

Transcript for Managing Lymphedema after Breast Cancer video

Slide 1

- Welcome to this presentation of “Lymphedema After Breast Cancer Surgery.” The goal of this presentation is to discuss lymphedema after breast cancer treatment, including risk factors and approaches to prevention and treatment. This presentation is part of the University of California San Francisco lymphedema prevention program.

Slide 2

- While most of us know that our cardiovascular system pumps blood through our body and provides oxygen and nutrients to cells and tissues, the lymphatic system is less well understood. But the lymphatic system serves very important functions.
- The lymphatic system removes excess fluid, microorganisms, and toxins from tissue spaces, and after the fluid has been filtered by the lymph nodes, returns this excess tissue fluid back into the circulatory system. In addition to this important role in fluid regulation, the lymphatic system also plays an important role in immune function, through the lymph nodes which filter foreign particles and cancer cells, and by producing immune cells - including antibodies. Another important function of the lymphatic system is absorption of fats from the gastrointestinal tract.

Slide 3

- Lymph originates from plasma, which is the liquid part of our blood. Our blood moves through our arteries (seen in red in the image on the left) and then into the capillary beds. Here, some of the plasma moves out of the blood capillaries into the surrounding tissues. This tissue fluid (called interstitial fluid) bathes the cells that make up the surrounding tissues, and carries nutrients, oxygen, and hormones to these cells. Cellular waste products and proteins leave the cells and also enter this interstitial fluid. Most of this interstitial fluid returns to the veins (which are blue in the image), but some fluid has to remain in the tissue space to bathe and nourish the cells. This left over fluid is continuously absorbed by the lymphatic capillaries (colored green in the image). Once in the lymphatic vessels, the fluid is called lymph, or lymphatic fluid. In addition to fluid, lymph also contains proteins and other debris that are too large to be picked up by venous capillaries. Lymphatic channels are present in nearly all the tissues of our body.
- The lymph is moved through the lymphatic capillaries into larger lymphatic vessels, which have smooth muscles in their walls. These muscles contract rhythmically and propel the lymph fluid in one direction. Valves in the lymphatic vessels keep the lymph from flowing backward from where it came. In the image on the right, you'll see indentations in the lymphatic vessel where the valves are located. This is a characteristic appearance of the larger lymphatic vessels. Because of the intrinsic contraction of the smooth muscles in the walls of the lymphatic vessels, the vessels have their own pulse. But the rate of contraction varies and depends on a number of factors, including the amount of lymph in the vessel, nerve innervation to the smooth muscles, and contractions of surrounding skeletal - or our voluntary - muscles. The lymphatic system is constantly in motion, pumping the lymphatic fluid from the tissue spaces, toward lymph nodes, then back to the venous circulation.

Slide 4

- As we've discussed, the lymphatic fluid travels to and through the lymph nodes. It's very important to consider the lymph nodes of the breasts and arms when we think about the effect of breast cancer treatment on the lymphatic system. Lymph nodes are widespread, numbering between 500 and 600 in the body, with clusters at various locations such as the axilla (or armpit). The lymph nodes are very small round or oval shaped structures, ranging from millimeters to centimeters in size, that act as filters for the lymph fluid carried to them by the lymphatic vessels
- You can see in the image on the left that toward the side of the breast tissue and up toward the axilla, we have regions of lymph nodes, that are often referred to as "levels" - for example levels 1, 2, and 3. Level 1 is the lower level denoted as number 1 in the image. You'll also see in the image more lymph nodes in the axilla. Also, there are nodes in the area above the clavicle (or collarbone), below the clavicle, and also along the sternum or breastbone. Each region of nodes has a name - for example Level II nodes (number 2 in the image) are also called the humeral and central nodes. You may see some of this terminology in your operative report if you have had lymph nodes removed. Also of interest is that about 75% of the lymph from the breast area drains toward the lateral breast, toward the Level 1 and 2 nodes.
- In the image on the right, the blue lines depict lymphatic vessels. You can see that lymph from the arm mostly drains through lymphatic vessels that lead to the humeral lymph nodes, then to the central lymph nodes, which are the level II nodes. This becomes important in both the development and management of lymphedema. Removal of or damage to the breast and axillary lymphatic vessels and axillary lymph nodes may block or disrupt the flow of lymph from the arm or breast. Remember that lymphatic vessels carry lymph to the lymph nodes. If the lymph nodes are gone, the path for lymph flow is interrupted. That may cause lymph fluid to build up in the tissues that are normally drained by those nodes and vessels.
- There are specific massage techniques that can assist with re-directing fluid away from that axillary area, where the nodes are damaged or missing, into areas with healthy lymphatic vessels and nodes. The lymph is directed, manually, toward the neck, opposite axilla, or lower trunk, where we have clusters of lymph nodes that are not affected.
- The final route for lymph is back into the venous system at the subclavian vein in the neck

