

**LATISSIMUS DORSI FLAP BREAST RECONSTRUCTION
THOMAS JEFFERSON UNIVERSITY HOSPITAL
PHILADELPHIA, PA
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NARRATOR: During the next hour in this live internet broadcast, Thomas Jefferson University Hospital surgeons will demonstrate one of the most often performed breast reconstruction surgical procedures, using muscle tissue from a patient's back. Women with breast cancer often seek immediate breast reconstruction after a mastectomy to help them regain a semblance of their body and for their psychological peace of mind. In addition to the live reconstruction, this webcast will cover the entire medical path that a patient diagnosed with breast cancer follows. You may participate in the program by sending questions at any time. Just click the MDirectAccess button on this screen. Physicians may take a post-assessment survey at the end of the program for CME credit.

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ANNE ROSENBERG, MD: Good afternoon. This is a live view from OR 3 at Thomas Jefferson University Hospital in Philadelphia. My name is Anne Rosenberg. I'm a Clinical Associate Professor and Breast Surgeon at Jefferson. Today I'll be narrating the procedure, which is a latissimus dorsi flap reconstruction. The mastectomy portion of this procedure was performed earlier today. At this time, Steve Copit, Clinical Assistant Professor and Plastic Surgeon, will update us on where he is in the reconstruction portion. Steve?

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STEVEN COPIT, MD: Anne, at this point the muscle has been harvested from the back, has been rotated around the front after the mastectomy has been completed. Patient was on her side for a period of time in order to harvest the muscle. The muscle has now been rotated around to the front, where the mastectomy defect was. This is the piece of muscle tissue from the back that I know we have video of later. It's been rotated around to the front. This is the chest wall muscle, the pectoralis major muscle, and there's a pocket that's been made where we're going to put a temporary implant, called a tissue expander, that will hold the tissues where we want them and create the shape of the breast.

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ANNE ROSENBERG, MD: While Steve is completing this portion of the reconstruction, we're going to go over with you the path that a patient might follow, beginning with the radiology component, the imaging component, following right through that path, from making a diagnosis and then into different treatment options. So what we'd like to do is remind those of you who have a question to feel free at any time during the broadcast to click on MDirectAccess, the button on your computer screen. We'll try to answer as many questions as possible during this broadcast, but certainly you can feel free to send your questions in by email and we'll answer them at a future time. Additionally, if you have any questions regarding the necessity for an appointment or to refer someone, please feel free to click on the appropriate button during this time on your computer screen.

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What we'd like to do is get started with the portion of the background, beginning with mammography. What you'll notice is that with mammography, there are two types of mammography, one which is considered screening, which is what you do when a patient is asymptomatic, not having any problems. Diagnostic mammography is performed when you have someone who has a problem. They have found a lump or they have some other symptom. A diagnostic mammogram will generally include other components, other sorts of views, may include an ultrasound. Recommendations are based on what is seen on the mammography, whether it's done for screening or for a diagnostic workup. Patients at the end of their mammography will have a rating called

BIRADs. These categories, BIRADs 1-6, and you can refer to these on the screen, will allow us to classify the level of concern there is about the findings on the mammography. The categories from 0 to 3 generally do not require any intervention. Those from 4 through 6 would require some surgical evaluation. Steve, do you want to tell us where you are right now?

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STEVEN COPIT, MD: Well, right now what I'm doing is taking the muscle flap, which is muscle, skin, and fat from the back, sewing it along the outside or lateral edge of the chest wall. Basically what I'm doing is using this muscle and the pectoralis major muscle to create a pocket, and it has to be the exact size of the expander we're going to use so it won't shift, so I'm just putting those lateral stitches in now.

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ANNE ROSENBERG, MD: When we evaluate patients, some of the patients will have what we call a palpable mass, palpable meaning that we can feel it. With masses that you can feel on examination, the typical standard of care is to remove them, which is called an excision. Most of the lesions that we'll find in this category will be benign and typically they'll either be cysts, which are fluid-filled, or fibroadenomas. So as I mentioned, 2/3 of these lesions will be benign. For lesions which are found on mammography or on ultrasound but not found on physical examination, we consider them non-palpable or not able to be felt. An ultrasound would be performed to try to demonstrate whether these are fluid or solid and then, depending upon the size and characteristics, recommendations would be made to either follow them or remove them. The other type of abnormality that one might see on mammography would be calcifications. Calcifications fit into two types: those which are very coarse, often associated with benign lesions, considered macrocalcifications, or those which are very tiny, called microcalcifications. The microcalcifications are the ones that we get most concerned about with regard to problems that might predict a cancer. As you can notice, I think Steve is getting that muscle pretty well sewn down there. Anything else up, Steve?

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STEVEN COPIT, MD: Well, the outside part is done. The bottom line, the anatomy we're trying to reproduce is the inframammary fold, which is the crease underneath the breast that really ultimately gives the breast its shape, so that is preserved at the time of the mastectomy. We mark it and that's not violated, so what I really have to do is just drape the muscle along that fold to recreate that. The skin that we took from the back replaces the areola and the nipple that was removed, because that has breast tissue in it. Then really, once this is all sewn down, which I'll do while you're going through the rest of the information, we just have to pick a volume of tissue expander that will fill that and create the same shape as the other side, so we always drape that into the field so I can have that to compare to. So on the lateral part I'm just going to do the inframammary fold, which is the crease underneath, and then we'll go ahead and put the tissue expander in.

