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## Advances in Radiation Therapy

March 10, 2008

Marisa C. Weiss, MD

### ELYSE S. CAPLAN, MA:

Good evening, everyone. I'm Elyse Caplan, the education director at Living Beyond Breast Cancer [<http://www.lbbc.org>]. It's nice to see a lot of familiar faces and some new faces, and we appreciate everyone who is with us tonight ... welcome, and thank you for taking time out of your busy day to join us. Tonight's topic will certainly get you up-to-date on the latest technologies available to women diagnosed with breast cancer, as well as on managing some of the side effects, etcetera.

Id like to give you a little background on Dr. Marisa Weiss, whom many of you know quite well. Marisa is the founder and president of BreastCancer.org [<http://www.breastcancer.org>], the world's most trafficked online resource for medically reviewed breast health and breast cancer information. She is the founder and past president of Living Beyond Breast Cancer. As a breast oncologist, Dr. Weiss has 20 years of active practice in the Philadelphia region. She practices at Lankenau Hospital [<http://www.mainlinehealth.org/lh/>], part of the Main Line Health System [<http://www.mainlinehealth.org>] and the Jefferson Health System [<http://www.jeffersonhealth.org>], where she serves as director of breast radiation oncology and director of breast health outreach. A regular "ABC News" contributor, Dr. Weiss has authored numerous articles for the network's website. She has appeared on CNN's "House Call with Dr. Sanjay Gupta" for the past three years during Breast Cancer Awareness Month and on the NBC "Today" show's special breast cancer series for seven consecutive years.

In 2005 Dr. Weiss was named Doctor of the Year by *Philadelphia Magazine*. She serves on the professional advisory board of Mommy's Light Lives On [<http://www.mommyslight.org>], the American Society of Clinical Oncology [<http://www.asco.org>] and the American Society

for Therapeutic Radiology and Oncology [<http://www.astro.org>]. And we all know, Marisa has many more credits to her name – but, without further delay, please welcome Marisa Weiss. (Applause)

### MARISA C. WEISS, MD:

We're going to do this a little bit more informally because the computer is not responding to our touch, so we're going to do it without the PowerPoint presentation and focus on the basics of radiation oncology. Radiation therapy is one of many different treatments that can be used for women who have been diagnosed. Now, as you know, there is only one of each one of you who is diagnosed with breast cancer, and the role of any treatment, including radiation, depends very specifically on your individual situation. There is no generic approach to any one person. It's up to the doctors on the team, as well as the other people that you depend on for your health, to work with you to figure out exactly what you're up against – the extent and nature of the problem that you're dealing with – so that you can identify the [appropriate] treatment. It could be one treatment; it could be a series of treatments [given] in [any of several] combinations and [sequences] in order to give you the best treatment possible.

Whenever a breast cancer is diagnosed, a lot of time is spent, right up front, really checking out the extent of the problem. That's staging. Pictures and images of the body are taken to understand how big or small the cancer is; [whether or not] lymph nodes are involved; [whether or not] there are other places in the body that may be affected. Then we look into the nature of the cancer – what is the personality of the breast cancer? How might it behave? There are a lot of different things we look at in terms of the personality of the cancer.

[It's] just like, when you meet a person for the first time, you probably want to know what this is person like and how you might interact with him

or her. You're probably very good, at this point in your life, at figuring out if the person is nice, if he or she is honest or funny or intelligent or if the person is tall or short, thin or fat. You quickly take in a lot of information about a person when you first meet him or her, and we do the same thing when we meet up with a breast cancer. We want to know the different personality features about a breast cancer so we can understand how best to treat it. The purpose of treatment, of course, is to get rid of the problem and, we hope, never see it again – or, if it's an active, ongoing problem, to get it under control for [what we hope is] an extended period of time.

Some of the personality features that we look at are ... the size of the cancer and the extent of the problem, but [we] also [look to see whether] it's fast growing or slow growing. Is it high grade or low grade? Grade is a reflection of how the cancer cells appear relative to normal cells right nearby. If the cancer looks like it's fast growing or aggressive, it's going to be high grade; grade 3. If it's sort of low key, very benign looking, and very slow growing, it's going to be more like a grade 1. We also look at the hormone receptors in the cells. Those are like little places – little receivers – that listen for what [the hormones] estrogen and progesterone have to say ... [Usually] those are measured [in terms of] a number, which indicates the percentage of cells that have hormone receptors. Estrogen receptors and progesterone receptors are read separately.

We also look at something called a HER2 gene. This gene can be present in about 20 to 25 percent of breast cancers. It's not the inherited kind of breast cancer gene abnormality – that has a different name. The gene abnormality that might be inherited – passed through a family – is called BRCA1 or BRCA2. There are other inherited gene abnormalities, but those are the two that we know the most about and that are most commonly tested for. The HER2 gene is [commonly associated]



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with a more aggressive problem. But we can do something [to treat it]; no matter what we find, we have therapies that we can use.

We look at whether or not the cancer cells are in the fluid channels of the breast. The breast has a lot of drainage – baby drainage – pipes in there that drain fluid away from the breast. It's the job of the lymph nodes to filter out any kind of fluid that's leaving the breast and to get rid of the "junk," or the bacteria or viruses or cells – anything that's trying to leave the breast area. It's sort of like a depot or a police station along the way. We look inside those teeny little fluid channels in the breast to see [whether or not] there are any cancer cells that have gotten in there and that are trying to leave the breast area – trying to "go out the back door," so to speak.