Slide 5

- Let's consider different types of breast cancer surgery and how they might affect the lymphatic system.
- In breast conserving surgery, such as lumpectomy or partial mastectomy, the tumor and a small part of the breast tissue is removed.
- Mastectomy is removal of all of the breast tissue. There are different types of mastectomies. The Simple or Total Mastectomy is breast tissue only.
- In a Modified Radical Mastectomy the entire breast tissue is removed, including the lymph nodes under the arm. Radical Mastectomy is rare these days, but involves the removal of the

entire breast, including the lymph nodes under the arm, and the pectoral muscles under the breast

- While modified and radical mastectomies include lymph node removal, a simple or total mastectomy or lumpectomy often includes either a sentinel node biopsy or an axillary node dissection.
- The sentinel lymph nodes are the first lymph node or nodes in the path of the lymph flow from the breast, and are those to which cancer cells are most likely to spread from a primary tumor in the breast. It is important for the oncologist to know the status of the lymph nodes in patients with breast cancer.
- A sentinel lymph node biopsy is therefore performed to evaluate for presence of cancer cells in the lymph nodes. Sentinel lymph node biopsy is when the the first lymph nodes that drain the breast lymph are removed and examined for cancer cells. If the sentinel lymph nodes shows signs of cancer, then further lymph node examination is needed. Axillary lymph node surgery involves surgical removal of the lymph nodes in the armpit, which means that a greater number of lymph nodes are removed. The number of lymph nodes removed varies from woman to woman. The fewer the number of lymph nodes removed the lower the risk for developing lymphedema. But there are other factors that contribute to the risk for developing lymphedema after breast cancer treatment.

Slide 6

- Now that we understand the anatomy of the lymphatic system, the flow of lymph fluid from the tissues back to the circulatory system, and that lymph nodes may be removed or damaged during cancer treatment, we can start to understand how lymphedema may occur.
- Breast cancer treatments may include the removal of varying numbers of lymph nodes. Radiation therapy may damage vessels or nodes. Damage from both of these treatments may results in disruption of lymph flow through the lymphatic system.
- When the impairment or disruption in flow becomes so great that the amount of lymphatic fluid exceeds the ability of the lymphatic system to absorb it, then an abnormal amount of this protein-rich fluid collects in the tissues of the affected area. This is lymphedema. Lymphedema is edema - or swelling - that's caused by damage to the lymphatic system. Left untreated, this stagnant fluid may also provide a culture medium for bacteria that can result in cellulitis (a type of infection), and also in fibrotic changes in the skin and underlying tissue.
- One more thing to note is that it may take about a 20% or 30% increase in swelling before we are able to detect it with our eyes. You may feel the impacts of that decreased flow before we are even able to see it.

Slide 7

- We know the underlying cause is damage to the lymphatic system and that the more nodes taken out, the greater the risk for developing lymphedema. But not all women get lymphedema after breast cancer treatment, even with very similar treatments. There are other predisposing factors.

- There are a number of possible triggers that may lead to lymphedema, in the presence of damage to the lymphatic system. For example, an injury to the at risk arm that causes swelling may overload the lymphatic system and lead to development of lymphedema if the lymph vessels and nodes are unable to keep up with the increased fluid load in the arm.
- Long distance flights are included on this list as well; however, there is debate among clinicians and researchers about the impact of flying on lymphedema. A few years ago, a study evaluated fairly athletic women who all had some type of breast cancer surgery. They noticed that when they flew for a long period of time all of them had a little bit of change in their arm measurements, but it normalized within a day or two. The question was, “Does the pressure from long distance flying cause lymphedema?” Clinically, one of the things that you might ask yourself is, “Do I have a tendency to swell when I fly?” If your feet swell when you fly, and you’ve had multiple lymph nodes removed, it might be a good idea to wear a compression garment to help with circulation and prevent swelling. In addition, we would encourage staying hydrated with water, and being mindful of consuming excessive amounts of sodium, alcohol, or other foods that dehydrate us. It’s also important to remember that you’ll be packing, carrying your bag, and may be using your arm more than usual. So you may need to modify your other activities the day before or the day of your planned travel.
- In terms of extreme overuse and extreme exercise, this is again where we encourage you to pay attention to your body. Repetition or overuse may be a risk factors for lymphedema. Pay attention to your symptoms. A common complaint associated with early lymphedema is a unique, full, heavy feeling in the arm. Our recommendation is if you feel this sensation during activity, listen to your body; stop and take a break, drink some water, and allow your arm to rest and recover.
- Garments that are too tight, such as underwear or bras, tight jewelry, or overly tight sleeves, can create a tourniquet effect, which may cause fluid to pool in the arm below the area of constriction - and aggravate lymphedema. So be mindful of how your jewelry and clothing are fitting.
- Prolonged exposure to high temperatures in environments in which you can’t control your body temperature very well, such as a sauna or hot tub, may be a potential trigger. You may notice swelling, especially in your fingers, due to the change in temperature. This is true also if you participate in hot yoga. Always consider how your body is reacting to the activity. Watch for increased swelling or feelings of heaviness in your arm. Be sure to drink plenty of water, and take breaks from the hot environment. If you’re able to get the same benefit from a regular yoga class, we might suggest considering that over the hot yoga class. Hot weather may be challenging as well, especially if you need to wear a compression garment. Try to stay cool, and avoid excessive sun exposure, and consider getting in the water if it’s safe to do so.
- Infections in the skin of your risk arm are also a possible trigger for lymphedema. If you cut yourself or you notice a skin infection, make certain that the area is cleaned using an antibacterial cream. Monitor the skin for signs of infection such as redness, increased swelling, warmth, and pain. Cellulitis is an acute infection and inflammation of the skin and subcutaneous tissue. The symptoms of cellulitis vary, depending on how severe the infection is. It can be mild and appear as local redness, heat, and swelling, but may become severe and spread to a larger

