

**BREAST RECONSTRUCTION: DEEP INFERIOR EPIGASTRIC PROCEDURE  
BETH ISRAEL MEDICAL CENTER  
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WOMAN 1: The diagnosis of breast cancer is shocking for anybody and everybody. It's really awful.

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WOMAN 2: If anything, the struggle is in what you will look like the most.

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WOMAN 3: And, yes, the person who said to me it's awful to wake up without a breast.

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ANNOUNCER: Over the next hour, live from Beth Israel Medical Center in New York City, you'll hear about the tough decisions these and other women made after learning they had breast cancer. You will also see the breast reconstruction surgery each of them chose to undergo. The deep inferior epigastric perforator flap technique allows surgeons to rebuild breasts in the most natural way possible. Unlike older techniques, the deep flap doesn't require the removal of abdominal muscle. That allows for a less painful and faster recovery. OR-Live makes it easy for you to learn more. Just click on the "Request Information" button on your webcast screen and open the door to informed medical care. Now let's join the doctors.

00:01:26

WILLIAM SAMSON, MD: Good afternoon. Welcome to Beth Israel Medical Center here in New York City. We're coming to you live from O.R. 3. I'm Dr. William Samson. I'm a plastic surgeon, and I'll be your moderator for today's program. Today we're going to provide you with an in-depth look at nipple areolar-sparing mastectomy and immediate reconstruction using the deep inferior epigastric perforator flap, or the DIEP flap. I'm pleased to introduce my colleague, Dr. Mark Smith, who's the associate chief of plastic surgery here at Beth Israel.

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MARK L. SMITH, MD, FACS: Thanks, Will. Yes, today we're going to discuss the deep inferior epigastric perforator flap, which is an innovative technique that allows us to reconstruct the breast using a patient's own lower abdominal tissue. In contrast to the older techniques that required sacrifice of the abdominal muscle, this technique does not. And it certainly is an advantage for patients in terms of recuperation and function afterwards.

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WILLIAM SAMSON, MD: We're also going to discuss nipple areolar-sparing mastectomy, and with us today is Dr. Sheldon Feldman, who's the chief of the breast surgical service here at Beth Israel.

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SHELDON MARC FELDMAN, MD, FACS: Hi, Will, it's a pleasure to be here. Nipple areolar-sparing mastectomy is an excellent option for many patients who need mastectomy. It's something that we're using with greater frequency.

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WILLIAM SAMSON, MD: Before we get into the surgical footage, I think it's important for us to acknowledge the impact of a breast cancer diagnosis on patients. We're privileged to have some actual patients share their experiences with us.

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WOMAN: Shock. So... I didn't -- I just want to get rid of the breast. I didn't really think of what was going to happen afterwards, because I -- you know, most parts of the world, women, their breast gets taken off and they go home, and six months later, maybe they're lucky to get some reconstructive surgery. So I was lucky that I was here and that I had this option. And I -- when Dr. Smith explained it to me, my husband and I both, right there and then, decided, "Okay, that's what we're going to do."

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WOMAN: It's a mental process. And stress that's wrapped up in the -- you know, the -- not only the decision but the recuperation. And you want to really keep your stress level down as much as possible to recuperate well. I think it's -- it is clearly one of the things that helped me most in recuperating. If anything, the struggle is in what you will look like the most. I mean, I felt very confident that I could get through it and be strong and I was well-supported.

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WILLIAM SAMSON, MD: Mark, these are very difficult times for these patients. They seem to be juggling so many different concerns. How do you manage these patients when you meet them for the first time?

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MARK L. SMITH, MD, FACS: Well, obviously, Will, they do have a lot of concerns, and not the least of which is what they're going to look like after a mastectomy. So what I try to do is explain the options to them and try and match an option to the patient's desires and priorities. And just show them that there's a light at the end of the tunnel.

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WILLIAM SAMSON, MD: These decisions, I'm sure, are very difficult. We're going to hear now from another patient as she made her decision regarding her reconstruction.

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WOMAN: At first, I thought nothing would matter except dealing with the cancer. And then aided by a lot of talking, and some of it was joking -- we weren't weeping and wailing, but you know, positive feedback from friends and daughters and somebody who came into my workplace and actually bared her breasts at my desk and said, "You've had this that and the other, I had reconstruction." So I was egged on by that woman, and she called me and followed up and kept calling me. And yes, the person who said to me "it's awful to wake up without a breast." At one point I thought, "I don't care." And then I did. And when I discussed it with my husband, who's all very open-minded and quite a feminist and never sort of openly says that everything depends on how you look and your shape, no, not at all, he was keen on the idea, keen on the idea of not having me be breastless. I was flattered. It seemed to still matter. It seemed to still matter.

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WILLIAM SAMSON, MD: This patient obviously has a very healthy perspective. And what's most intriguing to me is how her decision evolved first from not having reconstructive to selecting reconstruction with the DIEP flap. And this seems to have been the right decision for her.

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MARK L. SMITH, MD, FACS: Yeah, Will, I think the -- the concerns of a patient are multiple when they come into the office, and what we try and do is prepare them for the surgery and by explaining the different aspects and the different particulars of each option. What I'd like to do is actually share with the audience what I discuss with patients when I see them in the office. In particular, I usually use a diagram, which we prepared here. And I'm going to -- Shelly, could you hold that for me?

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SHELDON MARC FELDMAN, MD, FACS: Sure. You know, I think, Will, sometimes these patients are so much in shock with the diagnosis of breast cancer that they have this -- you know, they want the surgery as soon as possible and the reconstruction seems secondary. But then I think, you know, when we counsel patients and let them have a little time to digest it and say, "look, yes, you need to have surgery, you do have a breast cancer, we know how to take care of this for you, but your quality of life is very important and you want to have the best reconstruction possible." And I think that if we can decompress them enough to really consider that, then I think then it opens the door to this kind of discussion.

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MARK L. SMITH, MD, FACS: I agree. And it's important to have the opportunity to meet with the patient before they make the decision on mastectomy. Well, here I have a few diagrams which I'm going to use just to explain the differences in how we can use lower abdominal tissue to reconstruct the breast. There are a number of options to use a patient's own tissue, including the back tissue and the buttock tissue, but here we're going to discuss the abdominal tissue. Just by way of orienting our audience, this is a patient showing the blood vessels running down from above to the lower abdomen. Obviously when we bring this tissue up to the breast, we need to bring it up there with a blood supply, otherwise it's not going to heal. There are two blood supplies, one from above and one from below. With the older technique, the upper blood supply was used, and you can see that here, and the muscle was used as a conduit for it, so it was detached and brought up with the lower tissue, which was tunneled underneath the skin up into the breast pocket. This maintained the blood supply to the breast, but it sacrificed the abdominal muscle. And when a patient had a bilateral reconstruction, she would end up losing both muscles. So if we go back to the original diagram here, you'd see that the lower blood supply, which is the deep inferior epigastric artery and vein, comes up from underneath the muscle and perforates it with small vessels that go into this tissue. So we have the other option of detaching these vessels with the tissue, and if we go to the last diagram here, we can do that through just a small incision in the muscle to split the muscle. Once we detach it, we can bring the flap and the attached blood vessels up, and that will let us reconnect it to the blood supply up there, thus reestablishing the circulation.

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WILLIAM SAMSON, MD: Mark, you've done a wonderful job at explaining some of the fundamentals of the operation, but when I have patients in my office faced with this decision, they really want to get a better idea of what are they going to look like after surgery. Can you show us some actual patient diagrams that will help give our viewers an idea of what patients will look like after this operation?