We look at a bunch of other things, including margins. Margins really tell me more about the extent of the problem. Did the surgeon remove [the cancer] and get clear [margins] around it or not? That's something about the margins or the edges of the piece [of tissue] that was removed, and there is a front edge, back edge, top, bottom, right, and left that we look at [whether there is any cancer in any of those places on the tissue]. We also look at a bunch of other things. These days we're also looking at these fancy gene tests of the cancer, in which a lot of cancer genes are [examined] at the same time. That test is called the Oncotype DX test. There is also the Mammoprint test, and [there are] others right on their heels ... [but] the Oncotype DX test is the one that's available most commonly, has been passed through the insurance companies, and has more of a track record than some of the other gene tests. It's specifically for women with hormone receptor-positive – meaning that the receptors are there – breast cancer. The test is [performed in order] to answer the question [of whether or not an individual] woman would benefit from chemotherapy on top of hormonal therapy. That's what that test is specifically designed to answer right now. But of course, as you know, medicine marches forward, and the fact is that we're learning a lot more about every one of these little things. As we learn more, [it is hoped that our newfound knowledge will be of] greater benefit to people ...

So, basically, you work with your doctors to figure out the extent and nature of the problem that you have. Then, as a team [member], you work with your team of doctors, saying, "Okay – now that you know what I have and the extent of the

problem, what can I do to get rid of the darn thing and never see it again? Or, if it's something that I have to live with, how do I get it under control ... so I don't have to deal with it very much? [I need] treatment that I can live with – [that allows me to have] quality of life and feel like me and be a person and run my life and take care of my kids and continue to support myself" – which a lot of people have to do – "and everything else that is important to me."

There are two categories of treatment. There's local treatment, in which the focus is on the breast and the adjacent lymph nodes. The other category of treatment is what we call systemic treatment. In that, the treatment is aimed at the whole body; the whole system. That's why it's called systemic. In the bucket, or the category, of local treatment is surgery and radiation. In the category of systemic treatment is hormonal therapy for women whose cancers have hormone receptors present. Then there is chemotherapy, which – you all know the alphabet soup of various chemotherapies.

There are also what we call targeted therapies; the fancy, more [recently developed] medicines that specifically focus on something in the cancer that may have caused the [changes in the genes to prompt it]. If it's the HER2 gene that was the instigator, or the culprit, for example, there is a medicine, called Herceptin, that addresses that issue. If it's the little baby blood vessels that cancers seem to make more of, then [the treatment] may be Avastin, a medicine that is [designed] to block the formation of new blood vessels so that the greedy cancer cells can't eat as much as they want to. If the cancer is HER2 positive, there's Herceptin. There's also another medicine, called Tykerb, which aims its action against the HER2 [and HER1] gene[s]. The two HER genes are actually sister genes that talk to each other – kind of hang out together and cause trouble together ... Then that's a medicine that focuses on the two of them, not just the loudest one.

In terms of where I come in – I'm a radiation oncologist, which means that I work with a team of people who use radiation [to treat] women who have breast cancer whenever the situation warrants it. Radiation is most commonly used in women who have early stage breast cancer or who are looking at breast preservation therapy as an alternative to mastectomy. In general, the primary focus of local treatment is to treat the whole breast one way or another. You can treat the whole breast by removal of the whole breast; that's called

mastectomy. Or you can remove the affected part of the breast; even if it's an abnormality [that mammogram shows is] not actually a lump, it's called lumpectomy or partial mastectomy. The part of the breast that's affected is removed, and the rest of the breast is treated with radiation. Whole-breast radiation remains the standard of care for women who want to keep their breast as an alternative to mastectomy. Those two treatment options are equal [in terms of benefit] for a woman who has one cancer in the breast that's four centimeters or smaller [and] that can be removed with clear edges, or clear margins. Whether or not lymph nodes are involved has no bearing on whether or not a woman can have lumpectomy/radiation or mastectomy.

That's one role for radiation. Another role is for women who have more advanced disease in their breast and who may require mastectomy because, for example, the tumor is five centimeters or greater, or there are several cancers in one breast, or maybe there is skin involvement, or, if you were to remove the cancer, there wouldn't be much breast left. There are some people whose bra size is AA. With those women, there is not a lot of breast tissue to leave behind if you take the lump out.

In women who require mastectomy or who choose mastectomy, sometimes radiation is added after mastectomy. That's in women who have a breast cancer that's five centimeters or greater, in women whose surgeons can't get clear around it – like, they removed the breast, but the cells came up to the edge, and the margins are positive – or in somebody who has four or more lymph nodes involved. For premenopausal women ... who have any lymph nodes involved, there seems to be a benefit, a specific benefit, from radiation.

Let's just pause there for a second and evaluate what radiation therapy does. What is the benefit? Radiation is a very powerful form of treatment that is delivered [via] a lot of fancy machines after a lot of complex treat[ment] planning. I don't think this will come up, but I could show you some pictures of what [radiation therapy] looks like. It reduces the risk of recurrence by two-thirds. If your risk of recurrence [without radiation] was 3 percent and radiation would drop it down to 1 percent, that's not so exciting. You wouldn't [undergo radiation just to reduce your already minimal risk by] two percentage points. But if your risk of recurrence after surgery was 30 percent and you could reduce that risk by two-thirds, down to 10 percent, whoa – you just saved 20 percentage



points. You've got 10 percentage points left over, which could be pushed down further by additional therapies. It could be chemotherapy, hormonal therapy, a combination, or, maybe, targeted therapy.