area of the arm, and cause fever and a feeling similar to the flu. If you notice an area of redness, you can use a marker to draw a border around that area. If that area begins to expand or you start developing flu-like symptoms or if you notice signs of infection in your arm, call your medical provider right away. This may require immediate antibiotics. It's not something that everyone develops; however, this is an infection you want to catch as soon as it starts.

- Other known risk factors for breast cancer-related lymphedema are a significant weight gain or a body mass index over 30. Excess weight can place additional stress on the lymphatic system. Therefore, proper diet and adequate exercise continue to be important as methods to assist with weight management.

Slide 8

- Lymphedema can develop in any part of the body. In breast cancer related lymphedema, this is most often in the arm, although the chest or trunk may also be affected.
- You may feel discomfort in the affected limb, such as a heaviness, aching, or a full sensation in the limb, or even the breast itself.
- You may also experience areas of skin tightness. For example, if your hand is a little swollen, your skin may feel a little bit tight when you make a fist.
- On visual inspection of your hand and arm, you may even see less prominence of the bony prominences of your knuckles, or at your wrist or elbow. One side may look a bit fuller than the other.
- You may also notice that you're not as flexible as you once were. Of course that may be related to many factors, but if your hand or arm are swollen, the swelling may limit your flexibility.
- If you wear jewelry, like rings, bracelets, or watches, you might notice that your jewelry is fitting a bit more tightly, and that you can see marks left from your jewelry.
- You may also experience difficulty fitting into clothing; especially clothes that have a fitted or tight sleeve.
- Lastly, you may notice visible swelling. The swelling may come and go, change over the day, or over the week, and it may be persistent.

Slide 9

- Let's talk about how breast cancer related lymphedema is diagnosed in the clinic. Most often, it's diagnosed through a thorough history and a physical examination.
- Your healthcare provider will consider the types of breast cancer treatment you had, as well as other risk factors previously discussed, and your symptoms.
- Your provider may also take physical measurements, such as limb volume and circumference measurements at specific intervals along your hand and arm. Breast and trunk lymphedema is harder to measure so is evaluated primarily with visual inspection. Tools are currently being developed to allow better assessment of the trunk and breast.

- The most common method of measuring your arm for lymphedema is through the use of a tape measure. We measure the circumference of both hands and arms at specific intervals, and compare the at-risk arm to the non-at-risk limb and watch for differences, or compare the at-risk arm to previous measurements and watch for change.
- The lower image is a Bioimpedance Unit. This device detects different levels of fluid in the arms and legs via differences in electrical conductance, and compares one side to the other. In fact, this is the most sensitive type of measure that we have. We often use it with patients who may have very early lymphedema, or who are considered at a high risk for lymphedema, in order to catch subtle fluid changes before clinical symptoms appear. The sooner it's identified, and treatment is started, the better the chances that the condition can be improved and controlled.
- Ultrasound or a DXA scan may be used to evaluate the composition of the soft tissue in the swollen arm, but this isn't routinely done in clinical practice. There are other imaging methods that are used in research to evaluate the function of the lymphatic system, or used for patients who have a genetic or primary lymphedema.
- If there is any question about the cause of the swelling, your medical team may want to do other vascular studies to rule out a blood clot, or blood tests or other studies to evaluate for other possible causes of swelling.

Slide 10

- You are more likely to notice subtle changes than will be your healthcare provider.
- These images are of the same person's two hands. In the photo on the left, we see her normal, unaffected left hand and wrist, and you can identify the knuckles, tendons, and blood vessels. They are all visible. In your own hand you should be able to pick up the skin and easily move or pinch it.
- In the photo on the right, we see her right hand with lymphedema. The spaces between the knuckles on the right hand are puffy and filled in. You cannot see the tendons and veins on the back of the hand. The skin may appear shiny.