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ANNE ROSENBERG, MD: More frequently, now, we will complement mammography with an MRI. MRIs can be done, again, for screening or for diagnostics. Screening MRIs are not used in the general population. We tend to use them only in high risk population. They're very helpful with looking at people that we know have cancer or high risk population. We were hoping to show you right now an example of what the radiologist would see with an MRI. You can see that there are slices through and, as you noticed a second ago, there was a very bright white spot, so the tissue normally would be gray in color like this. After you give the injection of gadolinium, you'll see this very bright white spot. If there is, in fact, a malignancy, it will enhance. The word for when it looks like this is enhance. If we see an enhancing lesion, that's highly suspicious for cancer. You'll notice on this one there was a tiny, tiny lesion just next to it. It's important to have this information when we're planning surgery. Again you'll see the little tiny lesion here, right next to the larger lesion, and it predicts for the surgeon the extent of disease. So in reviewing how we use MRI, if we know someone has a cancer, we use them to help us define the extent of disease, tell us if there are other lesions in that breast or the opposite breast, and tell us whether or not we should expect any involvement of the chest wall or any involvement of the lymph node area.

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After we have the information from the x-rays, whether they be mammography, ultrasound, or MRI, we're often faced with a situation where a patient may require a biopsy. Biopsies come in many forms. They can be as simple as an aspiration, which is a needle just to perhaps take out fluid from the lesion, or if it's a solid lesion, to take out some cells, which is what's called cytology, or we can do a core biopsy. Core biopsies are when you use a slightly larger needle and these can be done in the office by the surgeon. The other options for biopsies require

some more invasive involvement, either using image localization, which is what a stereotactic biopsy is, which can use ultrasound, can use mammography or MRI, or a surgical biopsy, so at this time we had hoped to show you a few minutes of what's involved with a stereotactic biopsy.

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This would be the stereotactic biopsy table that allows patients to lie on it in either direction. As you noticed, there was a hole in the bed, so the patient would lie on this bed and the breast would fall through the hole and then, once it's through this hole, there is a breast compression, just like a mammography. Here the patient is already on the bed. You can see her breast just behind this light. Once the breast is in the compression, a mammography image can be taken, compared to the previous x-rays. If the lesion is found, you can notice they can then put this biopsy gun onto the attachment and you see it's pointing straight at the breast. It can then, using the x-ray guidance, be directed to very accurately remove a piece of tissue from the breast. If we don't use the stereotactic or core biopsies, then we do have the option of a surgical biopsy, which is when you would go to the operating room as an outpatient. It can be done with local anesthesia or sedation and generally the attempt is made to try to remove the entire lesion, which is what's called excisional. Steve, how are you coming up there?

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STEVEN COPIT, MD: Good. Obviously we're working through a little hole. Really the evolution of breast reconstruction, the greatest thing that has happened in the last 10 or 20 years has been the evolution of the mastectomy, with specialized breast surgeons sort of preserving a lot of the anatomy that we need to make the breast look like a breast. Unfortunately, it also means we're all working through a little hole, so what you're going to see here is basically what I'm going to be looking up into the axilla or the armpit and into the back, which is where the muscle was.

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ANNE ROSENBERG, MD: While you're going ahead and focusing that, let me just go over a little bit more background here about the histology. You'll just let me know when you get in focus. We have a slide here to show you the different sorts of things we see under the microscope. There are noninvasive lesions, which can be either lobular or ductal, and then there are invasive lesions. There are rarely things other than breast cancer seen in the breast. Every once in a while, you'll either see a sarcoma or lymphoma or spread from some other disease, but the majority of tumors that we see are ductal in nature and the majority of these are invasive ductal, so approximately 75-80% of the lesions that we see will be invasive ductal lesions. The noninvasive lesions do have a lot of controversy about the different treatment and do very much require individual evaluations by a physician to look at the specifics of your case in order to make a good treatment plan. Whenever we find out someone has cancer, we do check markers, both in the serum, looking for potential serum markers, as well as looking at what we call tissue markers, which are the estrogen and progesterone receptors, as well as Her2Neu testing using, at this point in time, usually the FISH technique to get better specification for that status.

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STEVEN COPIT, MD: What I can show you is that essentially this is the muscle, the latissimus muscle, that's coming from the back to the front, so there's actually a pocket made into the back. So what I did is the muscle is now sewn in all along the bottom fold and along the lateral or outside edge. We're going to put a catheter in, which is called a Q pump catheter. It's a little tiny catheter similar to the epidural catheters women have when they have babies. It drips a long-acting Novocain into the chest wall and helps with postoperative discomfort, so it helps to take a little bit of the edge off. We can lay this catheter right in the pocket where we need the medicine to work locally, so it's been a nice added tool for us. It goes in the pocket underneath the pectoralis major muscle.

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ANNE ROSENBERG, MD: In really simple terms, this acts very much like a garden hose and it just leaks the local anesthesia into the field, coming from this reservoir that Steve will attach at the end of the case.

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STEVEN COPIT, MD: It automatically drips the medicine essentially right exactly where we need it.

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ANNE ROSENBERG, MD: It's been marvelous because the patients that go through this procedure are able to get out of the hospital in approximately 3-4 days. About 95% of the patients treated here will leave the hospital in 4 days, even having had this procedure, even with it done on both sides. So once we find out that someone has a cancer, we do go ahead and stage them. Staging is done by looking at the tumor size, the node assessment, and

also evidence of metastatic disease. There will be a clinical stage, which is what we see with the patient when we look at them, and then there will be a pathologic stage, which is based upon what we find under the microscope. An integral part of staging is looking at the axilla because, particularly with breast cancer, we know that prognosis is related to axillary staging as well as tissue size. Steve, can you tell us what you have in your hands now?

