Respiratory Motion Management Devices (Respiratory Gating, DIBH, Abdominal Compression, Surface Imaging)

Motion management devices are tools used to manage or track your breathing to ensure you have the best and most accurate treatment possible. If your radiation treatment field includes your lungs, chest (breasts), or abdomen (belly), a motion management device may be used for your treatment.

Why is respiratory motion management important?

External radiation therapy uses a precise beam of radiation aimed into your body to damage cancer cells (tumor). It is important that the radiation beam targets all or most of the tumor while sparing as much healthy tissue as possible. As you breathe in and out, tumors in the lung, chest, and belly area can shift or move. This movement is normal, but there are devices that can be used to lessen or control the movement. These devices are meant to aim the radiation right at your tumor and not healthy tissues.

What are some of the common respiratory motion management devices?

Some common devices used to lessen the movement are respiratory gating, deep inspiration breath hold (DIBH), abdominal compression, and surface imaging. Your treatment plan and where you are having your treatment will decide what type of device you will use.

Respiratory Gating

Respiratory gating uses computer software and a block that sits on your belly to track your breathing cycle. Respiratory gating allows the radiation to only be delivered when the tumor is within a defined “window.” This helps ensure that the tumor is in the correct spot when the radiation is being delivered. Some gating systems will automatically turn the radiation off when the tumor leaves the “window” and then turns the beam back on when it enters the “window” again.

Deep Inspiration Breath Hold (DIBH)

Deep inspiration breath hold devices include the SDX and ABC (Active Breathing Control). You may be asked to breathe into a mouthpiece that measures the volume of air in your lungs, your inhale (breathing in), and exhale (breathing out). There will be a clip on your nose to keep air from going in and out of your nose. You might also wear video glasses. These glasses show you a graph or wave that links with your breath. When you breathe in, the line goes up. When you breathe out, the line goes down. Your radiation therapist can also see this wave on their computer. You will hold your breath at certain times during your treatment and this is when the radiation will be delivered.

Abdominal Compression

This device uses a belt with a compression “plate” that is placed on and around your belly. This puts pressure on your belly and diaphragm (the main muscle used in breathing). This limits the movement of your chest and belly while you are breathing, lessening how much your tumor moves.

Surface Imaging

Surface imaging uses special cameras and lights that are projected onto your skin that create 3D images of your body. These are used to get you in the correct position and keep you there during your treatment. If you lose your breath or move out of the correct position the software can turn the radiation beam off. It will turn

back on when you are in the right position.

What can I expect?

Most often, your care team will decide if a respiratory motion management device is right for you during the planning stages of radiation therapy, also known as “simulation.” During simulation, you will have a CT (cat) scan of the area to be treated. Information from the CT scan is used to define the treatment fields and create a “map” for the radiation team to design the treatment.

A four-dimensional computed tomography (4DCT) scan is done for patients where motion needs to be considered. A block will be placed on your belly and your breathing cycles and movement of your chest and belly are tracked by infrared lights and cameras. The 4D images (taken during simulation) let your care team see where your tumor is during the phases of your breathing. If your provider sees that your tumor moves as you breathe during the CT scan, you will likely need a respiratory motion management device during treatment.

You will have a chance to practice and learn more about your device before starting treatment. Your care team wants you to be as comfortable as possible and at the same time provide the best treatment possible. You should talk to them if you are having trouble using the device or if you have any questions.