Slide 11

- In these images, you can easily see the difference in size of the arms. In the image on the left, you see her left elbow, with the well-defined bony features very obvious.
- In contrast, the image on the right, her right arm, the bony elbow is obscured and can't really be seen at all. But you can even see more subtle changes at the elbow.
- You can try this on yourself: look at your elbows in the mirror. Is there a difference in the visible bony features on one side as compared to the other?

Slide 12

- The International Society of Lymphology has established a staging system for identifying the progression, or severity, of breast cancer-related lymphedema (or BCRL).

- Stage 0, which we see in the image in the upper left, is a subclinical or latent stage. Swelling is not visually evident; however, a person will be identified as higher risk for lymphedema. For example, if an individual had 12 lymph nodes removed and has undergone radiation, they might be identified as stage 0, due to a higher risk for lymphedema. This is so that the patient may receive key preventative care. .
- With Stage I, in the upper right hand corner, we can see that the arm has become slightly swollen, and it feels heavy. Also, during Stage I, swelling may vary and fluctuate, and even seem to disappear then reappear intermittently. In other words, the swelling does not necessarily behave consistently.
- With Stage II, the arm is swollen and feels spongy and, although the swelling may fluctuate, it never entirely goes away. Further, fibrosis may develop, due to fluid remaining in the tissue for an extended period of which, which causes the limb to feel hard.
- Lastly, Stage III is the most advanced stage. The affected arm may be quite large, due to swelling. Normal skin elasticity has been lost the skin hangs in folds. Stage III occurs rarely in patients with breast cancer. And, when it does it occur, it is usually related to patients who have barriers to seeing their doctor, and/or are not receiving regularly, quality care for the swelling. Note also that individuals do not necessarily move stage by stage, from 0, to I, to II, to III. Rather, a person may move straight from Stage 0 to Stage II, or can be diagnosed as Stage 1 and remain as Stage 1. The most important feature is the behavior of the swelling (such as pitting and fluctuation), as opposed to the exact size of the arm.

Slide 13

- As lymphedema becomes chronic or progresses, changes may occur in the skin and underlying tissue. The skin and underlying tissue may become tougher and thick, and abnormal fat deposition may occur in the affected limb. The arm may feel hard as the tissue become more fibrotic, and the swelling may no longer reduce when the arm is elevated.
- Untreated, more severe, lymphedema may predispose a woman to cellulitis, or tissue infections, in that arm.
- Other consequences of having lymphedema included decreased range of motion and decreased strength in the shoulders and arms. Since the limb may be heavier, it becomes harder to move, which in turn can create difficulties with functional activities such as dressing or reaching overhead.
- Some patients report pain which may be the results of increased pressure caused by swelling; others experience numbness and tingling in their hands and fingers
- Some women experience their swelling only in the trunk and breast or chest area. Sometimes, arm swelling can progress into the trunk. Breast tissue extends laterally beyond the chest a bit, and swelling is sometimes experienced under the axilla, or armpit, or in the back near particularly near the bra-line. Sometimes, lymphedema also presents in the breast, causing an increase in the size of the affected breast.

- In addition, it is good to be mindful of postural changes that sometimes take place after the breast surgery itself. After breast cancer treatment, there may be a tendency to assume a forward head and rounded-shoulder posture, which can lead to issues with the neck, shoulders, and upper back. It is best to catch these postural changes early and make healthy modifications as early as possible.

Slide 14

- Axillary web syndrome, or axillary cording, is another complication of breast cancer surgery. Axillary cording has been described as “feeling like piano wires pulling” from the axilla, or armpit, down the arm to the fingers. It’s also described as a burning pulling, which limits the range of motion in the arm. In the images, we see two examples of axillary cording.
- Cording is a result of an injury to the lymphatic system, although the exact cause of cording is still being researched. Some experts believe that the surgery to the underarm and chest area traumatizes the connective tissue that encases nearby bundles of blood vessels, lymph vessels, and nerves. This trauma leads to scarring, and eventually hardening of the tissue. This hardening can spread down the fibers of the connective tissue, which causes the cords to form. Cording most often develops soon after lymph node removal, such as a partial mastectomy or mastectomy, in which nodes have been removed. Treatment options include stretching, flexibility, manual therapy, laser therapy, and pain medication. The manual release of axillary cording is tailored to individual patients and their tolerance, and sometimes results in an audible pop, followed by an increase in range of motion with a decrease in pain. It is often uncomfortable during therapy, but yields greater comfort after the release.
- Research shows that after approximately 18 months, cording tends to release itself. Therefore, depending on a patient’s restrictions and goals, we may or may not focus on releasing the cording. For patients with a lot of restrictions, especially after surgery, and prior to radiation, therapists may aggressively focus on releasing the cording, especially if it adversely affects their ability to perform functional activities.