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STEVEN COPIT, MD: This is a tissue expander. It's a temporary implant that we can access postoperatively in the office to add saline to, salt water, so we can adjust exactly how much volume we need today in order to hold the shape of the breast that we want and then I can fill it or adjust that in the office afterwards. So right now it's filled with air. I'm going to take all the air out of it and then we'll put it into position and then we'll start filling it. It actually has a magnet, which allows us to find the spot on the actual implant where I insert the needle. It's a self-sealing area. So what I'll do is take all the air out and then we'll go ahead and I'll show you what we can do. This is just a magnet. It's a simple stud finder and it will move over the metal on the back of the expander, so we can actually run that across the patient's chest and it tells me exactly where to put the needle in the office in order to add more saline to it. It's shaped in what's called an anatomic shape, so it has to be placed exactly right, so we just sort of fold it and insert it and if I did this right, which it looks like I did today, it'll fit exactly in the pocket that we made and we can adjust the size of the expander to exactly fit the pocket and the dimensions that we want. It goes under the muscle which we took from the back, the latissimus muscle, and also under the pectoralis major muscle, which is the chest wall muscle. The two of those are going to be laid one over the top of the other. I'm going to finish sewing that in while you're talking, Anne, and then this skin paddle, which we harvested from the back, will fit exactly where the areola should be, and then we'll go ahead and build a nipple on that at a second procedure.

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ANNE ROSENBERG, MD: So with regard to staging, at the present time most axillary staging is done using a sentinel lymph node biopsy. We'd like to show you some examples of how we do the sentinel lymph node biopsies at this time. Sentinel lymph node biopsies can be done using two different techniques, one which is using a blue dye and the other, which is using a nuclear medicine isotope, so in a moment they'll go ahead and show you those two segments. Right now you're seeing Steve show the pectoral muscle down.

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STEVEN COPIT, MD: What I have is the tissue expander in place. Now I'm going to go ahead and inset or sew in

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ANNE ROSENBERG, MD: Steve, I have to interrupt you for one second. When we do the sentinel lymph node biopsy, we've either injected blue dye or we've used the nuclear medicine to identify where the lymph node will be. You can see here that we've used blue dye. You can see that through a very tiny incision in the armpit, we can identify a lymph node which has stained blue because it has picked up the dye that was injected into the breast. You can notice the blue hue of this lymph node. The lymph node will then be excised in its entirety and then submitted for pathologic examination. You can see then the lymph node is removed. We can see the blue hue to it. You can see here how nice and blue it is. It will then be evaluated by frozen section by the pathologist and then we go ahead and close that incision. Hopefully the lymph node would be clear and no further surgery would be done. The other option is to use the radioactive isotope and you can hear obviously the noise that you get from the probe tells you the signal when you have come over the area where the lymph node has taken up the isotope and then, using the probe during the procedure, you can track down to the lymph node. Once again, we dissect down through a very tiny hole using the probe. You see the probe immediately over the lymph node directs you exactly where you need to go and you can very precisely remove the sentinel lymph node without having to disturb the other tissues. It can then be tested and give you the information that you need. This again shows the blue lymphatic. This lymph node actually used a double technique, where the Lymphazurin dye was used, as well as the nuclear isotope. You can see that the lymph node has stained blue, easy to identify visually, and then can be excised from the surrounding tissue. Using the Neoprobe again to confirm that you have the lymph node. How are you doing there, Steve?

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STEVEN COPIT, MD: Good. I'm going to go ahead and fill the tissue expander, which we have all set up, so the tissue expander is in. The pocket is mostly done. The central portion, where we're going to go ahead and fill it, is right in the middle. So we have it hooked up to a closed system that has saline in a bag and all I have to do is

access that and just insert it in and then we can go ahead and fill it by just injecting the saline into the expander. The area where I put the needle is self-sealing, so it doesn't leak. We can go ahead and we're just going to put as much fluid in as we need to mimic the other side and hold the tissues where we need it. If she should elect at a later date to have an augmentation or have a larger reconstruction, we can always add more fluid or, in fact, take more fluid out if I have it a little bit bigger than the other side in the early post-op period.
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ANNE ROSENBERG, MD: One thing we talk about, Steve, all the time is how we time, how we stage these different processes. Obviously we start with a biopsy and then we go ahead and check the lymph nodes. Particularly if we're going to do a latissimus flap, we check the lymph nodes at a different time, although it's outpatient. Sometime usually within 4-6 weeks from that time, we go ahead and make plans for their definitive surgery. All of that would be followed by any recommendations for adjuvant chemotherapy or radiation therapy.
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STEVEN COPIT, MD: Rarely do the procedures we do for the reconstruction really affect their postoperative chemotherapy course.
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ANNE ROSENBERG, MD: When we talk about mastectomy, because people often talk about lumpectomy, but in this situation we're talking about mastectomy because there are times that we have to do a mastectomy. Even though we have options to save the breast, there are times that we do choose to do a mastectomy. In this particular case today, it was because of what's called multicentric disease, where the disease was not focused in one spot. To remove the abnormality, to remove all the disease, would have required removing almost all of her breast. You can see Steve is going to go ahead and fill this up a little bit more.
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STEVEN COPIT, MD: I'm going to give it a little bit more. I have the luxury of doing that because I'm looking at the other side. This is a 400 cc expander. It's only going to have 150 cc in it.
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ANNE ROSENBERG, MD: While Steve's filling this up, I want to go ahead and show you a little bit of what we did earlier today, which would be the mastectomy portion, and at the same time give you a little bit of information about mastectomies, so we're going to go ahead and show you a couple of minutes here about the mastectomy. When we come back, she's going to be pretty well expanded.
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This is what we do in preparation, which is to mark the crease just below the breast. It's important that this mark be made because when Steve is doing the reconstruction, he needs a reference point in order to be able to sew the breast back down. After that has been marked, we go ahead and mark around the areola because we're doing what's called a skin-sparing mastectomy. The little line that we're making here is an extension so that if we need to make a bigger hole to move all this muscle around and sew it in place, we have an extension. You'll see at the end, however, that when we close that extension, it becomes virtually invisible. This is skin-sparing because the only skin that we will remove is the nipple and areola. All the other skin is saved. When we finish today, you're going to see why this is so important, from a cosmetic point of view. From a therapeutic point of view, there really is no higher risk for any future problem using skin-sparing mastectomy, as long as the surgeon is very meticulous to be certain that they remove all of the breast tissue. It's a little difficult through this little tiny hole, but it can be done and you have to have the proper help.
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STEVEN COPIT, MD: The plastic surgeon certainly appreciates it. Frequently I take credit for how great everything looks at the end, but I have to tell you, most of the improvements we've done over the last 5-10 years have been due to improvements in the mastectomy technique, so on live television I'll thank you for that.
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ANNE ROSENBERG, MD: With regard to the types of mastectomies that we have, rarely will you see a radical mastectomy done anymore. Radical mastectomy would remove all of the muscles with all of the lymph nodes. Typically what you see done now is either a modified radical mastectomy or a total mastectomy with a sentinel lymph node biopsy. These two require that the breast tissue be removed. You'll notice here that we're working very hard through this tiny hole to dissect the breast tissue all the way down to the sternum, medially, then superiorly we'll go up to the clavicle. You see us here going up superior to the clavicle and then laterally we'll reach out to the latissimus and inferiorly down to the chest wall. It's important for us to be very careful when we