What we do as a team is use the various treatments – alone, together, or in sequence – to reduce the risk of recurrence as much as possible in [any particular] situation. Whether or not you apply any treatment, including radiation therapy, to a woman's situation depends on the benefit she might get from it. After mastectomy, many women have reconstruction, and those women may also need radiation. In that situation we have to coordinate everything [from the] surgery [to the] reconstruction [to the radiation]. Usually if a woman needs radiation after a mastectomy, she also requires chemotherapy or some other form of systemic therapy, in which case we have to coordinate the radiation with chemotherapy. We are very used to working as part of a team and customizing a treatment plan based on each person's unique situation. That is why you see specific doctors instead of getting your treatment [plan] over the Internet – you want to make sure that you get a treatment that's customized for you.

The other role of radiation therapy involves women who have more advanced disease that involves other parts of the body. Radiation is very good at addressing, let's say, spread that goes to the bone – where the bone might be painful and weakened by the presence of cancer growing in it. Radiation is used to help reduce the pain [and] to get rid of the cancer cells so that the bone can rebuild itself – heal and regain its strength – so that the woman doesn't have a risk of that bone breaking. So, [radiation is used to] treat a number of different [issues in] women who have metastatic disease: if they have pain; if a fracture has already developed – we'll still treat that, and often an orthopedic surgeon will come help stabilize the area as well; if there's an area in which a nerve is being pinched or the spinal cord is being pushed to the side, compromising someone's ability to be physically active as well as their sensation. We also will treat an area in which there might be some bleeding; if there's a spot somewhere that produced bleeding, we could treat [it] and other areas of spread.

Radiation is a very powerful tool. It is a very focused therapy. It's not like the radiation ... in this room there is electromagnetic radiation coming out of the light. In the visible spectrum, what you see in this room is [the] visible light spectrum,

[which] is low in energy; it scatters through the whole room and fills it with light. Radiation, when it's used for therapy, is very, very high in intensity; it's invisible, it's very forward moving, and completely controllable in its direction and its scope. In the hospital [setting] we have many different energies of radiation to choose from. The higher the energy, the further it goes [in the body]. We also can vary the treatment field and shape the area that gets treated. We usually use multiple beams to access the problem so that we can maximize the dose to where it needs to go and avoid [radiating] normal tissue.

Radiation, in general, does not make you radioactive. There is no hair loss unless we're treating the brain area. There is no nausea or vomiting. Most people can drive themselves to and from treatment. At Lankenau we have parking right there, and we provide it at no cost; that makes a difference. But it is inconvenient; there's no question about that. The coming in and out of there each day is inconvenient. Generally speaking, people are there about a half an hour a day. Most centers start early in the morning – like, seven in the morning. We start even earlier than that, and we go into the late afternoon. Generally speaking, [your treatment appointment is set at] the same time each day so that you can plan your life around it. It generally should be continuous, without interruptions, five days a week, Monday through Friday. It's important to get at least four treatments a week.

In terms of new applications of radiation, while the standard of care is whole-breast radiation, there is a promising new technique that looks at partial-breast radiation [in] women with early stage disease. When you just remove the lump, the area at greatest risk for [another] problem is right smack in the same neighborhood that the cancer started and grew up; sort of the "scene of the crime." That remains the area at greatest risk for recurrence. So, for women with small breast cancers whose greatest risk for recurrence is right around the neighborhood, you can deliver radiation to just that neighborhood to reduce their greatest risk of recurrence.

That radiation is given over a shorter period of time – more like twice a day for a week. It's more complicated, it requires a lot more treatment planning, and there are various ways of doing it. You can do it with a lot of baby beams coming from a linear accelerator – a big, fancy machine that makes and delivers radiation. Or you can

deliver it via an implant. Or you can deliver it via this fancy balloon called a MammoSite. [The balloon is placed in the area,] and you [insert] a radioactive pellet [via] a tube that goes into the middle of the balloon; [the pellet is] in there for five to 10 minutes each time, [and it's done] twice a day.

That's a synopsis of the key, basic breast radiation oncology principles. What I thought I might do at this point is open it up for questions. We'll go from there. Yes?

#### WOMAN:

If you have that [inaudible]

#### MARISA C. WEISS, MD:

It's an excellent question. The question is this: if you get partial-breast radiation, in this case using a MammoSite, which ... concentrates the radiation at just the area around where the breast cancer had been – we don't have a big track record on [MammoSite]. We have a short track record in a small number of women, since it's been out for only a few years. Only a handful of women have been followed out to five years. We have several thousand women who have been followed out a few years.

It's too soon to tell the benefit of this partial-breast radiation for that larger group. But, for the women who were treated with partial-breast radiation and followed out to five years, which is when we begin to really see if it works or not and how well it works, the situation is that they all did very well. But they were also predicted to do well, because those women who were followed out to five years were part of a study that let women in only if they had really small breast cancers, no lymph nodes involved, no margins involved – everything very low key and favorable. It is a promising new approach. Because it is promising, the National Cancer Institute [<http://www.cancer.gov>] started a big study, called the NSABP B-39 study, that compares standard of care, which is whole-breast radiation, to partial-breast radiation, using any one of the techniques that is approved. We don't know the results of that yet; that's underway now. We won't know for a few more years how it stacks up against whole-breast radiation.