Slide 15

- Next, let’s talk about recommended prevention strategies. This continues to be an area of active research, with some controversy and mixed results. Currently precautions are lifelong, because there isn’t a cure for lymphedema.
- Both a healthy, active lifestyle and an optimal, healthy weight will help to prevent lymphedema. When you’re returning to activity following breast cancer treatment, however, we want your increase in intensity of your activity to be quite gradual. For example, if you’re returning to the gym, to walking or running, or whatever your chosen physical activity is, start with a decreased intensity of only 50%. And, however quickly you might have progressed yourself previously, progression should also be on the slower side. We want to avoid overtaxing the lymphatic system.
- In terms of exercise, we have seen in recent years how important movement is for recovery. In the past, even as recent as 10 years ago, many healthcare providers would warn patients with breast cancer to not move their limb, and to avoid using the arm for normal activities. Now,

however, most healthcare providers are in full support of using the affected limb, and incorporating its movement into your daily activities.

- In fact, evidence has shown that exercise, such as strength training, decreases the risk for lymphedema by almost 30%. In other words, an active lifestyle and regular exercise can make a positive, helpful difference in preventing the development of lymphedema. Avoid performing repetitive movements, or holding prolonged positions without rest or changing positions. Can you take a break? Can you modify your position temporarily? If you're doing a repetitive task and you start getting that heavy, tired feeling, that's a great time to get up, walk around, do some stretches, drink some water and give your body a little bit of a break.
- It's also important to avoid limb constriction. For example, women should wear well-fitting bras that don't dig into the shoulder girdle.
- Good skin care is important. In drier climates such as the Bay Area, it's especially important to apply moisturizer and prevent cracking or chafing. be especially cautious to avoid pet scratches and insect bites, and to care for and monitor them when they do occur. There might be occasions to wear protective hand and footwear as appropriate. We recommend not cutting your cuticles; and avoiding blood draws, on your affected limb. We also advise using electric razors, rather than razor blades, on the affected limb. And, check your skin thoroughly on a regular basis, to ensure that there are no breaks in the skin barrier, because that would create an increased risk for infection.
- If you're traveling, compression stockings or garments can be helpful, although this is an area of continued controversy in the prevention setting.
- For skin protection while traveling, it's also recommended to carry bug spray, disinfectant, and antibiotics or anti-fungals.

Slide 16

- We've talked about risk factors and prevention strategies—but, if you do develop lymphedema, how do we manage it?
- Complex or combined decongestive therapy, or CDT, is the standard of care and is a multi-component treatment.
- The components of CDT include: Manual lymphatic drainage (MLD); Exercise; Skin care; and Compression. Compression strategies include wrapping with short stretch bandages, compression garments like sleeves and gloves, and sequential compression pumps. We'll talk about each of these in a bit more details.

Slide 17

- One of the components of CDT is manual lymph drainage or MLD. MLD is a very gentle massage, which helps activate the more superficial lymph vessels, the ones closest to the skin, to pump and re-direct the lymphatic fluid to areas where lymphatic function is better.
- The goal of MLD is to decongest the arm, improve lymphatic flow, and reduce the volume of fluid in the massaged area.

- MLD can be performed by a skilled therapist, and you can learn to do self MLD. Regardless of who does the treatment, you or your provider, the principles are the same. The strokes are light and attempt to produce gentle stretching of the skin.
- The massage is slow and rhythmic and should not cause pain or result in any reddening of the skin.
- With MLD of the arm, the massage starts by clearing a path for the flow of lymph from the arm toward healthier regions. After the initial torso and neck preparatory strokes are done, MLD of the arm starts with the upper arm - massaging upward with each stroke, and progressing toward the hand with subsequent strokes. As an example, in the upper extremity, the upper portions of the limb are treated first, to move fluid upward and create space for the fluid from below to move into.
- Imagine a straw with a clog at the upper end. the fluid behind the clog can't get through. We have to clear out the clogged area first. Then we can move the fluid below that area up through the newly cleared area. The same idea is true of a limb with lymphedema. If we clear the upper lymphedema area first, the fluid below can move up and onward. So we start with the upper portion of the arm and work upward, then move down a bit to the middle of arm and work upward, then we move down to the lowest part of the arm and work upward. This way, we can sequentially increase fluid movement through the arm.
- Oils or creams are not typically used in this type of massage, but if the skin is very dry a light dab of lotion may be needed. You might find that the best time to do self MLD is immediately after getting out of the shower, because dewy skin provides good traction.

Slide 18

- Here is a short video demonstration of self-manual lymph drainage. You can also access this video from the UCSF Physical Therapy Department website by going to the Patient Education page and scrolling down the page to find the link to the video.