go up toward the axilla and laterally, that we don't damage the latissimus blood supply, which is the thoracodorsal trunk. You'll see here we're continuing to develop the flaps. We develop these flaps in a very thin plane all the way down, as we mentioned, to those margins and then the breast will be able to be dissected off of the chest wall. There are times when we particularly will choose mastectomy and this will be in situations, as I said, with patients with multicentric disease, patients where removing the lump will leave too much of a deformity so that the breast will look unusual or there will be gross asymmetry. People that have had previous radiation therapy to the chest wall, particularly young women who may have had Hodgkin's as late teens or patients who have a contraindication to radiation therapy. For example, patients who have scleroderma cannot have radiation therapy because they can have future problems from their scleroderma. You can see here we're developing the flaps, almost finished at this point. They're almost up to the edge. They're done through this very, very tiny hole and we just set the flaps all the way to the margins that we've previously described. There's also now a group of women who will choose to have mastectomy, either because they have a genetic mutation or they have bad family histories but haven't had genetic testing.

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At this point, you can see that we have mobilized all the flaps and we're now going to remove the breast from the chest wall. You can see the pectoral muscle falling back as we remove the breast with its fascia from the chest wall as we go across. Again, it's pretty difficult to remove this through the tiny hole, but it's worth it in the end for the little bit of struggling that we do. You can see the marks here at the bottom of the breast, where we have injected with the methylene blue. Steve used these marks when he was positioning the breast reconstruction where the muscles were going to be sewn down to make sure that crease at the bottom of the breast is reconstructed as symmetrically to the opposite side as possible. You can see the tiny bit of skin that we've removed and now you'll see that we'll take the whole breast out through this tiny hole. You'll be able to see the whole volume of the breast. Steve, I was wondering if you could make some comments about what you talk to people about when they come for the consultation. Obviously you talk to them about whether they want immediate reconstruction or delayed reconstruction.

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STEVEN COPIT, MD: The vast majority of patients, unless we know that they're going to have radiation therapy before their mastectomy. We know that based on their lymph node status or the size of their tumor. Or they have other medical issues that would mean that they were at high risk for reconstruction. The vast majority of patients are candidates for immediate reconstruction, so we'll sit down and go over all the options. Really, the issues are in terms of morbidities of the procedure, when we're borrowing muscles from places, what they do, what activities they like to do, and symmetry is everything, so really, a lot of it goes into analyzing the other breast, its size, its shape, whether it's something that would be reasonable to match. Sometimes we adjust the opposite side, either reduce it, lift it up, make it larger, in order to get the reconstruction closer to the natural breast. Frequently that's something that we have to do, so a lot of that becomes things that get weighed when we're making the decision as to what type of reconstruction to do. We obviously have a book with pictures and diagrams and things, probably similar to a lot of what you're seeing, that allow us to sort of fine tune the patient's reconstruction.

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ANNE ROSENBERG, MD: What you can see on the screen right now is that we have removed the entire breast. Once it's out, you can see the size of it, going from the clavicle to the sternum and down to the chest wall. You can see that it is out through that very tiny hole. This is looking down toward the axilla, just to show you that we do take care when we go down toward the axilla to free up that last corner and a view of what would be the axillary vein and looking up at the axillary contents. At the final conclusion you can see that if we had to take some lymph nodes, the area where the level 1-2 lymph nodes would be, which we're pointing to now, and down toward the back. You can see that we're pointing right at the axillary vein and then the thoracodorsal trunk would be posterior to that. Again, just to illustrate the entire breast, which has come out, with the axillary contents, through that small skin-sparing incision. Steve, we talked a little bit about patients' objectives with this surgery. What would be some of the contraindications that you would talk to people about or some sort of expectations that they might want to have regarding this kind of procedure?