#### WOMAN:

For the study that [inaudible]



**MARISA C. WEISS, MD:**

Good question ... The first study involved only women who had cancers that were two centimeters or smaller, with invasive ductals, no lobulars, lymph nodes involved, no lymphovascular invasion – those little fluid channels of the breast – negative margins, and all that, and they had to be 45 or older. The next study, which is the study that's currently underway, had much looser entry criteria. You could have up to three lymph nodes involved, and the cancer could be up to three centimeters. You could have margins that weren't positive. You could have any subtype, from DCIS out to lobular, or anything like that. It's very wide open. So there are a lot of doctors, though, who feel uncomfortable with such wide criteria, because the MammoSite and other methods by which partial-breast radiation is given only treat out to a centimeter around the balloon, so the rest of the breast is untreated.

During the time that that study got underway, other studies came out saying, "Whoa, whoa, whoa. There is a survival benefit if you give radiation to the whole breast and lymph nodes after lumpectomy if there are any lymph nodes involved." So doctors are saying, "Wait, wait, wait; we do not feel comfortable putting women in that situation on this study because, if we do, we may not be giving them the potential survival benefit that every woman deserves." [As a result,] the studies have had difficulty getting finished for each category of stage. It's going to be a while [until we] get any results.

**WOMAN:**

[Inaudible] something you said about node involvement or what would be the case for that?

**MARISA C. WEISS, MD:**

The question is this: what value does radiation have after mastectomy, lymph node removal, and chemotherapy? The [issue of] reconstruction is irrelevant because that doesn't have any effect on the anticancer treatment; it's just ...

**WOMAN:**

It doesn't [inaudible] the radiation at all?

**MARISA C. WEISS, MD:**

No. Let's deal with that one separately. The question is, what's the role of radiation after mastectomy and chemotherapy? Of course it's individualized for each person, but, in general, the criteria are that the cancer is five centimeters or greater; that there's a positive margin of resection

– that the cancer came too close to the edge of the breast specimen that was removed, [so there's a worry that there might be] some cells on the other side that could still be there [and] that could grow up, [causing] a recurrence; [and that] there are four or more lymph nodes involved. Those are the widely accepted criteria.

Then there are a lot of subtle situations. For women who are [in] menopause who have any lymph nodes involved, studies have shown a potential survival benefit in radiation after chemo and mastectomy. Then the question is this: how much lymph node involvement [is there]? Was there extracapsular extension? That means that the cancer grew in the lymph nodes and broke through the wall of the lymph node, the capsule lymph node, and sort of spilled outside into the fat of the ampit. Then we look at lymphatic and vascular invasion and grade. Was this a fast-growing, aggressive-looking breast cancer, and did we catch it in the fluid channels of the breast in multiple areas? Let's say that, even though the cancer itself was only three centimeters, we see like little traces of cells going out north, south, east, and west. We start getting concerned that the whole breast is really at risk. In that situation, the question becomes one of whether or not radiation therapy would help in two ways. Would it help reduce the risk of ever having recurrence? And will that reduction in recurrence translate into a better [rate of] survival?

The thing is that I'm telling you what the criteria are [today], but they will be modified by new advances. So it's always tricky to come to a conference [with] current recommendations when maybe somebody here was treated years ago when the criteria were different. This keeps happening. For example, in December they showed that Oncotype DX testing could predict whether or not someone who has hormone receptor-positive disease and lymph nodes involved needs chemotherapy. All of the women [diagnosed before the announcement] who had [gotten chemotherapy treatment] automatically [because they had] lymph nodes involved were thinking, like, "Oh, thanks a lot. You brought it out in December for your little dog-and-pony show. Maybe you could have shared it with the world in October, when it would have benefited me." That's [a commonly experienced] feeling, and it's very normal [and] natural.

Medicine does march forward, and we learn as we go. You want to make sure that, whenever you're making a decision ... if it's diagnostic, you're trying to decide how to be followed [up on] over time, or, if it's therapeutic, should you stay on the medicine you are on; should you give it up; should you switch to something else – you want to make sure that you get the best information at each time [you visit your doctor], because it can change.

**WOMAN:**

Where do you get those [inaudible] like when you [inaudible]? Do you come up with them? Does the team come up with them?

**MARISA C. WEISS, MD:**

You mean in terms of [wanting to know your] risk of recurrence?

**WOMAN:**

Right.

**MARISA C. WEISS, MD:**

You would need to [get that information] that from your own doctors.

**WOMAN:**

So it's the whole team together?

**MARISA C. WEISS, MD:**

It's the whole team together. But you want to ask the right person on the team. Generally speaking, the way to get the best overall treatment is to get the best out of each specialty. The way to get the best out of each specialty is to [work with a team], but you also want to get your advice about each thing from the doctor who's got the most expertise. For example, I encourage people to ask me the questions about radiation oncology. I'm not the best person to answer questions about surgery, chemotherapy or reconstruction. I have people who bounce those ideas off me all the time, and I try to be helpful whenever I can. But it is not my area of expertise. I am not the one writing those prescriptions, taking responsibility for making those judgments and recommendations and implementing them. I think the best person to do that is the person who's regularly thinking about and taking responsibility for those things.

Likewise, I know that, in the past, a lot of surgeons wrote prescriptions for tamoxifen and Arimidex. That's not my style. I stick to my guns on this: I really think that you should get those treatment prescriptions and recommendations by a medical oncologist that specializes in that. Because the field keeps changing, and there are a



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lot of little nuances that only a medical oncologist is most likely to know about.

**WOMAN:**

I'm going to ask you a question [inaudible] I'm not sure. I'm asking for someone else with lung cancer. But [inaudible] for metastasis.