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MARK L. SMITH, MD, FACS: Well, these are -- these are photos of actual patients. And this photo just demonstrates the area of tissue that we use to reconstruct the breast. This patient's undergoing a bilateral mastectomy reconstruction. This is after her reconstruction. In this case, you can see that the breasts have been restored. We've done the nipple and areolar reconstruction secondarily in this patient.

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WILLIAM SAMSON, MD: Shelly, do all mastectomies require the resection of the nipple and the areola?

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SHELDON MARC FELDMAN, MD, FACS: Well, traditionally, when we started doing mastectomies, we would remove a lot of skin, thinking that it might not be safe from a cancer point of view to preserve any. And then we evolved it to skin sparing mastectomy, which would preserve all the healthy skin except for the nipple/areola complex, and the results with that have shown that it's very, very safe for selective patients. And now we've moved into the nipple/areola sparing, which really allows the cosmetic result to be as normal as possible, with minimal scarring. And most patients have this as an option.

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MARK L. SMITH, MD, FACS: I have a picture here of a patient here who underwent a nipple-sparing mastectomy, and you can see that all we've had to replace is really the volume of the tissue. The other thing I'd like to point out is that we mentioned the abdominal donor site. The abdomen is closed in a similar fashion to a tummy-tuck operation, so if we look at patients, we can see that the contour before and after surgery is usually improved in most patients. And we can see this best on the side views as we go through these patients. And you can see how the abdomen is flattened after surgery. The other thing I just want to touch on, Will, and it was mentioned by the last patient is that not all patients seek reconstruction and it may not be appropriate for all patients, but it's important for patients to understand the options. This patient was to undergo bilateral mastectomy and chose reconstruction, and here she is on the left side. On the right, another patient chose not to. And there's not necessarily that that's a wrong choice for that patient, but it's just important for patients to be informed so that they know what's available when they undergo their mastectomies.

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WILLIAM SAMSON, MD: I couldn't agree with you more, Mark. And I think this would be a good point for us to begin with the surgical footage of a bilateral nipple areolar-sparing mastectomy and immediate reconstruction using the deep inferior epigastric perforator flap. Shelly, I think we're going to begin with the mastectomy, although we're working simultaneously.

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SHELDON MARC FELDMAN, MD, FACS: Right, it's a two-team approach, so I'm doing the mastectomies while Dr. Smith is already beginning to harvest the flap. This was actually a patient with a left-breast cancer. We're now looking at the right breast. And she opted for a risk-reducing mastectomy on this side because of her strongly positive family history. And here through a small medial incision we're beginning to remove the breast tissue, we're beginning to undermine the tissue underneath the nipple areolar complex, and in this surgery, we do really remove all the breast tissue. We're not leaving a large amount of breast tissue under the nipple, which has been a concern in the past, that perhaps leaving breast tissue and milk ducts in that area could lead to an increased risk for recurrences in the future. So we really, as you'll see, after retractors are in place, we are now everting the nipple, we've removed all the breast tissue under the nipple areolar complex and all the ducts going into it, so we're not really leaving any significant amount of breast tissue behind. The incision planning's extremely important so that the blood supply is -- and here we're removing the breast tissue. We have a suture which is marking the location where the nipple would be, just directly under it, to orient it for the pathologist. You can see the skin flaps are very smooth, the nipple areola complex looks normal, so we've preserved all the skin of this breast, including the nipple areola complex. We've done the mastectomy in a way that removes all the breast

tissue just like we would do if we were doing a larger surgery or if we were removing a larger amount of skin like we did in the past. This is the specimen now. That's the suture. Again, marking where the nipple areola complex would be just above it on the skin.

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WILLIAM SAMSON, MD: So essentially the entire skin envelope is still intact and the reconstructive surgeon just needs to fill that with abdominal tissue.

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SHELDON MARC FELDMAN, MD, FACS: That's correct. Now, this is the side where the cancer was identified, and here as we work under the nipple areola complex, we're again removing all the tissue flush with the area where the ducts would be joining the nipple underneath, and we're sending tissue for a frozen section so that the pathologist can check that tissue to be absolutely sure that we're not leaving any abnormal cells behind. If there were a problem, then we would have to deal with it. Here you can see again, we've bared the undersurface of the nipple areola complex, the suture showing where they were connected before, and in a similar fashion, you can see the nipple areola complex is intact and the specimen is going to be removed.

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WILLIAM SAMSON, MD: Shelly, when you say that if there's a problem, we'll have to deal with it, how does it alter your surgical plan if the pathology comes back positive for cancer?

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SHELDON MARC FELDMAN, MD, FACS: Well, we always tell patients the most important thing is oncological safety. We want the best cancer operation possible, so if the -- if the tissue under the nipple were involved with abnormal cells or cancer, then we would remove the nipple. And then Dr. Smith would have to modify somewhat the reconstructive approach.

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WILLIAM SAMSON, MD: Dr. Smith, would you like to comment on that?

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MARK L. SMITH, MD, FACS: Well, we're prepared to reconstruct the nipple and areola even if we're doing a nipple-sparing mastectomy because we have adequate skin to replace it from the abdomen. So if we do have to convert to nipple-sacrificing or nipple areolar-sacrificing procedure, it's not -- it's not difficult for us to make up for that.

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WILLIAM SAMSON, MD: And at this point, you're beginning to harvest the abdominal tissue that will be ultimately used to reconstruct the breast. Can you comment on these steps in the operation?

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MARK L. SMITH, MD, FACS: Sure, well, Will, this upper incision allows us access to the beginning of the dissection of the flap, but it also allows us to begin the undermining of the upper abdominal tissue, and that being the skin and fat. When we remove the tissue from the lower abdomen, we will have a defect that we have to close. And as I mentioned earlier, we close that with a similar technique as we would in a tummy-tuck operation where we're removing a patient's excess skin and fat. That process requires us to undermine the tissue upward and then pull it downward to replace the missing skin.

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WILLIAM SAMSON, MD: Mark, we have a question from one of our viewers. It seems as if this viewer has already undergone the standard pedicle TRAM flap and she was interested to know if there's any way to reverse the cut muscle once it's been used for the standard TRAM flap.

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MARK L. SMITH, MD, FACS: You know, Will, I've actually been asked that several times in my office, and it's -- it's not possible to reverse that because now the tissue for one has been sacrificed and the muscle has been deenervated. There's no way to reconnect the nerves that once enervated that muscle to make it functional. Even if we were to detach it from the breast tissue and move it back downward.

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WILLIAM SAMSON, MD: We're going to continue rolling with the surgery at this point.

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MARK L. SMITH, MD, FACS: I also want to say that we see patients that are interested in secondary reconstruction after other techniques, and not that one technique is necessarily always better than another, but sometimes a candidate or a patient has a failed technique or has a problem with one technique and so we can use another. But unfortunately, once the abdominal donor site is used, it can't be used again.

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WILLIAM SAMSON, MD: So any tissue that is not used is discarded.

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MARK L. SMITH, MD, FACS: That's right. And in a unilateral, we might discard some of the excess tissue. In a bilateral, usually we're trying to use all of the tissue that's available to us.

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WILLIAM SAMSON, MD: And here you're elevating the abdominal skin and fat from the underlying abdominal wall musculature. How far do you usually extend this dissection?

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MARK L. SMITH, MD, FACS: Well, it depends on the amount of tension that's present at closure. The more tension, the more we have to undermine. You can see here that I'm seeing how much the tissue of the upper abdomen will advance across the anticipated defect, and I'll adjust my incision on the lower part. You might see here where I come up a little bit if I think that there's going to be a little bit more tension than we can anticipate with a patient in the standing position when we mark them.

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WILLIAM SAMSON, MD: Are there any special precautions as you make this lower incision?