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STEVEN COPIT, MD: Contraindications would be other medical issues, diabetes, high blood pressure, cardiac issues, which frequently are manageable and aren't absolute contraindications. A lot of the art of it is sort of

balancing all of those relative contraindications, making a calculation in terms of how many of those issues you can have and still have a reconstruction done immediately. A lot of times we'll just do something that's maybe a little more conservative. This patient happens to be very young, so we were able to spend a little more time and a little more effort to try and get her pretty close to her natural breast. If we're on camera now, I can show you this is the latissimus muscle now. It's all sewn into position. The tissue expander is under that. This is the pectoralis major muscle. The expander is in place. So the pectoralis major muscle comes down. The latissimus muscle goes up. Now I'm just going to go ahead and finish sewing that in. This is a drain that we're going to put in in the area. When I'm finished with all that, then we'll just going to tailor this skin paddle to fit right in the area where we took out the areola.

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ANNE ROSENBERG, MD: While you're doing that, I was wondering if you could've obviously talked a little bit about skin-sparing incisions. People are always concerned about what kind of incisions and scars they're going to have, so when people come to you and talk to you about their reconstruction options, what do you tell them about what the different types of reconstructions are and what types of scars to expect?

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STEVEN COPIT, MD: Really, it's a balance. I mean, it's a compromise, I should say. This operation has a very short scar on the back. It's actually as long as this skin paddle. It's closed in the bra line and is barely noticeable in most patients. It really heals well. The only scar she'll have is that short scar in the back and just the scar around the areola, and the other operations we do, like a TRAM flap, which is where we take tissue from the belly, has a very long scar across the abdomen, like a tummy tuck. That is because we're harvesting a lot more tissue. We're not using an implant to create the volume that we need. We're using fatty tissue from the belly. The tradeoff there, obviously, is a long scar but a flatter abdomen, so those are some of the compromises the patients get to choose. Assuming they're a candidate for a TRAM flap or an abdominoplasty type of breast reconstruction, obviously the tradeoff is a long scar for a flatter tummy, so a lot of these patients, similar to the lady who is being operated on today, she's very, very thin and obviously one of her goals is to minimize all the scars and put them in as hidden areas as we can, so hopefully hidden under bathing suits and bras, she won't have any visible scars.

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ANNE ROSENBERG, MD: Steve, do you have a minute now, if we were to show that muscle harvest portion?

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STEVEN COPIT, MD: Absolutely.

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ANNE ROSENBERG, MD: Maybe we can show what you did prior to the time that we got started. As we've shown you, we've done a mastectomy first. Then the patient would be rolled onto their side. Steve will show you now how we harvest the muscle that he's going to sew in ultimately.

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STEVEN COPIT, MD: The video, what they're showing, the patient's on her side. The skin paddle is obviously not this patient. The skin paddle is designed transversely or sideways, so it's going to be lying in the bra line. The dark mark in the incision we're actually going to make. The red mark is the outline of the muscle, the latissimus muscle, which is on the back. It attaches to the arm. It's a muscle that you can give up. It's a muscle that's well compensated for by other muscles of the shoulder girdle and patients will have normal function. They may have some weakness in things like rowing or climbing a ladder, but for the vast majority of sports and things that patients do, it's fine. The mark at the left, toward the top, is the tip of the scapula, which is an anatomic bony landmark that we can use to help limit our dissection to just the area we need. I'm going to go ahead and make the incision. The key to this part of the operation is harvesting the muscle and leaving that small piece of skin still attached to the muscle. Basically I always tell the residents we're dissecting the patient away from the flap, so we're going to elevate the skin and the fat off of the muscle. We always have to leave that small dollop of skin attached to the muscle because that's what carries its blood supply.

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ANNE ROSENBERG, MD: And that little bit of skin is what we're going to use, basically, to replace the only skin that we removed when we did the mastectomy, so it fits very nicely. I know you go to great pains to make sure that size matches very nicely to what we remove.

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STEVEN COPIT, MD: We set the patients up before surgery and I know exactly what type of incision you're going to make. Actually, you're nice enough to let me draw it for you and struggle through a little hole, so I can tailor it, make the scar on the back as small as I need to, just to replace what we've taken. We just have to elevate all the skin off the muscle. The remainder of the dissection then, the skin is all elevated there. That is the muscle with the skin paddle attached. The retractor is heading toward the breast, so we actually make a tunnel. That's what I was trying to show you with the camera before. We make an actual tunnel so we can pass the muscle under the skin, into the pocket. That's showing the pocket in there, so we can harvest it and actually pass it through. Part of my job is to have it pass as high in the armpit as we can so it doesn't leave a bulge in a thin patient. That's the muscle completely harvested. This is something we did earlier today. The retractor is actually lifting the muscle up. It's still attached by the blood supply so that blood is flowing through that muscle. What patients have to understand is we can't just take tissue from somewhere else and put it somewhere in large volumes like that. It has to be alive somehow, so that muscle is completely attached, except where the blood supply goes into it. There's an artery and a vein that passes into it up high in the armpit. That's what gives it its blood supply and allows us to twist it and put it where we need it, but it always has to stay alive, so the muscle's still pink, the skin is normal color, and we have to be sure, obviously, when we pass it through, that we're not twisting it to the point where the blood supply would get kinked. So I think at the next shot, we'll go ahead and pass that through, then we just go ahead and close the back and that small scar. Most people, fortunately, have enough extra skin on their back that we can just close it straight. I'm just finishing the dissection superiorly so that the flap will pass high in the axilla and not leave a bulge under her arm. Obviously in a thin patient, like we're doing today, that has to be very flat. In the patient today, actually, the entire muscle has been divided and the only thing that's still connected is the blood supply, so there's a small artery and a vein, called the thoracodorsal vessels, that are passing through. So the flap has been passed through. We're going to go ahead and close the back. We put a drain in the back to get everything to stick back down. The muscle at the base of that is the serratus muscle, which lies deep to that, so we just have to close the back and then we rotate the patient on her back so that we'll have the front exposed like we have it now.