**MARISA C. WEISS, MD:**

Radiofrequency ablation is not radiation. It's usually done in a radiology department. They create a complex wave device to cause damage right around the nozzle that does it. I don't have experience in doing it. I don't do it myself, and I don't take care of women or anybody with lung cancer. It's true that breast cancer can travel to the lung, but it usually still behaves as breast cancer in the lung rather than as lung cancer in the lung. They're very different diseases. I'm sorry that I can't tell you more about it. I would call and find out who, specifically, is doing that. I know there are centers [and] . . . radiology departments that are doing that procedure.

**WOMAN:**

She has been seen [inaudible] ready for surgery.

**MARISA C. WEISS, MD:**

There is a lot of fear about any kind of cancer treatment. There is a lot of fear about anesthesia. There is fear that, if you open the body, cancer will spread. That's not true, but it is a commonly held belief, and it is a big reason that a lot of people don't follow through and have surgery. The other day someone asked me if, when they opened up the problem, blood splattered around – would that spread it. No. There are very special techniques [used to handle] a cancer at the time of surgery, and [they involve] respecting the body [as a whole] and maintaining sterile planes and dissection lines and all that to keep the cancer process together. We call it "en bloc." And [the philosophy is to] not be slicing and dicing while you're in there. They just remove it. Also, when breast cancer is biopsied through the surface [via] a core, if cancer is discovered and they do lumpectomy, they usually remove the core biopsy entry point and the track at the time they do the lumpectomy.

**WOMAN:**

I was just going to mention that I have [inaudible]

**MARISA C. WEISS, MD:**

In terms of side effects from radiation, they depend on the area that's treated, and they involve only the area that is treated. If we're treating the breast, we treat in a way so that the two treatment fields come in at an angle, like this, skimming across the surface [and] catching the breast area. Again, we try to maximize the dose to the breast and avoid or minimize the dose to the normal tissue. Inside the treatment field is the whole breast – but, because the breast is a curved structure and [because it] sits on the chest wall, in order to treat the whole breast from the middle out to the side there ends up being a little bit of ribs and some muscle right underneath that is in the treatment field. A little bit of lung might [also] be in the treatment field.

Now, if you're treating the left side – the heart lives on the left-hand side. There could be some heart in the treatment field. Where I treat in my practice, I've never done that. It's unacceptable, and there are many fancy techniques and bells and whistles that you can use to make sure that you're off the heart entirely. But, in terms of side effects of treatment, again, there's no radioactivity, no hair loss, no nausea, no vomiting [and] no interference with hair [growth]. There is definitely inconvenience; you're disrupting someone's life, and you're making [her] come in each day for about seven weeks or so on the heels of other treatments.

[The inconvenience] could be as minimal as [undergoing] a bunch of different diagnostic tests, living through a period of uncertainty, having either limited or general anesthesia for surgery, [and having surgery]. That's the minimum. But many times radiation comes on the heels of extensive chemotherapy, premature menopause, hormonal therapy – stuff that knocks your socks off. And, basically, if you go through eight cycles of chemotherapy and you keep getting hit while you're down – you come up for air after one cycle and then it hits you again – by the time you're at the end you feel like you've been beaten up. During the course of chemotherapy they're often giving you medicines to help you get through it – steroids and all of these other growth factors that help you get through your chemotherapy – and often fatigue [due to] chemo is much worse after [the chemo has ended] than [it is] while you're getting it. It's [because of] the cumulative effect and the absence of those supportive medicines.

A lot of people I take care of feel like they're 100 years old [when they're] crawling out of bed in the morning, and they're maybe [60]. Even the women who are [35] feel like they're 100 years old, because their systems have just been shocked by all kinds of insults. And [you have to deal with feeling like that and undergo] radiation. And just the huge change of your internal hormonal milieu – maybe you were premenopausal at diagnosis and the chemotherapy threw you into an early menopause quickly. That's devastating. That really saps you of your energy. You feel totally exhausted. It's more than fatigue. That becomes a not-strong-enough word. Or maybe you were on hormone replacement therapy or some sort of hormonal therapy and then, after receiving a diagnosis of breast cancer, you were told to stop it. So you feel very different, and you feel tired from that change in your medicines. In general, [though,] radiation itself really doesn't tire you out. It shouldn't, because it really is directed only at the breast. If a large area needs to be treated, that's a different story.

We do use tattoos to mark the corners of the treatment field. That's a side effect. And blood counts might drop a little bit, but usually it's a very subtle drop. Those are basically the main side effects of radiation, besides the skin getting pink and reddish. Some areas will get tan. There can be some peeling – peeling in a dry way or patchy areas of peeling in a wet way. It depends completely on the treatment. If the breast is still intact, the skin reaction is usually very minimal and very manageable. If it's [done] after mastectomy, you need to get the skin red with radiation, because that's the very tissue that you're working on to reduce the risk of recurrence. And that's where the cells might be hiding out – in the skin and the envelope of tissues that had surrounded the breast before it was removed.

Also, the area can get sore and uncomfortable, and [you may] feel pressure or tightness. That depends on the situation. If it's the breast there, it can feel full and tender. If you're big breasted, it can feel very heavy and a little asymmetric, because we're very finely tuned people and we notice even subtle differences. If you have an implant or an expander in place – something that doesn't really belong in there; that's stuck in the middle of the area we're treating, you can get more tightness around that implant and even get scar tissue formation around it. That's the issue that some people have after [getting] implants: radiation causes scar tissue, and that scar tissue can happen around that area.