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MARK L. SMITH, MD, FACS: Well, we're -- as we go down through this tissue, we do look for a second pair of vessels that are sometimes present. Those are called the superficial inferior epigastric vessels. And those vessels can also be used to transfer this tissue up to the breast region. However, they're not always as reliable, and particularly the artery is not always present, or if present, may be very small. So the veins are usually present. And here we've seen the vein but there isn't an adequate artery, so usually in that setting, we'll proceed as planned with the deep inferior epigastric perforator technique.

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WILLIAM SAMSON, MD: As you move along with your dissection, I have another question from a patient. We have a patient who's concerned that she might be too thin for this operation.

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MARK L. SMITH, MD, FACS: Well, there are patients that are actually too thin to undergo this procedure. It's important to balance what they need in terms of the volume to reconstruct the breast with what they have available in their abdominal

donor site. If they're not a candidate for this, they may still be a candidate, though, for another operation either with their own tissue but using a different donor site, such as the buttock, or using an implant reconstruction.

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WILLIAM SAMSON, MD: Mark, this is a very careful dissection. I'd like you to point out the perforating vessels that arise from the deep inferior epigastric vessels and perforate through the muscle to supply this fat with blood supply.

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MARK L. SMITH, MD, FACS: Well, we're just coming up on them, and if you can see on the screen, there are small red lines coming up, particularly in this area, that are the beginnings of the perforator. We're just beginning to see it. Well, as we proceed with the dissection, we'll come up to the actual point where they perforate the underlying tissue. And at that point, we'll proceed with the intramuscular dissection to expose those perforators.

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WILLIAM SAMSON, MD: Mark, can you tell the viewers a little about what they're seeing, that shiny white tissue?

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MARK L. SMITH, MD, FACS: Yes, well, that's the fascia. And that's actually one of the strength layers of the abdomen. And one of the big differences between the deep inferior epigastric perforator flap and the older TRAM flap technique is that we don't take any of this tissue when we harvest the flap. In the older technique, you were required to take some of this tissue with the muscle in order to maintain these perforating vessels intact to the overlying tissue. What we will do is just split this fascia, make an incision in it, but not remove any of it.

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WILLIAM SAMSON, MD: So the fascia is equally as important as the muscle in maintaining abdominal wall strength.

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MARK L. SMITH, MD, FACS: Absolutely. And here, just as they've frozen the screen for us, it's a good shot to demonstrate where -- I'm just going to point here. You can see the perforator actually coming out through the fascia here and here, and usually there's several in a row, and there are actually two rows of perforators. This is the lateral row, which in a bilateral reconstruction is the one we typically use because it's centered on the flap.

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WILLIAM SAMSON, MD: How many perforating vessels do you usually incorporate in your flap?

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MARK L. SMITH, MD, FACS: Well, ideally, we'd only use one if it was a healthy large-size vessel, but usually it's two or three because these vessels may only be a millimeter, sometimes even a little less in diameter. If we see a larger, maybe one and a half millimeter vessel that's central, we'll use that vessel alone, and that will really minimize any dissection in the muscle.

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WILLIAM SAMSON, MD: So even if you use several perforators, the impact on the abdominal wall musculature is still minimal.

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MARK L. SMITH, MD, FACS: Sure. The muscle is still there. And the fascia as well. So we'll just close that back up. Here I just -- this is -- I'm just, I'd like to point out the viewers, we're about to open up the fascia. You can see that the instruments are quite delicate, even though the tissue's quite tough. We use these instruments because we don't want to injure the vessels as we go through, so we work a little bit

harder just to get in there, and once we're in, we can proceed a little more quickly with the dissection.

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WILLIAM SAMSON, MD: At what magnification are you working at this point in the operation?

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MARK L. SMITH, MD, FACS: Well, we haven't brought in the microscope yet, but we are using magnifying loupes. The magnification that I like to use is three and a half times, so we're -- the viewer is actually seeing it at about the magnification as we see it as we look through our loupes. Maybe not quite as magnified as this, but still, we get a pretty good look at vessels as we're dissecting down.

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WILLIAM SAMSON, MD: And now we're also getting our first glimpse at the rectus abdominis muscle just beneath the fascia.

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MARK L. SMITH, MD, FACS: Yeah. As we go through, we'll start following that vessel through the muscle, and I'm sure we'll see that a little later on in the video.

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WILLIAM SAMSON, MD: Shelly, one of our viewers has been told that she will likely require chemotherapy after mastectomy. If you see a patient like that, are you still going to refer them to discuss breast reconstruction options?

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SHELDON MARC FELDMAN, MD, FACS: Absolutely. If patients need mastectomy, many of those patients will require adjuvant chemotherapy. You know, we've done the studies to look at healing and any potential delay in treatment based upon chemotherapy. And the studies are very clear: these patients receive their chemotherapy on time, the chance of their chemotherapy being delayed by having reconstruction is not a real issue. So it's a theoretical concern that some oncologists sometimes have and patients have, but from a practical point of view, since many patients receive adjuvant chemotherapy who require mastectomy, it is not a contraindication to immediate reconstruction.

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WILLIAM SAMSON, MD: Thank you. I think we're ready to go back to our surgical footage. Mark, can you explain what you're doing here?

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MARK L. SMITH, MD, FACS: Well, many patients ask what happens to the bellybutton or the umbilicus during this operation. So right now we're actually cutting around the bellybutton. We don't remove the bellybutton and we don't actually move it. We dissect around it and then reinsert after we've elevated the tissue of the upper abdomen and brought it down. So here we've just circumscribed the bellybutton, released it from the surrounding skin. And at this point, we're going to continue dividing the flap to provide the medial exposure, because there is another row of perforating vessels that we can look at. But also just to separate the flaps.

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WILLIAM SAMSON, MD: Obviously in this case, Mark, we're doing bilateral reconstruction, so you're going to split the donor tissue in half. One half for one breast, one half for another breast. How does this differ if you were only reconstructing one breast.

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MARK L. SMITH, MD, FACS: Well, if we were only reconstructing one breast, we'd need enough volume to match the volume of the other breast, so we could take more than half of the tissue if we need to, if it were required to match that volume. The other things that we do sometimes, Will, are we can reduce the volume of the

opposite breast in a unilateral reconstruction. We'll often do that at the time of the mastectomy and reconstruction. While we're doing the reconstruction on one side, we'll also go over and do a reduction on the other side. This further assists us in getting a symmetric result.

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WILLIAM SAMSON, MD: Shelly, we have a question from one of our viewers. One of our viewers is interested in knowing if the DIEP flap reconstruction is harder to detect -- if it makes it harder to detect recurrences during the follow-up period.

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SHELDON MARC FELDMAN, MD, FACS: Right. It's a very good question. It does not. This was a concern with any type of reconstruction in the early days, that perhaps a recurrence could be masked by it. We know that the chance of a recurrence after mastectomy is small, it's probably under 5%. Those recurrences that develop almost always develop in the area just under the skin, so since the skin is preserved and all the superficial tissue is preserved in terms of the skin layer, those recurrences can be easily detected. So there's absolutely no reason to not consider a DIEP flap because of that concern.

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WILLIAM SAMSON, MD: Thank you. I think we're going to go back to our live surgical footage.