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ANNE ROSENBERG, MD: Okay, so what are you up to now?

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STEVEN COPIT, MD: At this point, the flap is in. It's completely sewn in. I have a drain here. It's a small plastic tube that actually is fluted so that blood and drainage can pass through that. That enables the body doesn't like open spaces, so it will draw fluid into the area, so the drain gets placed in in order to drain that fluid out. It drains it into a small bulb and the patient can empty this and mark the drainage so that we know how much it's draining. These drains just slide out in the office. I've never had one taken out. I know it's a little bit uncomfortable, but it only lasts a second and the drains we use now actually slide out much easier. So the flap is in place. It's completely sutured in. The tissue expander is in there and it has, I think, about the right amount of volume. There's going to be a little bit of swelling post-op, but I think that's about the right side and I know that because when I close the skin, the areola should be about the same size. Now what I'm going to go ahead and do is put some stitches in and then we'll trim that skin so it fits nicely in its spot and then it's just a matter of sewing everything in all the way through the skin layers. We'll check one more time, make sure we're dry. We create big pockets to harvest everything and put everything in, so we have to always make sure we're very dry because it wouldn't take much of a bleeding vessel to create a problem for us, so I'm sort of compulsive about checking that. I think we have the size about right and I think she's going to have a nice result.

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ANNE ROSENBERG, MD: I'm sure she's going to have a nice result. It looks great already. You can see how the breast is already filled to its original volume.

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STEVEN COPIT, MD: This type of reconstruction allows us to preserve the fold. Really, breast shape is determined by the fold underneath the breast. That's what makes it look like a breast and have that shape, so when we preserve that and are able to use the latissimus

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ANNE ROSENBERG, MD: One second, real quick, Steve, I know in the next 15 minutes that we have, they want to go over a few questions that have come across and I know in the next 15 minutes you're going to have that

pretty well sewn in so everybody can see what it looks like. We have a few questions to go over and we'll see what we can do with them.

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STEVEN COPIT, MD: They aren't any hard questions, are they?

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ANNE ROSENBERG, MD: The first question is an excellent question. I'm sure Steve answers it several times a day, which is why would somebody pick a latissimus flap over a TRAM flap? What would be an advantage or a reason why you would take this one over the other?

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STEVEN COPIT, MD: Well, the goal of the TRAM flap is to create a reconstruction using all your own tissue, with no implants. The patient has to have enough tissue on their abdominal wall, skin and fat, to recreate an entire breast, so for this patient, she has a flat tummy, she wasn't really a candidate. Really, you have to have enough—and it's very scientific. We pinch the breast and we squeeze the abdomen and try to get a feel for the volume comparison. So she wasn't a candidate for that.

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ANNE ROSENBERG, MD: So in other words, when people are too thin, they can't have the TRAM. If somebody wants to make two breasts, if they're having bilateral mastectomy, they really aren't a candidate. But other than that, you look to their medical situation. For example, someone with medical problems might preclude the TRAM flap.

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STEVEN COPIT, MD: Exactly. Previous scars or incisions would preclude a TRAM flap and might violate the blood supply to it. For these patients, thin patients, that is, really the options are usually using implants and the real choice that patients like this has to make is do I use the back muscle and the implant or just use an implant by itself? What I tell patients is this is more a breast reconstruction. We're trying to preserve the natural contours and shape of her breast. Just the tissue expander reconstruction, I tell people, is a breast construction. We're going to build a breast. It's not necessarily going to look like their old breast. It's going to look like a new breast that may not well match a normal breast. So for most patients who we're trying to match a normal breast, I would prefer to use the patient's own tissue, either with the TRAM or the latissimus flap, because it allows me to really recreate the minimal contours of the breast.

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ANNE ROSENBERG, MD: I know you started to answer this earlier, but patients ask all the time, if I have a flap like this, is it going to affect what I'm going to do? Does it affect my exercise, lifting, any of my activities?

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STEVEN COPIT, MD: Well, the TRAM flap certainly is going to have more of an effect on that than the latissimus flap. It's more morbid to give up a stomach muscle. We also do TRAM flap breast reconstruction where we use microsurgery and harvest very little abdominal wall muscle and, in fact, sometimes no abdominal wall muscle. It's a bigger operation, but it's an excellent operation. I would say the latissimus flap is less morbid in terms of giving up muscle function. These patients play tennis, golf, and can do most normal activities.

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ANNE ROSENBERG, MD: I think that carries over to our next question, which is how does this affect the recovery? As I said, probably 95% of our patients that have this procedure, even if you do both sides, will be gone from the hospital within 4 days.

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STEVEN COPIT, MD: Usually somewhere between 2 to 4 days. I tell most patients the recuperation is 4-6 weeks for every operation we do. I don't notice a big difference in terms of the recuperation between a latissimus flap and just a tissue expander. I mean, they're going to be on pain medicine for a couple of weeks. Most patients are driving in a couple of weeks. I'm going to try to give you outside numbers and not paint too rosy a picture, but most patients go back to work at about 4-6 weeks.

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ANNE ROSENBERG, MD: I do think that most patients get back to other sorts of activity more quickly with this operation than with a TRAM. With a TRAM, it does take a little bit of time to get your balance and strength back in your belly muscles, whereas with this operation people can be driving a little more quickly and back to their regular activities.