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Another thing that happens, in terms of discomfort, is that surgery involves cutting through little baby nerves to get into the breast to remove tissue from it. That area goes numb. It takes a long time for those nerves to wake up, see what's gone on in the breast and regrow and heal. A lot of times, if you're going through chemotherapy, they don't wake up at all. [In other cases, the] breast or breast area remains numb for a long time, because the chemotherapy inhibits the nerves' regrowth. But then, during radiation or after surgery or chemo without radiation, the nerves start to wake up, and they get pissed off that they were cut, and they hold a grudge.

They can cause a crawly feeling; an itchy feeling; a burning feeling; a shooting-pain feeling; an achy feeling; a hot feeling – all kinds of things. That usually gets better over time but, most certainly, they will always remind you, here and there, that they were cut at some point. It could be at someone's baby shower; you reach over for something and, ouch, you just got caught. Also, after radiation there is a slightly increased risk of breaking a rib if you were to fall down [or be hit in that area]. But that should heal normally. And, in someone who has a lot of lymph nodes involved [and in which] radiation is required to treat the lymph node-bearing areas to get control of that region, that person may have a higher risk of swelling, or arm edema . . . You can get more swelling of the tissues down here. That's also a form of lymphedema that can happen – a fuller breast; a little perkier breast; that kind of thing.

## WOMAN:

Can you [inaudible] medicines or ointments to try?

## MARISA C. WEISS, MD:

No radiation therapy effect just sort of comes up overnight. It's a very gradual onset, and you notice it over time – pinkness; a little redness; a little tanning. If you're African American the skin can get very dark, and then during treatment, what I do . . . not all places do this, but in my practice what I do is start out with Biafine, which is a French moisturizer. There are other things you could use, [such as] Aquaphor; it's cheaper. Most prescription plans cover Biafine. That's used three times a day. Then, a few weeks into treatment, when the redness begins, you can use a 1-percent steroid cream, which is followed, 20 minutes later,

by Biafine as a moisturizer, and continue that for a few weeks. Then you usually need to up the strength of the steroid cream.

I use betamethasone, and that is used three times a day and followed, 15 to 20 minutes later, by Biafine or another moisturizer. I think it's nice to dust the surface with cornstarch after you've applied the creams because it takes away [the stickiness]. It also reduces friction. If you perspire, it absorbs some of the perspiration. It takes away odors, and a lot of people like it. It has a therapeutic, soothing effect. If you've got a thin [nylon knee-high] around the house, just take kitchen cornstarch – it costs very little – dump it into the knee-high, tie a knot in it and you've got a little ball of corn starch inside of a nylon. After you apply the creams, you just tap it along the surface. Or you can use cornstarch in a bowl and a powder puff, or [you can] borrow someone's shaving brush and use that. My husband would not forgive me for that – that's one of his little prized possessions – but you can do that. It's also really important, during the course of treatment, to keep skin away from skin. Skin does not like to live up against itself. You know how, if you're big busted, you might have rashes underneath the breast during the summer? That's a yeast infection, [caused] because that's a warm, dark, moist place. And yeast normally lives on your body surface. So you try to give your skin space. It does not like to be up against itself, particularly during radiation. We ask women to keep their arm out, like that, when they're sitting in a chair. If you're around the house, make sure you wear an undershirt [that's] up underneath [the breast]. If you're big breasted, you can wear a tube top that stops [underneath the breasts] in order to let your breasts fall against the tube top rather than against your belly wall. We ask you to avoid wearing underwire bras or anything [else] that's going to rub under that area.

The good news is that the skin changes usually go away completely. Some women who require high-dose radiation in a particular area may have little, teeny pink marks – little spidery pink marks – in a particular spot. Those can be addressed pretty easily with laser therapy, and the tattoos can be removed later on if you want to do that. They're very, very tiny. I've got one on my hand, if anyone wants to see what it looks like.

## WOMAN:

[Inaudible]

## MARISA C. WEISS, MD:

Any limitation to exercise if you're undergoing radiation? Basically you want to be gentle on your body. If you were never exercising before and you start to exercise – which I totally encourage; exercise is very therapeutic from every point of view in terms of your health, your bone health, your balance, safety prevention, cardiovascular [improvement], your energy, your libido and everything else – but you don't want to do anything drastic. You have to be gentle on your body. I think it's a good idea to work with an occupational or physical therapist or physical medicine doctor to help you understand how to most safely and effectively get your body moving again in a symmetrical way so that you can build your range of motion, your strength, your flexibility and your posture, which I think is really important. I think that's a really good idea.

If you had been exercising regularly but just let it slide for a short period of time, you can reintroduce exercise slowly. As we grow older, our ability to just “bounce back and pick it up” is limited. That's where danger comes in – when you put too much pressure on yourself to do too much too quickly or to multitask. That's when accidents happen. For anybody who's going through breast cancer treatment – you cannot run on all five channels. You just can't. You need to work on one channel at a time, or two channels, but it's dangerous to try to do too many things at once; things like reading while walking up the stairs or talking on the cell phone while crossing the street or driving a car. You just can't do that. You could kill yourself that way. I mean it. You really have to be very careful. You can fall; you can break your neck. Accidents happen when you're compromised and you're pushing yourself to do more than you can do.