Slide 19

- Here are some general guidelines and reminders for self-massage.
- Find a position that works well for you, where you can be comfortable, whether it's reclining or sitting. Remove restrictive clothing.
- Ideally, MLD should be performed skin-to-skin; however, if you're performing it over your clothes, or out in public, there's nothing wrong with that. You will still get some benefits from it.
- The goal of lymphatic massage is to clear the pathway and move fluid from involved areas to the target healthy lymph nodes.
- Begin and end each massage session with deep breathing, to help facilitate that lymphatic pump.
- After a series of deep breaths, stimulate neck and target lymph node groups first
- Use a flat hand and perform the massage using half-circle strokes with release

- Perform about 10 to 15 strokes in each position. But if you only have time for 5 or 6, that's going to be much better than not doing the technique at all.
- As a general principle, we recommend performing self-massage twice daily.
- Go slow and breathe!
- It's important to note that we don't ever want to move lymph flow from a normal area to a swollen area. For example, if the right side is affected with lymphedema, don't move fluid into the right limb. Instead, one would move the fluid up toward the neck, and down toward the groin area (where other lymph nodes are working).

Slide 20

- Another important component of lymphedema management and self-care is exercise. Exercise activates your skeletal muscles and stimulates lymph flow, but also helps maintain healthy range of motion and strength, and aids in maintenance of a healthy body weight.
- We now understand that there is a healthy relationship between exercise and lymphedema, and that exercise is a necessary component of prevention and treatment.
- The exercise parameters (the duration, intensity, and type of exercise) for an exercise program will vary based on the individual, depending on your goals, the severity of your lymphedema, and risk factors that may be at play for you. Of course, your current fitness level and your general health status, such as pre-existing cardiovascular issues, neuropathies, or other conditions you may have, will also be important factors in the type of intensity of your exercise program.
- What we'd like to stress for women with or at risk for lymphedema is that the exercises need to be gradually progressed. You can reach your goals safely but also see significant improvements in stamina, vitality, strength, and mobility with a gradually progressive exercise program. Many people rush into exercise and, while it's a very important component to recovery, this needs to happen slowly, so we know how your body reacts and we can ensure that you have a safe, enjoyable, and effective exercise experience. The role of physical therapists and cancer exercise specialists is to help you safely build up and work toward your goals.

Slide 21

- With an eye to designing a complete exercise program—we attempt to address the multifaceted nature of physical fitness and bring everything together.
- In an ideal complete exercise program, one would incorporate activities throughout the week that address flexibility, aerobic fitness, strengthening, balance, and relaxation.
- Addressing flexibility through stretching exercises or activities that address range of motion may be needed in order to restore mobility that may be lost after cancer treatments such as surgery or radiation therapy.

- Aerobic exercise has been shown to help with almost everything, including the side effects of chemotherapy and radiation, but it also decreases the risk of cancer recurrence as well as improves the management of other chronic health conditions.
- Strength training helps to improve bone density, strength, and balance, and if done properly and carefully may reduce the risk of development lymphedema after breast cancer treatment.
- Balance exercises may be necessary following cancer treatments, such as chemotherapy, that affect nerve function and balance, to reduce the risk of falls.
- And finally, activities such as focused breathing are simple exercises that promote relaxation, calm the nervous system, and facilitate lymphatic flow.
- There are obviously many physical benefits to exercise. Some of the overall physical benefits of exercise include improved rest and sleep; improved aerobic fitness and tolerance to activity; decreased fatigue; improved flexibility and strength, maintenance or improvement of bone density; and weight management.
- There are also many emotional benefits to exercise, including improved self-esteem, mood, relaxation, and feelings of independence; the release of endorphins; and shifting the focus from illness to wellness.

Slide 22

- As you think about starting an exercise program, there are some additional issues related to the effects of cancer treatment that should be considered.
- For example chemotherapy induced peripheral neuropathy in which sensory loss persists in the feet, can lead to impaired balance and increase the risk for falls. Balance and strength training are important to decrease fall risk, but precautions should be taken to avoid falls during the exercises.
- We want to be aware of the presence of bone metastasis, particularly in the spine, as weight bearing or resistive activities may be difficult. We might opt for more unweighted activities such as swimming or biking, and avoiding extreme ranges of motion for the spine. Considerations for osteoporosis are similar. Women with osteoporosis need to perform weight bearing and strengthening training exercises, but again be mindful of balance and fall risk.
- Cancer-related fatigue may affect your level of endurance, and we will want to be mindful of this in designing your exercise program. The recommendations are to start easy and slow, and work up from 10 minutes to 30 minutes and from 3 to 5 days a week.
- Cardiopulmonary complications, such as a cardiomyopathy or congestive heart failure, are also factors to consider in planning an exercise program. You or your trainer may need to monitor your symptoms, heart rate, respiratory rate, and blood pressure.
- Myelosuppression - reductions in red blood cells, white blood cells, and platelets - is a common side effect during cancer treatment. Anemia can increase fatigue, weakness, and difficulty concentrating because of decreased red blood cell counts. With neutropenia (when your white blood cell count is low), there is an increased risk of infections, so staying away from crowded

gyms may be beneficial. With thrombocytopenia, a decrease in platelets, there is an increased risk of bruising or bleeding, so being mindful about the environment in which you exercise, and maybe favoring lower-impact activities would be recommended.