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MARK L. SMITH, MD, FACS: Actually, Will, I also want to make a comment regarding that, because when -- when patients have concerns that they express to me, we also tell them that when we look at patients who've had reconstructions and those who haven't, that the survival is equal between both groups of patients, so there's definitely no difference in survival after reconstruction or no reconstruction in terms of patients with breast cancer. I'm sorry, I did --

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WILLIAM SAMSON, MD: It's okay. Before we go on, describe what we're seeing here. I just want to mention that we saw a lot of surgeons at the table in an earlier shot, and I just want to emphasize that this is a real team approach. We have -- from the very beginning of diagnosis, we have a comprehensive breast cancer center that helps patients from diagnosis through reconstruction. You also saw a shot of weighing the breast specimen, which, Mark, would you like to make some comments on that as we pause right here?

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MARK L. SMITH, MD, FACS: Yeah, why don't we pause the film -- the video for one second if we can. And yeah, we weigh the breast just so we have an estimate of how much volume is required to reconstruct the breast, especially in a unilateral reconstruction, we'll take exactly that volume and replace it. In a bilateral, it just gives us an idea of where we are in terms of the reconstruction, whether we have more or less tissue. And if we have more, then we may trim a little bit more of the tissue to be appropriate to the size of the breast pocket.

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WILLIAM SAMSON, MD: Okay, here we are further along with the dissection, and Mark, if you can help point out some of the anatomy and special precautions that are taken.

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MARK L. SMITH, MD, FACS: This is a great shot. Actually, what you see here coming over that small clamp is the nerve from the lateral -- passing laterally to medially from the lateral strip of muscle to the medial strip of muscle. And the blood vessels are passing underneath it. So we're carefully separating this nerve out and keeping it intact, and that's important because otherwise that medial strip of muscle would be

deenerverted. So here this is an excellent view of the perforators passing underneath. Well, the actual artery passes underneath and goes up into the perforators, which we're just indicating there. So we have three perforators here. You can see how small they get as they enter into the flap, but they get larger as they coalesce and come down into the main vessel. And that's where we want to divide them, down lower, because that's going to be a lot easier to reconnect to the vessels up in the breast area.

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WILLIAM SAMSON, MD: Mark, we have a question from one of our viewers. Would you recommend a DIEP flap reconstruction in a young woman considering having children in the future?

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MARK L. SMITH, MD, FACS: That's a great question, and we've seen it a number of times. And the answer is, it depends. Some patients have enough tissue that we can do it, and when you consider a young patient who has their whole life ahead of them, they may, if they had an implant reconstruction, they may require a number of surgeries to replace that implant over the course of their lifetime. So the DIEP flap provides a durable reconstruction, one that, once it's there, should last indefinitely. However, some patients don't have a lot of extra tissue there, and if we do the DIEP flap, they may be quite tight afterwards. And so I've done both. I've counseled patients, telling them that it may be possible if that's -- and it depends on their priorities, obviously, Will, but it may be possible. And in some patients, I've actually told them, "No, why don't you wait, do the implant. After you've had the baby, maybe we'll consider doing this, you may have a little more laxity and long-term, you'll have your own tissue eventually."

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WILLIAM SAMSON, MD: That's very helpful. I see how you tailor -- tailor the plan for the individual. Let's go back to the videotape.

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SHELDON MARC FELDMAN, MD, FACS: I think Mark's approach is great with it, because it is such an individual -- and I think empowering the patients with the options so that they really know the full spectrum and they have an understanding really gives them control over the decision process. We're certainly not going to allow them to do something that's unsafe, but I think if they're allowed to make the decision with good information that at the end of the day, it's a better decision for them.

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WILLIAM SAMSON, MD: Sure. Mark, the dissection here is now in the pelvis. At the origin of the pedicle. Can you orient our viewers so they can understand what we're looking at?

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MARK L. SMITH, MD, FACS: Sure. Now we're looking from above downwards, sort of towards the feet. So at the bottom of the screen would be the patient's head and at the top, the feet. And I've made some markings on the vessels just to orient them because after we detach them, they can twist before we reconnect them, and we don't want to have a twist in the vessels. That would lead to an obstruction. So those markings are just for us to orient the vessels before we detach them. And here again, Will, you can see that the nerve is fully dissected out and we've had the full exposure of the vessel.

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WILLIAM SAMSON, MD: Now, I think it's important in that image for our viewers to realize that although the exposure was very good and it seemed as if the muscles

were splayed apart, none of the muscle had been removed. It was just retracted outwards for exposure so we can get to the vessels at their origin.

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MARK L. SMITH, MD, FACS: That's right. We can still see a lot without damaging the muscle. We just separate the fibers and once we release those little retracting hooks, the fibers come right back together and they'll heal back together.

00:31:37

WILLIAM SAMSON, MD: When you're talking about healing, we have a question from one of our viewers who's asked about the recovery period. What do you tell your patients regarding recuperation from this type of an operation?

00:31:49

MARK L. SMITH, MD, FACS: Well, one of the big pluses of the DIEP flap compared to the TRAM flap is that the recuperation is about half the time. We usually, when we were doing TRAM flaps, told patients that they would have to wait about three months before they did any significant lifting because there was a large fascial incision and also there was no muscle left to reinforce that incision. Now that the muscle's left behind and the incision's much smaller, usually by six weeks, patients resume pretty much most of their activities and we just say, you know, gradually increase towards heavy lifting after six weeks.

00:32:21

WILLIAM SAMSON, MD: Thank you. Let's go back to the video, please.

00:32:24

SHELDON MARC FELDMAN, MD, FACS: I think the patients also have much less discomfort. When we think back to the TRAM flaps, you know, for a while, we would always put in epidural catheters for these patients, for post-op pain control when we did TRAMs. And I think we've stopped doing that with the DIEPs because these patients have much less discomfort because the muscles are not resected, so it's been easier to tolerate for sure.

00:32:41

MARK L. SMITH, MD, FACS: Sure. The patients get out a little sooner and they certainly get back to normal activity faster.

00:32:46

WILLIAM SAMSON, MD: I think we have a great image here that demonstrates the anatomy nicely. Mark, will you take us through this?

00:32:52

MARK L. SMITH, MD, FACS: Sure. Well, actually here you can actually see the pulsatile movements of the perforator. Here is the main pedicle coming up and underneath the nerve, and the flap is pretty much isolated now, so we're just checking the circulation to the distal parts of the flap to see that it's bleeding, because there are no other blood supplies feeding the tissue at this point, just those three little vessels.

00:33:18

WILLIAM SAMSON, MD: And as you delicately rub the skin, it's clear that there's nice healthy bleeding at the skin edge, so that portion of the flap has got good circulation.

00:33:25

MARK L. SMITH, MD, FACS: That's right.

00:33:29

WILLIAM SAMSON, MD: Let's continue the dissection here. Is this on the other side, Mark?

00:33:33

MARK L. SMITH, MD, FACS: Yes. This is actually the other dissection, and you can see similar anatomy, but here there are two nerves that we've dissected out and the artery's actually passing between them. And so again, we've preserved the

enervation but we freed up the vessel. And we'll continue in a similar fashion as we did on the other side, isolating the flap onto that pedicle and then later on dividing it.  
00:33:58

WILLIAM SAMSON, MD: Mark, this is a good shot of both flaps divided and prepared. Now, obviously, we're going to have to prepare recipient vessels in order to restore circulation to these flaps. Can you begin to tell us about preparation of the recipient vessels in the chest?  
00:34:14

MARK L. SMITH, MD, FACS: Sure. Well, once we have these vessels dissected out and once the mastectomies are completed, we'll move up top to start exposing vessels that will be the ones that we connect. And we showed that on the schematic earlier. This is just a close-up showing that nerve and then, again, the pulsatile flow into the small perforators as they go up into the overlying tissue.  
00:34:37

WILLIAM SAMSON, MD: Perhaps we can advance the video to the dissection of the recipient vessels in the chest.  
00:34:44

