Deep Inspiration Breath Hold Radiation Therapy

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Introduction

Welcome to the Radiation Oncology, Princess Alexandra Hospital, Ipswich Road Campus, one of Queensland’s most acclaimed public cancer treatment facilities.

The following guide has been written for patients receiving Deep Inspiration Breath Hold (DIBH) - Radiation Therapy at our Ipswich Road Campus.

This guide provides a basic overview of what DIBH radiation therapy is, why it is used and how it is delivered. It also details the equipment required and gives instruction on how patients can prepare for treatment.

It is not intended to replace specific specialist medical advice.

If after reading this guide you have any questions about DIBH radiation therapy, please seek further advice from your Specialist Doctor (Radiation Oncologist).
What is DIBH - Radiation Therapy?

Deep Inspiration Breath Hold (DIBH) is a radiation therapy technique that involves delivering radiation to treat a cancer site when the inhalation (or breathing in) phase of your breathing cycle reaches a defined point.

At our Ipswich Road campus, what this means is that you breathe in, hold your breath for a short duration while your radiation treatment is delivered, and then resume normal breathing.

During a treatment session this process may be repeated several times using specialised medical equipment to monitor and help regulate your breathing.

Typically, the amount of air you are asked to breathe in is set at 75% of your maximum lung capacity. The length of time you will need to hold your breath for is around 22 - 25 seconds. These settings are determined at the time of your radiation therapy planning by our health care team.
Why Use The Technique?

There is essentially one reason why your Specialist Doctor (Radiation Oncologist) may recommend the DIBH technique, and that is in your particular case, DIBH will help reduce the amount of radiation healthy organs are exposed to when treating your cancer site.

This can lower your risk of experiencing treatment side effects.

When you hold your breath, your diaphragm (breathing muscle) is no longer moving up and down and therefore the movement of your lungs, liver and heart is reduced.

This reduction in motion helps the radiation therapists obtain a more accurate picture of where your anatomy is positioned for your radiation treatment.

As a result, a treatment plan can be designed and delivered that better targets your cancer site while minimising radiation exposure to healthy organs. This can be particularly useful when treating cancers in the chest or abdominal area.

In some cases, the DIBH technique can also be used to help move a cancer site away from surrounding anatomy.

For example, if you are having treatment for a left sided breast cancer, the DIBH technique may help expand the air gap between your breast / chest wall and heart.

Expanding the air gap moves the heart away from the radiation field, significantly reducing the radiation dose to the heart.

This is important because research has shown that long-term heart health after breast cancer treatment can be affected by radiation dose. Keeping the radiation dose received by the heart as low as possible will assist in maintaining a healthy heart.

While there are advantages in using the DIBH technique, it should be noted that it is not suitable for everyone. In some cases, alternative treatment methods may be recommended as they provide better results for your individual condition.

A thorough assessment will be made at the time of your radiation therapy planning to determine whether the DIBH technique is the right option for you.
When you attend our Ipswich Road Campus for your radiation therapy, several steps need to be completed before you can receive treatment using the DIBH technique.

One of the first steps after your specialist consultation, is attending a DIBH coaching session at our Radiation Oncology Department.

This coaching session is only provided to patients who have been recommended the DIBH technique by their Radiation Oncologist.

At this appointment you will be taken into a CT scanning room and taught how to breathe correctly for treatment using a device called the Active Breathing Coordination (ABC) system.

This specialised medical equipment is designed to help manage your breathing routine for DIBH - radiation therapy.

From a patient's perspective, the ABC system looks similar to a swimming snorkel, in that it has a single use rubber mouth piece, connected to a flexible tube, and a foam peg to block your nose. This design ensures that all breathing only happens through your mouth.

When you breathe through the mouth piece, air is filtered into a device called a spirometer. This device measures the amount of air you breathe in and out, which is then displayed graphically on a computer screen.

The spirometer also has a valve inside it that can be opened and closed to regulate air flow.

This allows the amount of air you breathe in and hold for treatment to be precisely set by the Radiation Therapists.

It's important to realise that the ABC system does not control your breathing. It only helps regulate the volume of air you breathe in and the length of time you hold your breath for.

You can still breathe at any stage by simply releasing a hand held button (patient control switch) that opens the spirometer valve. This means that you have full control over when you start holding your breath and for how long.

The radiation therapists will ask you to keep the button pressed down for most of your coaching session if it comfortable to do so. However, if you need to breathe when the ABC system is engaged all you need to do is release the button.
Set-up & Measurement

To set up for your coaching session the Radiation Therapists will ask you to lie down on the CT couch in a position that’s suitable for your planning and treatment.

You will then be given a foam peg to put on your nose and a single use mouth piece to place between your teeth as earlier described.

At this point you should only be breathing through your mouth, with all your breath directed through the snorkel and none leaking from the sides of your mouth or nose.