But I think that, in general, the recommendation is to use lighter weights with more repetitions than heavier weights with fewer repetitions. Really be gentle. Women spend so little attention on themselves. You have to think of yourself as a baby – that you're taking care of yourself as you would a new baby in the house; that you have to really pay attention to the cycles. How often have you been eating? How often have you been drinking? Peeing and pooping? Are you sleeping well? Is there too much noise or not enough noise? Are there too many visitors? Are there not enough visitors? Are people who are visiting sick or well? That's how you have to think



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about yourself, and that's the only way that you're going to get through the treatment and get beyond it – by living in a way that allows you to back to health. The biggest mistake people make is to keep pushing to do everything at once. I have watched people collapse in front of me and people who just really push too hard.

## WOMAN:

How do you determine how many weeks of radiation [inaudible]?

## MARISA C. WEISS, MD:

The length of radiation is pretty straightforward and standard. It was determined by dose-finding studies that were done over decades ... The NSABP [National Surgical Adjuvant Breast and Bowel Project; <http://www.nsabp.pitt.edu/>] protocols involve 28 treatments to the whole breast, which is 40 centigray or [5,025], and then on top of that you can add a boost. Most centers add a boost so that the area where the cancer used to live gets an extra dose of radiation. [This boost is] particularly important for women who are premenopausal or anybody with a significant disease. It's pretty standard to give whole-breast radiation in a certain dose and then shift and focus in on the area where the cancer used to be with a boost.

The range [of number of treatments] is really narrow. It ends up being between 28 and 35 treatments. It really depends on the pathology report and, primarily, the margins of resection. Were the edges clear or not? Did the doctor get well around the problem or not? Do we need to use extra radiation to get rid of cells that could be at a close margin?

## WOMAN:

[Inaudible] whether or not you can get radiation again.

## MARISA C. WEISS, MD:

When can you get radiation again? In general, a definitive course of treatment to one area of the body cannot be repeated at the same dose. Your body has the ability to heal itself after a full, full-strength course of radiation, but there is some memory of the radiation. You're never radioactive, but ... healed tissues do not tolerate the same amount of radiation again. There are all kinds of ways that we can get around that. You can give smaller amounts of radiation more frequently; [for example,] you could treat twice a day with a smaller dose each time. You can use a smaller dose together

with a chemotherapy that synergizes with radiation, like 5-FU or Xeloda. It's a medicine; you can take that by pill or you can take it intravenously. Those are ways that you can sort of leverage more radiation in a situation where you need to have it and there is no other therapy that's going to be useful or of help to you at that time.

## WOMAN:

Having had radiation over that tissue – does that make the skin tissue more vulnerable to getting skin cancer?

## MARISA C. WEISS, MD:

There are a few things going on. Does radiation increase your risk of developing skin cancer? Generally not. If there is a person who's got a predisposition to skin cancer, that person will have a higher risk of getting skin cancer if she's got too much sun exposure or if she is getting radiation; in someone like that, it may increase the risk for skin cancer a little bit. But, in general, the risk of skin cancer is not increased. In fact, radiation is actually a very effective form of treatment for skin cancer; in many people who have skin cancers that cannot be removed, radiation is a very effective treatment. I had unbelievable cases of sunburns in Irish guys that had been lifeguards for 10 years; their skin would slough off three times during the summer. They had just huge areas of skin cancer on the back – like, a country's or a continent's worth – and we treated, and it would go away. So radiation is used for many other cancers as well.

## WOMAN:

I, too, was radiated years ago ... [inaudible]

## MARISA C. WEISS, MD:

It's contracted a little bit. Let me talk about that, and then I'll get to your question about the healing. The effects of radiation can change a little bit. After radiation is finished, you can get some scar tissue in that area that heals up the spot, just like you get scar tissue that heals up the spot after surgery. The radiation area that's treated is a larger area, so [there will be] healing tissues in that area. Now, the way in which those tissues may be affected by changes in your life over decades can vary from one person to the other. For example, if someone is a smoker – smoking narrows small blood vessels that feed the tissue – healing is always a problem. If you get any subsequent insult to the breast, healing it is harder. If someone has a blood vessel problem – [for example, if he or

she develops] lupus or has scleroderma or something like that – [he or she] can have a real problem with healing.

If someone gains weight after radiation – let's say that, when you had the radiation, you weighed 140 pounds, and now you weigh 160 pounds; you will have gained a lot more of that weight in the untreated side. The treated side does not accommodate the weight that's trying to get in there, so you can [experience] a pressured feeling on the treated side relative to the other side. Somebody may have had reconstruction issues or serial reconstructions. The area that's treated is not as forgiving, and it doesn't heal as well after treatment.

There are women I take care of who may have had reconstruction and [who have healed] from that, and then they decide, a few years later, they want [a bigger breast size]. Women can get very fussy about different things if they focus on them. And there are women who just keep trying for perfection. No, I don't like that ... The more you mess with or intervene or treat an area that's had surgery, chemotherapy and radiation, the more you're asking for trouble. You have to understand that most plastic surgeons have women – their entire waiting room, in general, is [full of] women asking, "Okay, can you do this for me? I really would like ... this would be exactly perfect. [And then can] you do this for me?" This is what they're doing all day long – they're having little nips, little tucks, little injections of all of this stuff all day long. And the plastic surgeons are also seeking perfection.