MARK L. SMITH, MD, FACS: Sure. I just also want to say, again, it's amazing that these flaps can live on such a small blood supply, but because there's so little metabolic activity compared to a muscle flap, we really only need these small vessels to keep that tissue alive and healthy and allow it to heal well.  
00:35:03

SHELDON MARC FELDMAN, MD, FACS: Mark, are there some patients with vascular problems that might not be a candidate for this type of reconstruction?  
00:35:08

MARK L. SMITH, MD, FACS: Well, there are. Certain patients with connective tissue disorders, patients with poor circulation either from smoking, diabetes, and/or people that are very heavy may not be ideal candidates. However, comparing it to the older technique, this tissue will actually have better blood supply. And the complications that we see are not related to the perforator flap portion but really to the donor site, because the donor site still requires undermining of the skin, and if there's poor blood supply to that overlying skin, there may be some delayed healing. But certainly in terms of the abdomen, it's much better to use this technique for anyone.  
00:35:52

WILLIAM SAMSON, MD: And --  
00:35:56

MARK L. SMITH, MD, FACS: So we're just holding up the tape here, we're flying forward, but it looks like we've made it up to the area in the chest where we're starting the dissection for the recipient vessels. And just to orient patients, Will, this is -- we're looking back through where Dr. Feldman removed the breast, through that incision. You can see the nipple off to the patient's right. and I'm just freeing up the tissue, the small muscle that is attached to the edge of the rib. We've split the pectoralis muscle, which is sort of the bigger muscle of the chest. Again, not cutting any fibers, just splitting in between it to expose this inner space between the second and third rib.  
00:36:33

WILLIAM SAMSON, MD: So this is the intercostal muscle, which is the muscle between two ribs. You're removing a small segment of it. Does that have any aesthetic or functional impact?  
00:36:44

MARK L. SMITH, MD, FACS: No, because aesthetically, the pectoralis muscle will reapproximate over that, and that will camouflage this. And functionally, we're really -- this is greatly magnified, but we're really removing only about a postage-stamp

size piece of muscle, and this muscle really does not have any significant function in terms of a patient's postoperative recuperation.

00:37:06

WILLIAM SAMSON, MD: I know that some surgeons will routinely remove a portion of the rib. Is this a technique that you'll use?

00:37:13

MARK L. SMITH, MD, FACS: Well, ideally, we try to avoid removing the rib. We can remove -- or we will sometimes remove a little bit of the cartilage to give us more exposure if the inner space is very small, but in the majority of patients, we do not have to do that. However, it is okay to remove some of the cartilage. Patients can still function perfectly normally, it's just we try not to.

00:37:36

WILLIAM SAMSON, MD: Mark, these are the same vessels that are used by cardiac surgeons for coronary revascularization. How do you counsel patients regarding this?

00:37:47

MARK L. SMITH, MD, FACS: Well, obviously, first most of the patients we're going to be doing this on are younger and ideally not high risk for cardiac disease, but if someone has a family history that may make them a higher risk patient, we will tell them that, "Listen, the cardiac surgeons would not be able to use these vessels to do bypass surgery." Fortunately there are other vessels in the body that can be used, and so it does not preclude having bypass surgery, but it just precludes using these vessels for it.

00:38:17

WILLIAM SAMSON, MD: And, Mark, do you just want to point out the internal mammary artery that we're seeing?

00:38:20

MARK L. SMITH, MD, FACS: Yeah, and I think we'll get a little better view in a moment. Yeah, here. That's the artery that the clamp is just coming underneath now, we're just freeing that up. You can see below that, a little bit of white tissue. That is the plural lining, the lining that separates the lung cavity from the chest, and we've just separated the artery from that underlying plural surface.

00:38:47

WILLIAM SAMSON, MD: Mark, are these the only recipient vessels that can be used when transferring tissue from the abdomen to the chest?

00:38:52

MARK L. SMITH, MD, FACS: No. We used to use the thoracodorsal vessels much more commonly, and those are located in the armpit. But as Shelly can attest to, they're doing less and less in terms of axillary node dissection, so it's harder to get into those vessels without creating some disruption in the tissues. Isn't that right, Shelly?

00:39:09

SHELDON MARC FELDMAN, MD, FACS: Right. Since most of our patients are having sentinel lymph node biopsies now and only axillary dissections if they're node-positive, then we would not routinely be dissecting out the thoracodorsal vessels. So although they still can be used as a secondary potential source, we're not routinely exposing them. And you know, I think from a technical point of view, those vessels sometimes are a bit smaller.

00:39:31

MARK L. SMITH, MD, FACS: They are, so ideally we like using these. But they are available if for some reason these are not.

00:39:38

WILLIAM SAMSON, MD: Great. Let's go back to our video as, Mark, you're preparing the recipient vessels.

00:39:44

MARK L. SMITH, MD, FACS: Yeah, here we've basically finished dissecting them out and I've just placed a microsurgical occlusion clamp on the artery, and here we're putting it on the vein. And in order to prepare them for anastomosis, we actually have to divide the vessels and check them to make sure there's good flow through the vessels. And so here we've just clipped the artery and we'll be dividing that, and then we will be -- here you see we're about to divide that.

00:40:15

WILLIAM SAMSON, MD: Mark, these vessels are quite delicate. Can you tell us about the instruments that you're using to occlude flow?

00:40:21

MARK L. SMITH, MD, FACS: Yeah, those clamps are especially calibrated to block circulation coming through the vessels but not to crush them. We have to be very delicate. These vessels you can almost see through actually, especially the vein. It's almost transparent it's so thin.

00:40:40

WILLIAM SAMSON, MD: We're -- we have a question from one of our viewers. She had the back flap, or latissimus reconstruction, approximately five years ago, and she wants to know if she can request to use this stomach muscle -- I assume she means the abdominal flap -- to reconstruct her breast to improve volume.

00:41:01

MARK L. SMITH, MD, FACS: Well, the -- certainly it's an option if she has adequate tissue in her abdomen, we could use it. It's -- the thoracodorsal vessels obviously wouldn't be our choice, but they normally aren't in terms of recipient vessels, but we could consider using the lower abdominal tissue to augment that volume, certainly.

00:41:24

WILLIAM SAMSON, MD: Back to the video, Mark. Just to give the viewers an idea of the size of the vessels that we're using here.

00:41:31

MARK L. SMITH, MD, FACS: Well, I think we'll get another chance to look at that, but there is a little calibrated grid behind, and when we get back to that, I will show you the exact measurement on those particular vessels. Right now I think this shot actually is a good shot because it shows that we're both working at the same time. And one of the big advantages of working with a team is that you can have two surgeons working or even three surgeons working simultaneously. Here we're back in the chest, and you can see we're calibrating the size of the vessels and that vein is about two and a half millimeters in diameter. And you can compare that also to the grid behind it, which is calibrated at one millimeter for each of those squares. So obviously, these are small vessels that we're working with.

00:42:17

WILLIAM SAMSON, MD: And now we're back down to the abdomen in the pelvis, about to divide the blood supply to the flap.

00:42:24

MARK L. SMITH, MD, FACS: That's right. And so now that we have the recipient vessels ready, it's time to transfer the tissue. We've divided the -- this is the vein and now the artery. Actually, vice-versa. That was the artery and now the vein. And now the flap actually has no circulation and it's one what we call ischemia time. It's basically starving for blood supply, so we don't want to take too much time before we reconnect it.

00:42:51

WILLIAM SAMSON, MD: How much time do you routinely take and how much time can this tissue survive without circulation?