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STEVEN COPIT, MD: We do, obviously, a lot of this. We send every patient for physical therapy, no matter what type of reconstruction we do. Physical therapy has been a huge boon for us in terms of getting patients up and moving, getting them to stretch their shoulder for the abdominal wall reconstruction, and we're fortunate that we have physical therapists who specialize in oncologic reconstruction patients because they obviously are a little bit more complicated. They know exactly what we did and know how to help the patients get back to their normal function, so that's been a big help for us.

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ANNE ROSENBERG, MD: I know you're coming down to the wire here, Steve.

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STEVEN COPIT, MD: Yeah, we're just going to put some more stitches in. These are anchoring stitches. All the stitches are under the skin, so after this I'm going to go ahead and do a subcuticular stitch. The next part of the procedure would be in a few months time or after completion of any chemotherapy, to go ahead and use just a small portion of the old incision, take out the tissue expander and put in a permanent implant, which can be silicone or saline. We go through those options with the patients in the postoperative period. Then, at a later point, in the office, we'll build a nipple, the actual nipple papilla or bump, out of the skin that's right on the circle and then we tattoo it. We have a tattoo machine in the office and our aesthetician tattoos it and we get the color matched just right. This piece of skin will pretty much be numb forever. Some patients, when you get the skin paddle small enough, will have sensation, but all of this skin that's been preserved will all have normal sensation over time, so with the exception of a small area, this skin all should have normal sensation.

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ANNE ROSENBERG, MD: You're almost done.

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STEVEN COPIT, MD: Yeah. I'm just trying to make sure I get the circle pretty round.

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ANNE ROSENBERG, MD: The nice thing is that because the only tissue we remove is her areola, we keep the size, assuming the two sides started evenly. We keep the size of the areola matching the other side, so when you do your reconstruction, it really makes a nice match.

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STEVEN COPIT, MD: Normally I'll try, at the second surgery, to get the scar a little bit smaller so that we can actually tattoo right over the scar. That usually helps hide it. So it can be very well hidden when we get the color just right. Our aesthetician is pretty good at matching the color of the other areola.

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ANNE ROSENBERG, MD: One thing we get asked all the time in the office, Steve, and I know you do as well, is how one makes a decision, do they pick a saline or do they pick a silicone implant at the end and are they both equally safe and how do they work?

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STEVEN COPIT, MD: Well, the silicone implants, one of the advantages is, when we talk about that with the patients, they have a saline implant in, so they really have a good baseline to compare it to. Silicone implants feel softer, look more natural, and the literature clearly supports their use and safety. The Mentor implant, which is the implant I use, the FDA has recently approved it for all uses, so we're right now putting them in under FDA trials. That trial is probably going to end in the next few months and silicone implants will be readily available to everyone, whether they're having augmentations or reconstruction. At the present time, it's just for reconstruction. I'm very comfortable with the safety of it. It certainly creates a superior reconstruction in terms of its feel. Saline implants have some rippling where you can actually see the edge of the implant. What you're seeing here is the drain. She's so thin, the drain is right under the skin, but silicone implants are superior. We spend a lot of time going over the issues with saline and silicone and the monitoring of it and most patients will ultimately elect silicone because it's preferable in terms of the outcome. So we've got most of the stitches in. Now we're just going to—All the stitches will ultimately be under the skin. So we'll run a subcuticular stitch next, so there will just be tape on the incisions.

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ANNE ROSENBERG, MD: While you're closing that subcuticular, just to mention for follow-up, patients who have had breast cancer do require mammography if they choose to have any breast tissue remain, which for example,

would be the opposite side. So on the reconstructed side, there would be no need to do mammography. That side would be examined simply by feeling the breast tissue, which is essentially skin at this point, with the reconstruction underneath. So the reconstructed side would be followed with physical examination. Any tissue left on the other side, if it wasn't removed, would be followed with mammography. These would generally be done annually. Occasionally a 6-month follow-up will be indicated if there is some other area of question. Bone scans, chest x-rays, bloodwork can be done if it's indicated, based on recommendations from the oncologist.

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STEVEN COPIT, MD: The greatest victory of a plastic surgeon is every once in a while a plastic surgeon comes back and says she went in for her mammogram on the other side and the mammography tech insisted on mammogramming the reconstruction because it looked so realistic.

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ANNE ROSENBERG, MD: We have somebody that we wanted to spend a few minutes showing. I was going to have that little section come right at this moment to give Steve a chance to go ahead and close this incision.

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PATIENT ON VIDEO: I had heard about Anne Rosenberg and Jefferson and came here, met with Anne, and very quickly Anne had a solution. She had a plan and she helped me implement the plan. She felt that the only reasonable course of action was to have a double mastectomy and we discussed it in her office that day and we proceeded by, you know, going ahead with the surgery and really within an hour she had me in Dr. Copit's office, having him explain the reconstruction, and I was confident in both of them that this was the right course of action. It was actually a relief to have someone tell you what they thought you should do, instead of just getting a lot of confusing answers. You know, it's hard for someone who's not a doctor to make these decisions themselves, so it's nice that she was confident enough to tell me what I needed to do.

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ANNE ROSENBERG, MD: For both of us, for Steve and me, it's very important that there be a good line of communication between the patient, the patient's family, and us and the other staff working and involved in the care. It's critical that we talk about what our expectations and goals are, and only if we do that can we really be certain that we have a good outcome in all regards.

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STEVEN COPIT, MD: A big part of it is tailoring the reconstruction so that it functions well for the patient. Not every patient needs this type of procedure. We try to always not make it about what's necessarily the best reconstruction, but what's the best reconstruction for each patient, trying to figure out what their goals are, how even things have to be, what types of tissue they have to let us use. I think the art of it is making sure that we get the right reconstruction for each patient and trying to make sure that we afford the patient every possible option, every type of reconstruction, and not sort of make every patient go through one procedure that we happen to favor. I think that's part of the art of it is making sure everybody gets what's right for them. That's a long and lengthy process of going through for the patient and for us to try and tailor their care so that they're comfortable with their decision.