With someone who's had surgery and chemo and radiation and all of that stuff for breast cancer, you're not going to get that same level of perfection, but you and your surgeon might decide that you're going to try for it. I think that's a mistake, because I think that, when you're dealing with tissues that have already been put through so much, you don't push it too far. You're just asking for trouble. That's my personal point of view. I have patients who come to me and say, "I'm going to have my new nipple constructed out of the tissue right next door to it. I want something that's bigger that will show through my T-shirt." I'm, like, "You know what? I really don't think that's a good idea." It would be much better, if you want that look – they have latex nipple/areola things that you put into your bra. You can do that. Just as [there are] a lot of women [who] buy things to cover up – they call it headlights; low lights – there are women who want that look. Whatever you



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want is fine, but don't compromise the health of your tissues in order to get it.

**WOMAN:**

So there isn't anything that can be done about that?

**MARISA C. WEISS, MD:**

I haven't examined you. If someone has a lot of healing problems – and, of course, I don't know your situation at all.

**WOMAN:**

I'm just saying. It's not [inaudible]. And you're saying that's vain.

**MARISA C. WEISS, MD:**

I'm not saying that's vain. But in a situation it's just a question of is it the size, do you like the size, are you symmetrical in size, it's just the skin.

**WOMAN:**

[Inaudible]

**MARISA C. WEISS, MD:**

There are certain plastic surgeons who will push, but not push too far.

**WOMAN:**

[Inaudible]

**MARISA C. WEISS, MD:**

You could go to a plastic surgeon and say, "What can you do for me?" If it's someone who really does a lot of breast surgery, you can get a good opinion.

**WOMAN:**

[Inaudible]

**MARISA C. WEISS, MD:**

It's all related. What's happening down there affects what's happening up here. There are some excellent plastic surgeons in Philadelphia, and you could go see one and see what [he or she] can do for you. Of course, you've gotten very clever, probably, with a prosthesis or special bras or necklines and things that you could put on that would distract the eye from that specific spot. There are all kinds of creative and resourceful things that you can do. I do think that you need to see someone who's very experienced because [he or she will] use good judgment about how far to go or when to stop. The last thing you want to do is to make it worse. And that could happen.

**WOMAN:**

Can you recommend anybody?

**MARISA C. WEISS, MD:**

I can talk to you a little bit afterward, or through Elyse; you can talk to her about that. But there are some excellent plastic surgeons, absolutely, with much more experience than others.

**WOMAN:**

[Inaudible] plastic surgery and reconstruction. I'm wondering if you can talk a little bit about [inaudible]

**MARISA C. WEISS, MD:**

There is no "right answer." You have to decide, with your cancer doctors, if there is a role for radiation after mastectomy from a cancer point of view. Will radiation add significant benefit in your situation? If the answer is yes, then you need to have radiation. You'd want to coordinate that as best you can with a plastic surgeon. The plastic surgeons – they're perfectionists. They don't like radiation. They don't like anything that will get in the way of their surgery result looking perfect. And, of course, you feel the same way. You'd rather have it be perfect. Generally speaking, all of the tissue reconstructions in which the breast is rebuilt using tissue borrowed from another part of the body – the belly brought up here, the traditional way – has been the TRAM reconstruction.

At Penn and at Lankenau we use the DIEP procedure, the free-flap procedure, which I find significantly superior because you're not borrowing muscle to build up the breast and there is not nerve that goes with it. Your surgery is longer, but the function is better. Your belly works like it should, and the recovery is faster because you're not pulled together, like this. And there is less of a risk of a pain syndrome. Any of those reconstructions with tissue, either borrowed from the belly, in whatever form, or sometimes borrowed from the rear end – here and here; brought up – [those patients] tolerate radiation without any problem whatsoever. Never had a problem.

We've had Serletti at Penn and Wu at Penn. Serletti has been there for three years now. Before that, I worked, for 10 years, with the people from New Orleans and Johns Hopkins and various parts of the country that invented that procedure. Never had a problem. I have a lot of experience in treating women in that situation and haven't had a problem.

[The doctors at] Memorial Sloan-Kettering, in New York [<http://www.mskcc.org>], don't use those procedures very often; they use implants. In most situations, they use the expander to stretch out the tissue where the breast had been, and they switch it out for the implant before radiation is given. We don't do that in Philadelphia. In Philadelphia, at the time of mastectomy the expander is put in, just like they would, let's say, at Memorial. And that's expanded after surgery. Maybe during chemotherapy it's expanded. Then radiation, if it's needed, is given while the expander is in place. Later – six weeks to two months later – the expander is removed and the implant is put in. You're walking around with these two mountains that feel really tight. Often they have to be partially deflated in order to get ideal radiation. A lot of doctors don't do that. My total commitment is always to give you the biggest benefit and to avoid side effects, so in my practice we deflate that expander enough so that it's not pushing.

When the expander is hyperexpanded, it pushes the chest wall down and flattens it up against the heart and the other tissue. You end up treating more normal tissue than needed if [the expander is] hyperexpanded, and that's unacceptable. We have the plastic surgeon remove fluid from the expander in order to give the chest wall its natural, normal shape. It allows me to deliver the radiation to the place it needs to go and to avoid dose to normal tissue. But it might take a few times. Usually we do both sides because, in order to come in like this, you need to come in at an angle, and you want the other breast out of the way. If the other breast is sticking up like a mountain, it's going to be right in the middle of the way. So you have to take the time you need in order to get the best treatment possible. There might be some adjustments required to get there.

Listen, thank you for coming. (Applause)

**ELYSE S. CAPLAN, MA:**

Thank you, Marisa. Thanks for all of the personal interaction, and thanks to everyone.

[END OF TRANSCRIPT]