00:42:59

MARK L. SMITH, MD, FACS: Well, as I said earlier, it doesn't have any muscle, so that is in our favor. The tissue could probably survive easily four hours or more, even up to -- not much more than four hours healthily. But it can survive. We like to do it in about 30 minutes in terms of the transfer, 30 to 40 minutes at most. And that's just to minimize the effects on the tissue when we transfer it.

00:43:21

WILLIAM SAMSON, MD: Mark, you're irrigating the flap, you're injecting heparin through the artery and we see it starting to come out through the vein. Why don't you tell our viewers the importance of this maneuver.

00:43:31

MARK L. SMITH, MD, FACS: Well, I like to do this just because I don't want any clot to form in the flap or in the vessels distal to the anastomosis where we're going to connect it, so we just flush it out. Heparin is a blood thinner. It just basically anticoagulates the flap while we're transferring it. And here you actually see it's free from the body now.

00:43:52

WILLIAM SAMSON, MD: That's why it's a free flap, right?

00:43:54

MARK L. SMITH, MD, FACS: That's right.

00:43:55

WILLIAM SAMSON, MD: And now the flap will be transferred to the chest and we'll get to that in just a minute. I just want to reiterate you can see the nerve there which is supplying the medial aspect of the muscle. The muscle is healthy and pink. Essentially no fascia has been removed, and this is going to be a very easy closure without any tension.

00:44:17

MARK L. SMITH, MD, FACS: That's right, and you see how the muscle just comes back together once you remove those little hooks. It's just been split, it'll heal right back together.

00:44:24

WILLIAM SAMSON, MD: And here you're temporarily tacking the flap to the patient's chest to secure it in place while you prepare for the microvascular anastomosis or connection of the blood vessels.

00:44:39

MARK L. SMITH, MD, FACS: Up top, you can just begin to see that the vessels are going down into where we're going to connect them. Those are the vessels from the flap that are now draped down into the chest, where we'll bring in the microscope and actually do the microsurgery.

00:44:54

WILLIAM SAMSON, MD: What kind of magnification does the microscope -- actually, we'll hold off on that question. Tell us about this instrument that you're going to be using.

00:45:00

MARK L. SMITH, MD, FACS: This is called a microvascular coupling device. It's used by us to reconnect the vein. And you can see how these little rings are brought together. The vein is actually draped through those rings and allowed to be approximated by the rings. Those rings snap together and it actually creates an anastomosis between the vessels.

00:45:24

WILLIAM SAMSON, MD: So each prong interdigitates into the opposing ring and they lock in place. And it's fine to leave that device in place?

00:45:32

MARK L. SMITH, MD, FACS: Sure. And actually here, this is a good shot just showing the vein draped over the prongs and we're just pushing it down, and then we'll close it. Yes, this is a biocompatible device. It's a very small little ring, and it actually holds the vessel open, too, so it prevents the vein from being collapsed at the area where we connected it, so it actually -- it facilitates what we're doing but it also is protective of the connection as well.

00:46:00

WILLIAM SAMSON, MD: And it also expedites the surgery a bit, doesn't it?

00:46:02

MARK L. SMITH, MD, FACS: Sure. It takes about five minutes to do this.

00:46:06

WILLIAM SAMSON, MD: Do you use this coupler ever to reapproximate the arteries?

00:46:11

MARK L. SMITH, MD, FACS: It can be used for the artery, but in general the artery is a little bit thicker, so my preference is just to do it the old-fashioned way, which is to sew it. So in a little bit we'll see how we do that. Here I'm just trimming the vessels down to get them the appropriate length. We don't want one vessel longer than the other because they're intermittently associated, it can lead to buckling of the vessel. So we just trim it down so that they sit comfortably opposing each other.

00:46:43

WILLIAM SAMSON, MD: And I think we're about to see you begin to do the arterial anastomosis with a hand-sewn technique. Tell us about the suture material that you use to sew such small delicate vessels together.

00:46:58

MARK L. SMITH, MD, FACS: We use nylon suture, typically a 9-0 nylon is what it's called, it's a very fine diametered suture. And if you look at the actual thread, it's actually thinner than a human hair. The needle is very tiny, and again, we're using what we call the jeweler's instruments to do this. And at this point, we have probably about eight times magnification under the microscope, so things look a lot bigger to us, and it enables us to be very precise as we tie these knots down.

00:47:29

WILLIAM SAMSON, MD: While we're watching you elegantly perform this anastomosis, I have a question from one of our viewers. One of our viewers has said that she's had prior abdominal surgery and is interested to know if she is still a candidate for DIEP flap. She doesn't specify what kind of abdominal surgery she's had.

00:47:44

MARK L. SMITH, MD, FACS: Well, that's an important point, because some abdominal surgery, such as a caesarian section, may not preclude a patient from undergoing a deep inferior epigastric perforator flap, but if you've had a large upper abdominal incision, that could affect the blood supply. If you've had a surgery that has disrupted the perforating vessels, such as an abdominoplasty, that could also limit our ability to do any sort of reconstruction using that tissue. So it really, the answer is it depends on what type of surgery the patient has.

00:48:18

SHELDON MARC FELDMAN, MD, FACS: How about things like liposuction, Mark, is that a problem in terms of using abdominal tissue? Because that's becoming a pretty common procedure.

00:48:24

MARK L. SMITH, MD, FACS: It is, actually. Only in that the volume may be reduced. Technically, with liposuction, the perforating vessels may still be preserved. Obviously, we have to take a look, and there is a chance that it may be somewhat disrupted by the abdominoplast-- pardon me, the liposuction operation, but in most

cases with liposuction, you don't disrupt the vessels, you just remove volume, and so our real hurdle is getting enough volume to reconstruct the breast after a liposuction.

00:48:53

WILLIAM SAMSON, MD: We have another question from one of our viewers. They're interested to know how long the surgery takes.

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MARK L. SMITH, MD, FACS: Well, it depends, is the answer. The operation can be done in perhaps under the quickest conditions, maybe in four or five hours. But as you know, Will, we like to spend a lot of time shaping the breasts, which is a personal preference. Some surgeons will like to complete the microsurgery and come back in a second stage and do more of the shaping and revision of the reconstruction. So it's almost a planned two-stage process. We like to do as much as we can up front, so usually in a unilateral, it'll take about six hours. And a bilateral, it can be anywhere around 10 hours or even 12 hours or more. It just depends on the amount of shaping we want to do and also the anatomy a patient has.

00:49:44

WILLIAM SAMSON, MD: Yeah, as you showed earlier, the anatomy is variable. Sometimes you deal with smaller perforators, sometimes you have to dissect more perforators, sometimes it's difficult to dissect the nerves and preserve the nerves.

00:49:57

MARK L. SMITH, MD, FACS: Yeah, it certainly -- it's quite variable. You know, if the patient has an ideal anatomy, it can go very quickly.

00:50:03

WILLIAM SAMSON, MD: I have another excellent question from one of our viewers. This viewer has e-mailed us asking: do you recommend the DIEP flap for someone who's very physically active?

00:50:13

MARK L. SMITH, MD, FACS: Well, I would say that the DIEP flap is actually an ideal reconstruction for the active person. There is a period of recuperation. Certainly there's going to be a period of inactivity during that six weeks after surgery, and then there will be a gradual period of returning to your normal activity, but if you want to have your own tissue as a reconstruction, it's one of the few techniques that doesn't involve any muscle. I just want to go here, Will, because I think we're releasing the vessels to restore the circulation, and right now, I've just released the vein and we're getting ready to release the arterial clamps.

00:50:51

WILLIAM SAMSON, MD: So the microvascular reconnection or anastomosis of the vessels is complete and now we're getting ready to restore circulation to the flap by releasing the clamps.

