior to discharge.

It is quite common to see some blood in the urine for a day or two after the procedure. This is quite normal, so do not be alarmed. There can also be blood in the semen.

Advice on drinking

For one week after the implant, you are encouraged to drink plenty of water to flush through any small blood clots that may develop out of the bladder. Thereafter, you should return to a normal drinking pattern and your daily intake should not normally exceed 1.5 litres per day. Alcohol, in moderation is fine.



Urinary symptoms

After the implant, it is common for patients to notice a gradual worsening of their urinary symptoms. Often, patients will find that they do not have too many problems during the first couple of weeks following implant. Symptoms will then peak at around 4-6 weeks post-implant, but improve over the ensuing months. For this reason, we would normally advise that you keep your catheter handy for about six weeks.

Typically, patients complain of a slow stream, with urinary frequency and urgency during the day and night. There may also be a feeling of incomplete emptying of the bladder, with the need to strain. Most often, the symptoms are worse at night and during periods of inactivity.

These side-effects are due to the swelling of the prostate following the procedure and irritation of the prostate and bladder lining due to radiation from the seeds. They are temporary and will settle in time.

We would normally expect that by 6-9 months following implant a patient's urinary symptoms will have returned to how they were before treatment began.

Medications

After the brachytherapy implant, all patients will receive:

- An alpha-blocker
- An anti-inflammatory painkiller
- A course of antibiotics

Alpha-blocker

This tablet relaxes the muscle within the prostate gland and helps to reduce the narrowing of the water pipe as it runs through the swollen prostate, so reducing urinary symptoms. This is best taken in the early evening.

You will be encouraged to take this tablet until your urinary symptoms settle.

Anti-inflammatory painkiller

This tablet has two benefits. It is an effective painkiller and is also useful in reducing the inflammation from the prostate gland, so helping to relieve urinary symptoms. You will receive a one-month supply of this tablet and we encourage you to take this medication for at least three weeks.

Antibiotic

You will receive a course of antibiotics

These will help to prevent infection following the implant. They are safe to take with an alcoholic drink if desired.

Urinary retention

As previously mentioned, approximately 1 in 20 patients may have temporary difficulty in emptying their bladder after the implant and this can result in urinary retention.

The symptoms of urinary retention are an inability to

pass urine and lower abdominal discomfort, usually with a constant desire to urinate. Normally we teach patients to catheterise themselves, using single-use disposable catheters, which most patients find is easier and more convenient. This avoids having a permanent, indwelling catheter. The inability to pass urine is usually transient and, within a few weeks, you will find that your bladder starts to empty properly again and the need for catheterisation will stop.

Bowels

Some patients find that, immediately following the implant, their bowels tend towards constipation. This can usually be relieved by an increase in fresh fruit, vegetables and fibre.

Occasionally, patients can experience troublesome rectal symptoms following their implant, such as frequency of opening their bowels or diarrhoea. This symptom is more common following additional external beam radiotherapy than with a brachytherapy implant alone.

The symptoms are usually self-limiting and can often be managed by changing one's diet slightly, by reducing the roughage, i.e. decreasing fruit and fibre intake. Immodium medication can further reduce any urgency or discomfort. Very occasionally, steroid suppositories are required. These symptoms tend to start 6 months after the implant.

Erectile dysfunction

Erection of the penis may be affected by brachytherapy. The risk is lower in younger men who have had no previous difficulties obtaining an erection and it tends to affect about 15% of our patients following treatment.



Current research suggests that the risk is lower than with other treatments, such as radical prostatectomy. Treatment with PDE5 inhibitors (Viagra, Cialis, Levitra) is usually effective in approximately 80% of patients should difficulties in achieving and maintaining an erection occur.

Some men notice a decreased or dry ejaculate following brachytherapy. This is a common, temporary, side-effect of some of the alpha blockers, but can also occur as a result of the brachytherapy itself.



Follow-up after brachytherapy

Normally you will be reviewed by your urologist approximately a month after the implant. PSA will be first checked 3 months after the implant. Usually, it will then be checked every 3 months for the first two years and every 6 months thereafter. Approximately 25% of patients will experience a temporary small rise in PSA (a 'PSA bounce'), typically anywhere between 6 months-2 years after the procedure. This is quite common, with the PSA dropping again after a few months. The reasons for this bounce phenomenon are unclear, but it does not have any effect on the overall success of the treatment.

Other Information

Resuming normal physical activities

You should be able to resume normal activities (e.g. work, shopping) within a few days. However, we would normally advise you to avoid heavy lifting or strenuous activity for the first two weeks after your implant.