This will ensure that the ABC system obtains an accurate measurement of how much air you breathe.

If you think your nasal passage is not sealed by the peg or you are having trouble breathing through your mouth, please tell the radiation therapists as they may need to adjust the equipment to better fit your individual needs.

The radiation therapists will now ask you to take a series of big breaths in and out, without holding, to determine what your maximum lung capacity is using the ABC system.

As you breathe your lung volume is traced in real time on a computer screen.

From this information a threshold is set around 3/4 of your maximum lung capacity. The threshold is the amount of air that you will need to breathe in and hold for treatment.

Once this value has been recorded, the radiation therapists will commence your breath hold coaching.
The Breathing Routine

In order to make your coaching session as comfortable as possible, the Radiation Therapists will start by setting the ABC system to help hold your breath for only 5 seconds.

Before you begin holding, there are three things that need to happen.

1) You must push down on the hand held button (patient control switch) to allow the Radiation Therapists engage the ABC system.

2) The Radiation Therapists must activate the software that controls the spirometer valve when they see you are ready to hold your breath.

3) The breath you take before holding must be large enough to inflate your lungs up to the threshold that has been set.

Only when all three conditions have been met will the ABC system close the spirometer valve to help you hold your breath.

The Radiation Therapists will talk you through this process and guide you to breathe in a steady pattern before asking you to hold.

On the following page is an example of how you may be instructed to breathe by the Radiation Therapist.
The Breathing Routine (Verbal Instructions)

THERAPIST: Okay, so we are going to practice holding your breath for 5 seconds, if you can press down on the button for me...

(you press down on hand held button)

Now lets start with 2 easy breaths.

(you breathe in and breathe out through your mouth)

That’s easy breath number one.

(you breathe in and breathe out through your mouth)

That’s easy breath number two, and on this next breath, breathe in until the machine helps you to hold,

(you breathe in until the ABC system engages at your threshold and you hold your breath while the Radiation Therapists counts down)

5,4,3,2,1... and breathing normally.

(ABC system disengages and you resume normal breathing)

During your coaching session this process is repeated several times gradually increasing the time you hold in 5 second increments until you reach 25 seconds.

The Radiation Therapists may also adjust your threshold that determines how much air you breathe in. This may be set higher or lower depending on what you feel is comfortable. Remember it’s completely up to you what level your threshold is set at, so if would like it changed please tell the Radiation Therapists.

Once you have reached your maximum breath hold duration, (which will need to be in the range of 22 to 25 seconds), the radiation therapists will perform a series of breath holds using the maximum time you were able to achieve.
Treatment Technique Decision

While the ABC system is simple to use, it can often take a bit of practice before you feel comfortable with the DIBH breathing routine.

If you are having trouble holding your breath, please let the Radiation Therapists know as it may be possible to make adjustments or use an alternative treatment technique.

The use of DIBH - Radiation Therapy will only proceed if you can comfortably hold your breath for 22 to 25 seconds and have a consistent breathing profile when measured using the ABC system.

At the end of your coaching session a decision will be made on whether to use the DIBH technique for your treatment or to explore other options. This is done in consultation with you, your Radiation Oncologist and the Radiation Therapists.

It important to realise that your radiation therapy course is still designed to meet strict standards regardless of what technique is used and that all treatments are optimised to manage individual conditions.
Planning & Treatment Process

After your coaching session is complete you will be required to return in the following days for a CT planning appointment. This is where the Radiation Therapists will set your treatment position and take a CT scan (X-ray pictures) of your cancer site as outlined by your Radiation Oncologist.

This process usually takes around 1 hour, but can vary depending on the area being planned.

The information obtained from CT planning is then used to develop a computer model that details how your radiation therapy is going to be administered.

You can read more about this process by downloading our “Radiation Therapy - A Guide For New Patients”

The only difference is that for DIBH – Radiation Therapy you are required to perform the DIBH breathing routine during the CT planning scan and treatment delivery.

If you have any further questions about the DIBH – Radiation Therapy, please speak to your Specialist Doctor (Radiation Oncologist) or call our Nursing Care Advice line. PH: 3176 1967
Contacts & Location

General enquiries:
PH: (07) 3176 6586

Nursing care advice line
PH: 3176 1967

For general enquiries please call our reception between the hours of 8:00am to 5:00pm

If you are a patient attending for radiation therapy and need to discuss appointments, calls can be made to the general enquiries line between our treatment hours of 8:00am to 8:30pm.

Address information:
Princess Alexandra Hospital Radiation Oncology Department (Main Building), Ground Level Zone E / F (Orange Lifts), 199 Ipswich Road, Woolloongabba QLD 4102.

Parking facilities:
Free on-site under cover parking is available for patients receiving radiation treatment. Access to cancer services car park requires security code and permit. This can be obtained prior to treatment from our reception.