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ANNE ROSENBERG, MD: You know, Steve, it's really important that the people around us help us because if Dr. Kilmartin weren't here, giving us this excellent anesthesia, keeping up with us, making sure the patient was comfortable, and if Eric and Laura weren't there dutifully holding the retractors and of course, you know, Maureen's been handing you instruments just seamlessly, without even having to have a peep

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STEVEN COPIT, MD: Well, Eric's a resident, so he has to be here, I told him.

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ANNE ROSENBERG, MD: And then again, where would we be without Patty, who has had the whole room running just perfectly the whole day.

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STEVEN COPIT, MD: They have really managed—there's a lot of cameras in here.

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ANNE ROSENBERG, MD: Steve, do you think you could take a minute and once you clean up there, explain how you'd reconstruct the nipple, because I think it's pretty easy to see where the areola would go. That's really going to be the same spot and I think if we see both sides at the same time, it's really easy to see that the area we've

removed matches identically to what we started with, so if you could give a little explanation on what happens with nipple reconstruction.

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STEVEN COPIT, MD: Absolutely. In the office, we can do it, either because this area is already numb or because we can numb it up. What we do first is build a bump. The way we would design that would be there's a bunch of different ways to do it. Basically design a piece of tissue like this. The idea would be to lift all this tissue up and fold these two pieces of tissue around each other to create a bump. The patient has stitches in there for two weeks. We take the stitches out at two weeks, let things heal, and then tattoo it. Really, then what we would have is an areola. I try to make it a little bit smaller than the other areola. We would go ahead and tattoo over the scar itself, actually tattoo the papilla or the bump and then, with the right sized implant, this is a tissue expander, so it's not exactly right. It's a little bit wider on the side. This is about the most narrow implant we have. She has a pretty narrow chest wall. We should be pretty even. We try and make sure the cleavage is the same. This is a drain that's sticking up, so that wouldn't be there. We get the volume about right, build the nipple, and tattoo it. We should be fairly close to the same size.

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ANNE ROSENBERG, MD: Steve, can you put the light on the left side a little bit so we can have a little bit better because I think it's really important to see that right now she looks the same volume as she started. You can really see that the volume is the same. She's got cleavage.

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STEVEN COPIT, MD: I have to say that I'm not very emotional, but there are times when you go in a patient's room post-op and she obviously has pain and she just had surgery, but they can look down and actually see that there's a reconstruction and they can look down. We leave all the dressings off. There's just going to be tape on the incisions. We encourage the patients to look at it right away. She should be able to look down tomorrow and see that there's a mound, it has about the same size and shape. It might be a little bit lumpy because of the drain, but most patients can see that there's going to be an end to this that's going to be okay, that's going to be functional, that's going to look okay. I mean, we don't wish this on anyone, obviously. I'd prefer she not be here, but the fact is, this reconstruction has come a long way to helping patients restore their feel whole again, to emotionally feel like they're back to normal. I did tell this lady that I felt confident that we should have her back in all her bathing suits and clothes that she likes to wear and part of the process or the evolution of reconstruction has been these operations used to be intended for Grandmom, who maybe didn't wear quite as thin clothes or quite as fashionable clothing and the art has been to sort of evolve the procedures to keep up with the disease, which seems to want to affect younger and younger women.

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ANNE ROSENBERG, MD: We do want to thank everybody for attending the session with us today and remind those of you who are CME viewers that CME credit can be received by completing the evaluation at the end of this broadcast. For those of you who are interested in further information, either as a patient or for someone you know that might be a patient needing some further information, if you wanted to either schedule an appointment or get a referral, please click the appropriate button on your computer screen for further information. There will be a replay of the webcast available at www.jeffersonhospital.org/webcast. That will be beginning tomorrow. There will also be information at that site which can be viewed at the webcast launch page, discussing breast cancer treatment, genetics, risk assessment, and other support programs available at Jefferson. I'm going to turn to Steve so he can show you the final finishing touches.

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STEVEN COPIT, MD: I'd like to remind everybody to get their mammogram every year, as instructed by their doctor. So we have the reconstruction done. This is the Q pump catheter, which is a ball full of long-acting Novocain that will drip into the patient's chest area where we've done the surgery. The reconstruction is completed. These are the only dressings we put on, just tape, so there's this tape on the front, there's a short incision on the back which has some tape on it, and the two drains. Everything's done. We're going to go ahead and take all the drapes down. I don't know if you have a view of both sides, but I think we got pretty close today. This side may be just a little bit fuller because the expander is in there and that metal port, but I think we did pretty well today and I hope she'll be pleased with the result.

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ANNE ROSENBERG, MD: Steve and I again want to thank all of you who have joined us this afternoon. We're obviously happy that you were able to go through this experience with us because it's been very valuable for us to be able to offer this kind of option to patients and have such good, successful outcomes.

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NARRATOR: This has been a live internet broadcast of a breast reconstruction surgery from Thomas Jefferson University Hospital in Philadelphia. If you registered for continuing medical education credit, click the slide on the right side of the screen now to access the evaluation form and to receive credit. To make an appointment with a Thomas Jefferson University Hospital physician, call 1-800-JEFF-NOW or click the Make An Appointment button on this screen. Physicians who wish to discuss a case or refer a patient to a Thomas Jefferson University Hospital surgeon, please call 215-955-0215 or click the Refer A Patient button on the screen. This live internet broadcast represents the hospital's ongoing efforts to bring medical education to both patients and the healthcare community.