



Breast Cancer: Learning about Radiation Therapy¹

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After surgery for breast cancer, your doctor may suggest that you visit with a radiation oncologist to determine if you would benefit from radiation therapy. This fact sheet provides a basic orientation to external radiation therapy for the treatment of breast cancer so you know more about what questions to ask.

Radiation does not mean radioactive. The term radiation refers to the emission of any type of heat or light energy. People are exposed to a form of radiation when they stand in front of a fireplace or when they get an x-ray. When the energy source is controlled and regulated, like a furnace, a power plant, or an x-ray machine, radiation is a useful and productive tool that adds to the quality of our lives.

Radiation treatments for cancer come from machines powered by electricity. A linear accelerator releases photons (packets of light energy) and electrons (negatively charged sub-atomic particles) in a concentrated and carefully aimed pattern designed to target cancer cells. By using a small dose repeatedly every day over several weeks, radiation treatment helps kill cancer cells.

The radiation treatment works by bombarding cells with energy that breaks apart molecules. This

generates electrons (one type of free radical) that spin off to hit other cells and disrupt DNA synthesis. Both healthy and cancer cells are damaged during this treatment. The daily dose of radiation is kept low enough to allow healthy tissues to regenerate. Because radiation generates free radicals, you might be tempted to take antioxidants (e.g., vitamins A, C, E; coenzyme Q10; turmeric, etc.) to help buffer the effect of radiation. To the extent that antioxidants are helpful, however, they may also reduce the effectiveness of radiation treatments. Many doctors recommend that you avoid such supplements until three to six weeks after the last radiation treatment. Ask your doctor about whether you should discontinue or when you could take antioxidants.

Prior to beginning radiation treatment, a CT (computed tomography) simulation is done. This involves getting a CT scan in the treatment position—flat on your back with your arms above your head. You may receive a few tiny but permanent tattoos. These are used as reference points to set up your daily treatment. After the CT simulation, your radiation oncologist and staff will design a treatment plan most suitable for you. The goal of the plan is to optimize the delivery of the radiation to the areas at risk (breast, chest wall, and lymph nodes) while minimizing the dose to your lungs and heart. If the

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heart is too close to the radiation field (a possibility in left-sided breast cancer), a breathing device may be used. When the lungs are inflated, they help push the heart out of the radiation field. The device helps synchronize the radiation emission with your breathing.

A complete dosage of radiation for breast cancer is usually delivered in approximately 30 consecutive days, excluding weekends and holidays. It is preferred that you receive all exposures from the same clinic. This ensures that all measurements and settings are consistent. Each day the entire process takes about 15 minutes. Receiving the radiation is painless, as long as you can lie in the proper position without moving.

The science of radiation therapy involves many variables that are chosen to match your particular tumor location, tumor type, cell activity, and body shape. Photon radiation is used to target cells that are deep below muscle tissue or bone, like the lymph nodes along your collarbone. Electron radiation is most effective at the skin surface, so it is often used for chest wall treatments. The angle of the machine and the length of time of the treatment also change the way the dose is delivered. Other devices are used in the path of the beam to optimize the dose.

For most breast cancer patients undergoing radiation therapy, the radiation oncologist's team uses a combination of these tools to target the area of the incision, the breast tissue, and the relevant lymph nodes. This area may be as large as a square that starts in the hollow of your throat and runs across the top of your shoulder, down your side to about 2 cm below the lower edge of the breast and up along the center of your sternum. Radiation may also affect the upper back.

The target field is not treated with one exposure, but is divided into 2–15 jigsaw pieces to get the best angle and coverage. Customized blocks will be made for you to allow the exposure to target each jigsaw shape. For women receiving radiation after a mastectomy, the seam where these treatment fields meet could represent a gap when you breathe in and out, so there is intentional overlap along these lines. Halfway through the treatments they will shift the seams slightly (which requires new blocks) so that

the tissues near the seams are neither over-exposed nor missed.

What to Expect From Treatments

You may not notice any reactions for the first week or two. Radiation treatments gradually increase the process of cell damage; you are likely to feel worse the week after the last treatment. Some reports indicate that the cells do not stabilize until six months after treatment. Some women experience continued soreness for a year or two.

Most women note three types of effects from radiation treatment.

1. Everyone has some type of skin reaction from the radiation. It usually begins as a “sunburned” sensation which often increases in intensity until the end of treatment. You may only get a slight burn. It is important to heed the directions you will be given about skin care, particularly the soaps, creams, and oils you should and should not use. If the burn worsens, the skin blisters and peels off. Even in severe cases, however, it is possible for the skin to heal quickly without a great deal of scarring. Your doctor can prescribe a cream to promote healing and reduce the possibility of infection. Because radiation tends to dry out skin, regular use of oils and creams after radiation treatment can promote the return of supple skin.
2. Most women report that their muscles and bones become sore and stiff as the radiation treatments continue. An initial assessment by a physical therapist can help you obtain and retain an appropriate range of motion through treatments. Some therapists will also recommend strategies to prevent lymphedema. It is very important to continue exercising your arm and shoulder muscles throughout treatment. If mobility is impaired after treatments, you may find physical therapy or massage beneficial. Many women experience scarring and fibrosis of the tissues that received radiation, and massage or physical therapy can be helpful to improve mobility and ease pain. It could be helpful to identify a therapist with experience working with patients who have received radiation treatment.

3. Most women feel tired from radiation treatments.

You may not notice it until the fourth or fifth week and even then you may just need to go to bed earlier. Afternoon naps may be helpful.

It is not unusual for women to experience sadness or even depression during radiation treatment. Staying mentally active, eating well, and exercising are strategies for feeling your best during treatment. If you do experience extreme mood changes, speak to your health care providers and/or a mental health counselor.

There are a number of people who can answer questions and provide assistance during your radiation treatments. You will see technicians every day while you receive your treatment. Nurses at the clinic station are available to help you with questions about your skin and other symptoms. You will meet with your doctor once a week during treatment, and you can request a meeting with a doctor on any day you have a concern or question.

Radiation treatment is a highly advanced and very technical tool to achieve specific goals in cancer treatment. Recent research indicates that women can be helped by radiation treatment even if they have large tumors or positive lymph nodes. Ask enough questions to make a decision about this treatment and set your mind at ease.

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