00:51:00

MARK L. SMITH, MD, FACS: The final clamp is the one on the artery feeding the flap. And here immediately you see the blood supply is pulsatile through the anastomosis. There's always a little bit of leaking where the needle sticks are, but that closes off quite quickly, usually without any intervention. Sometimes we'll see a little bit of spasm underneath where the clamps were, because there is a small layer of muscle that wraps around the vessels, and so where they're under the clamps, they can get a little bit of spasm. So here I'm just teasing those muscle fibers to allow that area of the artery to dilate up.

00:51:37

WILLIAM SAMSON, MD: And here I see you're checking the flow by compressing the vessel.

00:51:42

MARK L. SMITH, MD, FACS: Yes, we just squeeze out the blood and we want to make sure that it fills across the connection. And there you saw that the blood's coming back out, and that means both the artery and the vein are functioning well.

00:51:52

WILLIAM SAMSON, MD: And so the flap is now well perfused. What would you say your ischemic time was on this?

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MARK L. SMITH, MD, FACS: Like I said, usually it's somewhere around 30 or 40 minutes. Just depends on how much time it takes us to get things positioned and the vessels prepared once we're up there. This just shows that the flap is bleeding again just like it was when we were looking at it down on the abdomen.

00:52:12

WILLIAM SAMSON, MD: And you can see the pedicle there pulsating, perfusing, bringing blood into the flap and returning blood out of the flap, and it appears at this point you're about to place the flap into the -- into the mastectomy defect.

00:52:28

MARK L. SMITH, MD, FACS: That's right. we -- it's always a little bit challenging because Dr. Feldman is taking these breasts out through smaller and smaller incisions, but we -- we carefully place the flap back through. Obviously, we have to be very careful because those blood vessels are very delicate and we don't want to avulse the perforators or disrupt the connection that we just made. But I just want to say that here you begin to see sort of what we're going to be expecting to be the result after we're finished. You see the skin that's been preserved, and now it's being filled up with volume.

00:53:04

WILLIAM SAMSON, MD: The flap is a triangular flap, and obviously will need to be shaped. And I think we'll talk a little bit more about that later on.

00:53:14

MARK L. SMITH, MD, FACS: Yeah, the shaping is usually done after we close the abdomen, and I think we'll move onto that in a moment, but the shaping is a big part of the operation. In fact, in some ways, that is the operation as far as the patient's concerned.

00:53:29

WILLIAM SAMSON, MD: I just want to take another question from our viewers. One of our viewers has asked: is it possible to get breast augmentation after a DIEP flap?

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MARK L. SMITH, MD, FACS: Actually, yes. Even though a lot of our patients that seek a DIEP flap are looking to avoid an implant, there are patients who are really looking for a natural result and feel that with a DIEP flap, they have basically restored their native breast volume, but they may want to have more volume, and in that case, they can augment that and it will give them a more natural result than an implant alone because now you have tissue over it, much like you would in a normal breast augmentation.

00:54:06

WILLIAM SAMSON, MD: Thanks. I think we're ready to go back to the tape.

00:54:12

MARK L. SMITH, MD, FACS: I think we're coming up, actually, on the abdominal closure here. And at this point, we're just looking at the anatomy of the muscles and where -- those markings, actually, if we could stop the film -- the tape for one moment. We can see these markings here, and those markings actually outline the full extent of the rectus muscle. So instead of closing just this area, which we're about to see, we would have to close the whole length of this and actually might even have to replace some of this missing tissue with synthetic materials in order to

get the abdomen closed, because don't forget, we not only have to replace it on this side but the other side. And it may be very tight. So that's where the -- the big difference is, is in the closure of the abdominal donor site.

00:55:00

WILLIAM SAMSON, MD: We can role the tape now, and I think you'll appreciate how easily this tissue comes back together. It's a completely tension-free closure. Since no muscle has been removed, no fascia, or connective tissue, around the muscle has been removed, this is a very easy closure. It's very quick. And the risk of hernia is significantly reduced, wouldn't you say, Mark?

00:55:22

MARK L. SMITH, MD, FACS: Yes. Obviously this closure is not only tension-free but it's reinforced by the underlying muscle, which is the opposite of the other technique, the TRAM flap, where there is tension and there is no muscle reinforcement.

00:55:38

SHELDON MARC FELDMAN, MD, FACS: And hernia formation was not such a rare thing in the past with the older technique. It was a real clinical issue. So for that to be gone is a major advance for patients.

00:55:45

MARK L. SMITH, MD, FACS: Sure. And not even just hernias but just bulges. Because sometimes we would not get a true hernia, which is an actual defect in the abdominal wall, but we would see areas of weakness where the -- when a patient strained, the abdomen would bulge outward. So this has eliminated really both of those issues for the most part.

00:56:04

WILLIAM SAMSON, MD: I think we're back up to the beginning of shaping the breast now. Mark, what are the key -- key elements to shaping the breast?

00:56:14

MARK L. SMITH, MD, FACS: Well, we start out with a triangular piece of tissue basically from the abdomen. We have to make it look like a breast. And it's fairly flat as well. So what I'm doing now is just reestablishing the confines of the breast, if you will. During the mastectomy, it's not uncommon for the skin to be separated a little bit from the chest wall, so we want to make sure that we have the creases that go around the breast reestablished, so this is the resecuring the inframammary fold area. Once we do that, we'll extend it out laterally as well to define the lateral portion of the breast. And then we'll start trimming the edges of the breast to round it out and possibly even fold a lateral portion of the breast underneath to give it even more projection.

00:56:58

WILLIAM SAMSON, MD: Mark, in this image, you can see that there's skin from the native breast that has been well preserved by Dr. Feldman as part of his mastectomy, but there's also skin from the abdominal donor tissue. How do you manage these two layers of skin?

00:57:14

MARK L. SMITH, MD, FACS: Well, you can see here, we're burying temporarily the skin from the abdomen, but obviously we can't leave that in there. It won't heal to the overlying tissue, just as if you put your two hands together, you can hold it there all day long and they're not going to grow together. Once we decide what tissue can stay from the breast skin, we'll start, as you see here, to peel off the outer layer of the abdominal skin, and that will allow that underlying fat to heal to the overlying skin, so in this case, we're just starting to trim the excess skin from the underlying tissue since we have most of the breast skin to work with.

00:57:48

WILLIAM SAMSON, MD: In circumstances of delayed reconstruction, if a woman undergoes mastectomy without reconstruction and then at some point later on sees you for reconstruction, how would you alter this operation for that type of a patient?  
00:58:02

MARK L. SMITH, MD, FACS: Well, in that case, this skin would be very useful and we wouldn't discard it like we are now. We'd actually have to replace a large amount of missing skin, because after a mastectomy, if you're not preserving skin for reconstruction, you have a lot of redundant skin and the breast surgeon, Shelly, you'll usually resect almost all of that excess skin.

00:58:20

SHELDON MARC FELDMAN, MD, FACS: We do, we want to have a smooth closure without redundancy. I think the ability to -- to me, what makes so much of a difference between immediate and delayed reconstruction is by saving the normal envelope of skin and the nipple areolar complex like in this place, the shape of the breast is really maintained. And if we do a mastectomy where we save no skin, then we've taken the whole shape away. And then, you know, it's obviously more difficult for you to then come up with a shape that's going to be matching to the other side if it's a unilateral procedure. So it's a major, major difference. And sometimes it's hard for patients to understand that, but I think when they do then it makes some sense.

00:59:00

MARK L. SMITH, MD, FACS: Just here, I'd like to point out that we're doing the abdominal closure, and you can see the bellybutton has remained attached, and here we're going to drape the skin over. And this is what we were referring to over is the tummy-tuck type closure. There is a long scar in the abdomen, but it's concealed in the lower abdomen. And you can see though there's no tension on the intraabdominal - or I should say the muscle layer closure, there is some tension on the skin, which is actually where we get the improvement in the abdominal contour.