- And of course, there is the risk of lymphedema. If you are at high risk of developing lymphedema, or have lymphedema, then there are some considerations to factor in to your exercise program, especially exercises that target the upper body.

Slide 23

- As we've discussed, there are numerous benefits, both physical and emotional, to participating in a regular exercise program. In addition, there are specific benefits to doing upper body exercise for women who've been treated for breast cancer, and who have or are at risk for developing lymphedema. Regaining flexibility and strength of the muscles of the chest, back, and arms is essential for recovery of prior levels of function and for improving quality of life.
- Research has shown that women with or at risk for lymphedema, who perform a careful gradually progressive upper body exercise program, may experience a lower risk for lymphedema; and the management of lymphedema becomes easier. The research recommendations are that upper body strengthening exercises should begin with very light weights and that increasing weight and repetitions should progressed slowly, being mindful of any increased swelling or symptoms.
- For patients who are not familiar with strength training programs, or other types of exercise in which they would like to participate - we recommend seeing a physical therapist or cancer exercise specialist. We want to make sure your technique and quality of movement are optimal, for your long-term benefit and safety.
- Instruction and supervision is important when just starting out. Some resources are included at the end of this presentation.

Slide 24

- The major rule of thumb is to avoid inactivity! The more active you are, the better off you'll be in the long run.

Slide 25

- When designing an exercise program, we like to include strength training, aerobic activity, and flexibility exercises spread throughout the week.
- Some good general recommendations are to perform strength training exercises 2 times per week; moderate aerobic activity for at least 150 minutes per week (for example 30 minutes 5 days a week); and flexibility exercises, such as stretching, everyday.
- We also recommend one to two rest day between days where you perform strength training exercises, to give your body time to recover.
- For those patients at high risk for of who have lymphedema who want to do strength training, we recommend starting with very low weight for upper body strengthening exercises, and

progressing slowly - adding weight only when you know that you can tolerate the previous load. We also suggest alternating upper and lower body exercises, to give your arm lymphatics a chance to catch up to the increased demand on the system from lifting weights. If you have lymphedema, wear your compression garments during exercise. The National Lymphedema Network publishes exercise guidelines for women with or at risk for lymphedema. There is a list of resources at the end of the video.

Slide 26

- Before getting started, please consult with your health care practitioner.
- Seek out a therapist who understands the specific needs and precautions for exercise following breast cancer treatment, particularly if you are at risk for or have lymphedema.
- Consider your goals and fitness level.
- Make your exercise fit into your lifestyle. Do something that you'll like so that you can stick with it

Slide 27

- Guidelines during your exercise session include using the right tools, such as wearing the appropriate clothing and shoes, and using the right equipment.
- Start low, progress slow, let symptoms be your guide.
- Warm up first. For an aerobic session, you can just start the activity at a lighter intensity, like walking before you jog. For a strength training program, you can begin the session with a few minutes on the bike or treadmill to increase the blood flow to your large muscle groups to warm them up before lifting weights.
- Respect your limitations, and take frequent rest breaks to allow more limb recovery.
- Last but certainly not least—stay hydrated and avoid overheating.

Slide 28

- After exercise, we recommend doing an active cooldown. An active cooldown allows your cardiovascular system to return to its regular state after a training session. This involves bringing the heart and respiratory rate, body temperature, and metabolism back to their normal levels. An active cooldown might include an easy walk immediately following your more vigorous walking session, for example.
- We also want you to keep an eye out for any concerning changes in symptoms, such as aching, throbbing, or a congested feeling in the limb; changes in skin color and size, shape, heaviness, or pain; and pain or discomfort in the area of lymph nodes. If you do have signs and symptoms, discontinue the exercise, elevate your limb, and apply ice.

Slide 29

- We recommend beginning an exercise session with a few minutes of deep diaphragmatic breathing... to set the intention and to increase your mindfulness.
- There are an infinite number of ways to engage in an exercise program.
- You may want to consider joining an exercise class. For example, the Strength after Breast Cancer Class is designed for women at high risk for or who have lymphedema. The class starts with a series of exercises that target the trunk - or core - muscles. This is followed by introduction of the strengthening exercises, for both the upper and lower body. The SABC strengthening program is designed so that the stress on the lymphatic system is minimized, by alternating upper and lower body exercises, and starting with low weights and progressing slowly. The class ends with stretching exercises.
- You can also do exercises on your own - for example you can engage in a moderately vigorous walking program following by stretching, and do strengthening exercises at home 2 days a week.
- You can join a number of classes in the community. Or seek out instruction from a personal trainer with specific training in rehabilitation following cancer treatment.