Many patients are concerned about whether an implant poses any potential dangers of radiation exposure to their family and friends. It is important to remember that although the seeds are radioactive, you



are not. Objects that you touch or items that you use do not become radioactive. Other people may use linen, clothing, tableware, or dishes after you without special precautions. Your bodily waste (urine and stool) are not radioactive.

There are no restrictions on travel or physical contact with other adults. However, special precautions listed below should be taken when in contact with small children and pregnant women in the first 2 months following treatment.

Family relations

You may sleep in the same bed as your partner, provided she is not pregnant. Sexual intercourse, using a condom, may be resumed once you feel comfortable to do so. Initially, a condom should be used, because there is a very small risk that a seed may be passed in the semen.

Your semen may be discoloured dark brown or black. This is normal and is a result of bleeding that may have occurred during the implant. Following 2-3 ejaculations, it will not be necessary to use a condom.

Radiation protection

There are no formal restrictions on your activities when you return home. However, we recommend that the following precautions are followed for the first 2 months after the implant, after which time the radiation levels reduce significantly and you may resume life as normal.

1. Women who are or may be pregnant should not sit very close to you (e.g. on the same sofa or bed) for more than a few minutes a day. However, you may continue to greet or hug them as you would have done before the implant and spend as long as you wish in the same room as them.
2. Do not sit children on your lap for long periods. As

explained above, you may briefly cuddle them for a few minutes and they may stay in the same room as you for as long as you wish.

3. Other adult family, friends and colleagues are not at risk and restrictions on time and activities are not necessary.

What happens if the cancer returns?

Whilst the success rate of brachytherapy seems to be as high as for surgery, neither treatment option can guarantee cure. Should the cancer return in the prostate gland, a radical prostatectomy, or cryotherapy are possible further treatment options that can still provide cure.

Summary

Brachytherapy is a very effective treatment for early prostate cancer, with patients rapidly returning to normal activities.

Urinary incontinence after this procedure is rare and the risk of impotence seems lower than with surgery and external beam radiotherapy.

Patients do, however, experience a temporary deterioration in their urinary symptoms for the first few months after their implant.

It is important to remember that the day you are discharged from hospital after the implant is really the day that your radiotherapy treatment starts.

Other Resources

Information video

The Prostate Cancer Centre has produced a patient information video entitled an *introduction to prostate brachytherapy*, that describes the procedure in more detail and reports the individual experiences of patients treated by this technique. The video may be downloaded and viewed through the website at:

www.prostatebrachytherapycentre.com

Useful website addresses and support networks

The Prostate Cancer Foundation of Australia www.prostate.org.au

The Prostate Cancer Foundation of New Zealand www.prostate.org.nz

Cancerbackup www.cancerbackup.org.uk

The Prostate Cancer Charity www.prostate-cancer.org.uk

PCaSO www.pcaso.com

The Sexual Dysfunction Association www.impotence.org.uk

The Prostate Brachytherapy Centre www.prostatebrachytherapycentre.com

Prostate Brachytherapy Advisory Group www.prostatebrachytherapyinfo.net

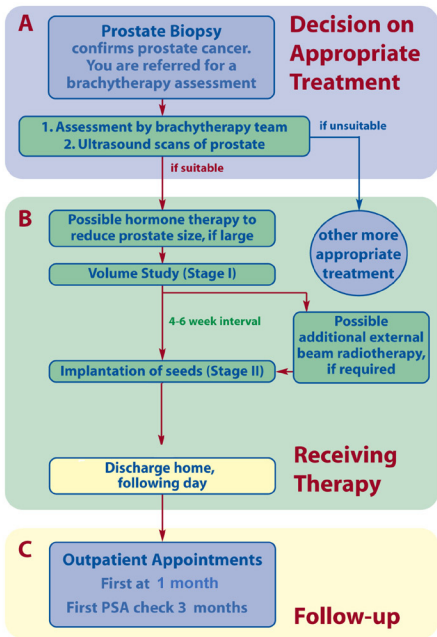
My Prostate Cancer Options www.myprostatecanceroptions.com

Other useful websites www.prostatespecialist.co.uk
www.seattleprostateinst.com

Prostate brachytherapy: questions to ask your doctor

- Will I be given hormone treatment prior to brachytherapy? If yes, why? If not, why not?
- How long does the procedure take?
- How many of these procedures do you do a year?
- Will I require external beam radiotherapy as well as brachytherapy?
- In your experience, how successful is this procedure?
- What are your results in respect of impotence and incontinence?
- How long will I be in hospital?
- Will I have much pain after the implant and how will the pain be controlled?
- How soon is my follow-up appointment after discharge, and when will the PSA first be measured?
- How often will my PSA be checked?
- What should the PSA be after brachytherapy? What would it mean if it doesn't reach that level? What would you do then?

The steps in your treatment for prostate cancer





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Patient Notes