00:59:32

WILLIAM SAMSON, MD: Mark, I also want to comment that without removing any components of the abdominal wall, no muscle and no fascia has been removed, when you close, the umbilicus or bellybutton remains in the midline.

00:59:46

MARK L. SMITH, MD, FACS: That's true. With the other techniques, especially on the unilateral closure, the bellybutton gets pulled over to one side, so you actually have to tighten up the other side anyway just to bring it back to the midline. So here we just, we see the bellybutton is actually buried under the upper abdominal skin. We'll start to close this tissue, and we do it in layers to distribute the tension off of the skin closure down to the deeper layer so the skin is closed without tension. And then secondarily, we'll bring the bellybutton up.

01:00:16

WILLIAM SAMSON, MD: I have a question for Dr. Feldman: will I still have sensation in my nipples if I undergo nipple-sparing mastectomy?

01:00:24

SHELDON MARC FELDMAN, MD, FACS: Most patients do not have normal sensation. Some patients have some sensation and we definitely tell patients that up front that there will be alteration because the nerve supply to the nipple comes from within the breast. Some patients do, but the normal experience is that there's significant change in sensation.

01:00:46

MARK L. SMITH, MD, FACS: I would reiterate that there's -- the difference between normal and having sensation is important. And studies show that about between 30 and 70% of patients may have some sensation, but none of the studies really say

that any of that sensation is normal. So that is a great question, actually for patients to be aware of.

01:01:07

WILLIAM SAMSON, MD: I have another question from one of our viewers for Dr. Feldman. This sounds as if it's come from a plastic surgeon: how thin are the skin flaps in the skin-sparing mastectomy?

01:01:13

SHELDON MARC FELDMAN, MD, FACS: Right. Well, you know, what I tell the residents and what I try to do certainly when we do this is that the mastectomy that we do, with skin-sparing or nipple-sparing in terms of the breast tissue that's removed is the same amount of breast tissue that we would remove as if we were removing, you know, the entire breast the old way with a lot of skin overlying. So we use the same anatomical landmarks, we really, you know, stop the superficial fascia, but we don't make the flaps thicker, certainly not, to improve blood supply. The biggest priority always is doing the best cancer operation possible and then obviously with the best reconstruction, we can do the two together, which we think gives the best results for patients.

01:01:53

WILLIAM SAMSON, MD: Thank you. Let's continue to roll the tape, please.

01:01:59

MARK L. SMITH, MD, FACS: Will, could I also add though that I think that Shelly does an excellent job in terms of his part of the surgery, but it's important that technically, that is a very important part of the operation is doing the skin envelope dissection in a uniform plane, because all it takes is one thin area to compromise the blood supply. And then that would compromise the operation. We can continue the tape actually.

01:02:28

WILLIAM SAMSON, MD: Yeah, at this point in the tape, Mark, you're diagramming the location in the newly redraped abdominal skin where you're going to deliver the bellybutton.

01:02:39

MARK L. SMITH, MD, FACS: Yes, and what we'll need to do is actually not only just remove a little bit of skin but we actually have to remove a core of fat out from this area. It's a little bit like that old board game called Operation where you basically have to dissect carefully around the tissue without hitting the sides, and we use a cautery to minimize the bleeding, but we obviously don't want to burn the skin around it, so we carefully work our way around. And here you can see us removing that core of tissue.

01:03:06

SHELDON MARC FELDMAN, MD, FACS: You must have been pretty good at that game.

01:03:10

MARK L. SMITH, MD, FACS: I was about 3, I started playing. And here we're just putting in the deeper sutures. We'll put in a small superficial suture in to finally close that once we're all done.

01:03:27

WILLIAM SAMSON, MD: Now patient -- I'm sorry, a viewer -- stop the video for a second. We have a viewer who's asked about tattoos and does the location of tattoos change after this operation?

01:03:39

MARK L. SMITH, MD, FACS: It sure does. It depends where they are. But if they're on the abdomen, when we close, they do move. And in this patient, we actually took

the tattoo, and that's ending up in the breast area, but we've removed it with the superficial skin. So yeah, they do move.

01:03:55

WILLIAM SAMSON, MD: That's great. Mark, you definitely showed a very good result in that last picture. The breast mound was restored immediately. Shelly did a great job at preserving the nipple and the areolar complex. I compliment the reconstruction and the abdominal contour was excellent.

01:04:15

MARK L. SMITH, MD, FACS: Yeah, so I think, you know, we hadn't quite finished the final stitches there, but I thought I'd just show another patient sort of in the pre-op, immediate post-op, and what to expect later on, because you can kind of see that where the scars are going to be. Here another patient about to undergo a left mastectomy. This is her immediately post-op. And obviously, she had her nipple and areola sacrificed, but she has her breast mound restored in one stage at the time of the mastectomy. We'll do the nipple reconstruction a few months down the road. And you do see that there are scars that are evident, but the breast mound is there, the abdomen is flat, and over time, these will all improve. Scars do fade. It usually takes about six months to a year for the scars to mature. And after the nipple and areola tattooing, the circumareolar scar is really concealed at the border of the nipple areolar complex. So with time, many of the things that we see right after surgery tend to smooth out and fade.

01:05:17

WILLIAM SAMSON, MD: Great. I'd like to take this opportunity to let you all hear from a patient who's actually made it through the reconstructive process and speaks a little bit about life after mastectomy and reconstruction.

01:05:35

WOMAN: First of all, look at me. do I look like a breast cancer patient? Do I look like I'm suffering? They're fine. You know, I want everybody to have the opportunity, if they have breast cancer, to get through it, to come out the other side, to see that there's life afterwards. It is dark days, dark, dark days that diagnosis, the testing. It's horrendous. But you can get through it, and you can get through it well and you can get through it whole. And you can get through it complete. And there is, you know, a good life afterwards.

01:06:15

MARK L. SMITH, MD, FACS: Well, Will, I think that says it all, the patient who has passed through the long journey from diagnosis to treatment and finally to recuperation and cure. You know, this is what -- this is why we do this. You know, you see a patient that's not only healthy but who feels like their life is restored, that they're back to normal, that the quality of life is the same as before. I think that's the most rewarding part about what we do, it really is.

01:06:43

WILLIAM SAMSON, MD: I agree. Absolutely. Shelly, do you have any final comments for today?

01:06:48

SHELDON MARC FELDMAN, MD, FACS: Well, I think, you know, just to reiterate what Mark was saying and also, I think, the concept of the team approach. You know, these patients from the get-go, from the initial diagnosis, the way that diagnosis is made, avoiding surgical biopsies, doing minimally invasive diagnosis, incision planning if they need mastectomy, and really having a multidisciplinary team that works together is the key to providing excellent care for these patients.

01:07:11

WILLIAM SAMSON, MD: I agree 100%. Mark, any final comments?

01:07:14

MARK L. SMITH, MD, FACS: Well, I'd just like to thank the patients that volunteered to share their experience with us and our viewers and also to thank our audience for the great questions. It was really, I think, a great experience for all of us.

01:07:27

WILLIAM SAMSON, MD: I hope you all enjoyed this as much as we did and found it informative and educational. From Beth Israel New York, good night.

01:07:41

ANNOUNCER: This has been an in-depth look at DIEP flap reconstruction surgery at Beth Israel Medical Center in New York City. OR-Live makes it easy for you to learn more. Just click on the "Request Information" button on your webcast screen and open the door to informed medical care.

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