Slide 30

- Let's review the importance of proper skin care, with lymphedema, which is essential. We really want to emphasize avoiding trauma and injury, and reducing the risk of infection. The important points are Cleanliness, Protection, and Inspection.

Slide 31

- Some ways to address these 3 key points are: keeping your arm clean and dry; applying moisturizer daily to prevent chapping and chafing; Use a good pH-balanced lotion that moisturizes and keeps the skin supple. It's important to avoid cracks in the skin which can be a conduit for pathogens and increase the risk of cellulitis or infection
- Not cutting your nail cuticles; using sunscreen and insect repellent as appropriate;
- Using an electric razor for shaving areas near the affected limb, such as the armpit;
- Avoiding blood-draws and punctures on the affected limb;
- Wearing gloves during activities where an injury might be a risk; avoiding scratches and punctures, and using soap, water and antibiotic ointment to clean as needed;
- Lastly, contacting your physician immediately, if you experience any symptoms of a rash, itching, redness, increased skin temperature and swelling, fever, or flu-like symptoms.

Slide 32

- Another component of lymphedema management is the use of compression.
- Guidelines around compression are an area that has changed over the past couple of years. Some lymphedema therapists share that, clinically, they sometimes find that manual lymph

drainage works, but not as well as consistently applied compression - either compression through bandaging, day use compression sleeves and gloves, and/or the use of night compression. Thus, whether a patient is using bandages or garments, consistently applying compression to the affected limb is important.

- Compression is used in two different situations: to reduce swelling; or to prevent increases in swelling or maintain reductions in swelling following treatment.
- Compression to reduce limb swelling in lymphedema typically involves multiple layers of bandaging and sometimes padding. The bandages used are different from an Ace bandage. The Ace bandage has high level of elasticity and can cause a tourniquet effect when wrapped. The bandages used for lymphedema compression, however, have a much lower elasticity, and are known as short stretch bandages. This method encourages passive transport in lymph collectors; Amplifies muscle and joint pump effects; Stimulates lymphatic contraction; and helps break down fibrosclerotic tissue.
- Compression bandaging with short stretch, multi-layer bandaging is very effective for volume reduction and maintenance. However, it can also be quite cumbersome. Patients may need 2 or 3 sets of bandages, and if are receiving full lymphedema treatment, may need to change the bandages everyday. For some people, wearing these bandages may not be feasible for example at work. Fortunately, there are also other compression options.

Slide 33

- The garment in the top image is a reduction garment. This garment is used until the swelling in the arm is stable, at which point you would be transitioned to a regular compression garment.
- The regular compression garment, seen in the middle image, includes a sleeve and gauntlet or glove, and should be worn daily, if you're experiencing swelling.
- However, if you don't have regular swelling, and you're using it for more prophylactic (or preventive) reasons, you might put it on three minutes before your activity (for example exercise or gardening) or before a flight or major changes in altitude and then leave it on for that much time afterwards.
- Some women who have a harder time controlling their lymphedema also use a sequential compression pump, as shown in the image at the bottom. There are some models that are better than others, so doing a bit of research before purchasing one is recommended. Pumps may not be covered by medical insurance, and they may cost upwards of \$1500. For patients who use the pumps, these can be an adjunct to bandaging or compression garments.

Slide 34

- Here are some examples of other types of compression strategies. The images on the left are of the Circaid. This garment provides fairly stiff compression for persons with latex allergies or without hand strength to don garments
- The images on the right are of the Reid Sleeve, which is more of a night-time garment. Some night garments may not provide as much compression as wrapping, but they

- There are different companies that make these garments. There's not much compression to it; however, it's a nice, easy type of material, which is often used at night to keep swelling at a nice steady level.

Slide 35

- Other treatments for lymphedema include the Endermologie, laser therapy, kinesiotape, and the Physiotouch.
- These treatments may be done in addition to standard rehabilitation techniques to work on specific areas to improve lymph flow and decrease tissue fibrosis.

Slide 36

- There are several sources of information and many resources available for patients with, or who are at risk for lymphedema. These include the Lymphology Association of America, the National Lymphatic Network, the Lymphatic Education and Research Network, St Mary's Comprehensive Lymphedema Program, the UCSF Cancer Resource Center, and UCSF Patient Library.
- You can also visit the UCSF Department of Physical Therapy and Rehabilitation website for patient education information where additional materials can be found.

Slide 37

- Here are a few more resources that you might find helpful.

Slide 38

- We hope this presentation has been helpful to you!
- Patients, their stories, and care-needs vary while coping with the potential and real challenges of breast cancer and treatment side effects.
- Among women who are at risk for and living with lymphedema, both prevention and early treatment are very effective for most people.
- Thank you for your time and attention.