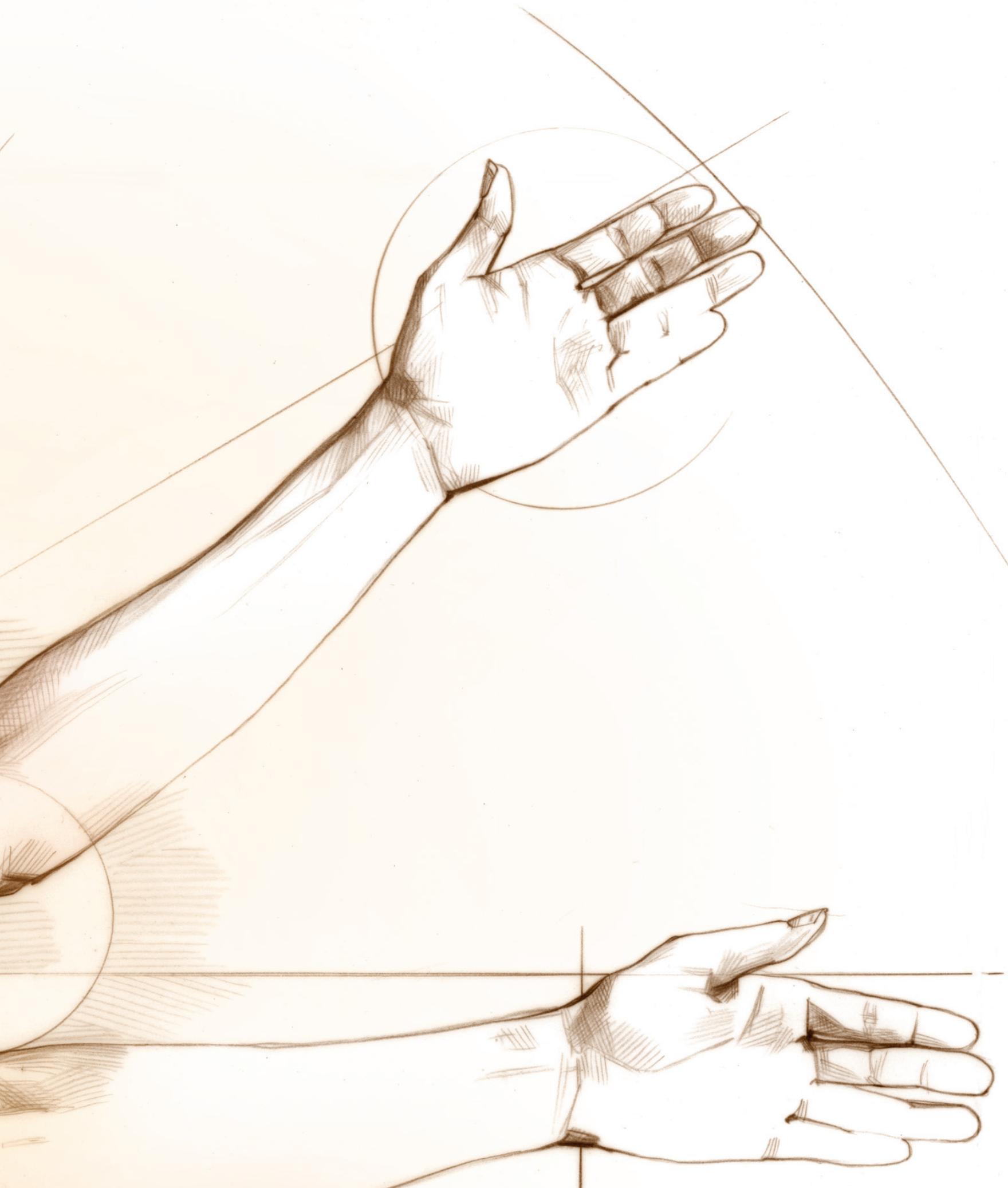


Bodies in motion

They beat breast cancer, only to be battered by side effects of treatment. Assistant professor Mary Fisher is helping survivors thrive with research and clinical practices to keep their bodies in motion — and their quality of life soaring.



By Shannon Shelton Miller
Illustrations by Bruce Morser



As co-chair of her 50-year class reunion committee, Joanne Daley '57 stood out among her peers at Reunion Weekend 2007, buzzing around Kennedy Union and greeting her fellow Flyers with a warm hello.

Colorful scarves and hats hid the vestiges of her chemotherapy treatment. She remembers the sheer exhaustion she felt as she worked to fulfill the Reunion Weekend duties she had accepted months before a Stage II breast cancer diagnosis. A tumor in her left breast was triple negative, a type that tends to grow and spread aggressively. Daley says her doctors “threw everything they could at it,” providing a standard of care that sent her cancer into remission and extended her life.

On March 19, 2015, Daley, now 80, celebrated eight years of being cancer-free. A scar marking the spot where tissue was removed remains a permanent reminder of what she endured eight years ago; a compression sleeve on her left arm, swollen to double the size of her right, symbolizes the continuing physical restrictions she manages as a result of her treatment.

Daley's story is one Mary Fisher has heard countless times in her career as a physical therapist and assistant professor in the Department of Physical Therapy: A breast cancer survivor completes radiation or chemotherapy, only to notice debilitating physical limitations, usually in the arm and shoulders, that weren't present before.

“The survival rate for breast cancer is nearly 90 percent,” Fisher says. “After breast cancer treatment, we should be able to help these women return to the same level of quality of life they had before their diagnosis.”

That vision guides Fisher's research as she works to raise awareness among survivors, their doctors and loved ones that the fight against breast cancer can continue, in a different arena, long after the cure.

MOVEMENT AFTER SURVIVAL

Three months after Daley's surgery in March 2007, she developed lymphedema, a painful condition in which fluid fails to drain from body tissues, leading to swelling in the

arm or leg. Removal of lymph nodes from around the armpit, called axillary nodes, is a common risk factor, and close to 60 percent of breast cancer survivors report symptoms of lymphedema after completing cancer treatment.

“It's a pain in the butt — you can quote me on that,” Daley says.

The swelling in her hand and arm make gardening, one of her favorite hobbies, range from uncomfortable to painful. Washing dishes becomes a struggle with a swollen hand, as does the simple task of holding food in place to cut it. Trips to buy clothes become exercises in frustration, as Daley struggles to slide coat sleeves over her left arm. She must buy two sets of gloves to make a pair to fit differently sized hands.

As common as such complaints are, doctors and other health care professionals are usually more focused on keeping cancer at bay. The rest of the patient's physical state isn't often part of post-treatment conversation.

Because of her interest in physical therapy, however, Fisher listened to these survivors.

“While I was in graduate school, I had a conversation with a colleague who had breast cancer many years before, and she said to me, ‘You know, Mary, I'm still having trouble with my arm five years later,’” Fisher says. “That got me looking into this and thinking about it, and I began to read the literature and find out what kind of problems women who have had breast cancer treatments face.”

Among her findings is that not all regain full arm function even six years after undergoing surgery, radiation or chemotherapy. She is also finding that early intervention with exercise and physical therapy can help women recover fully.

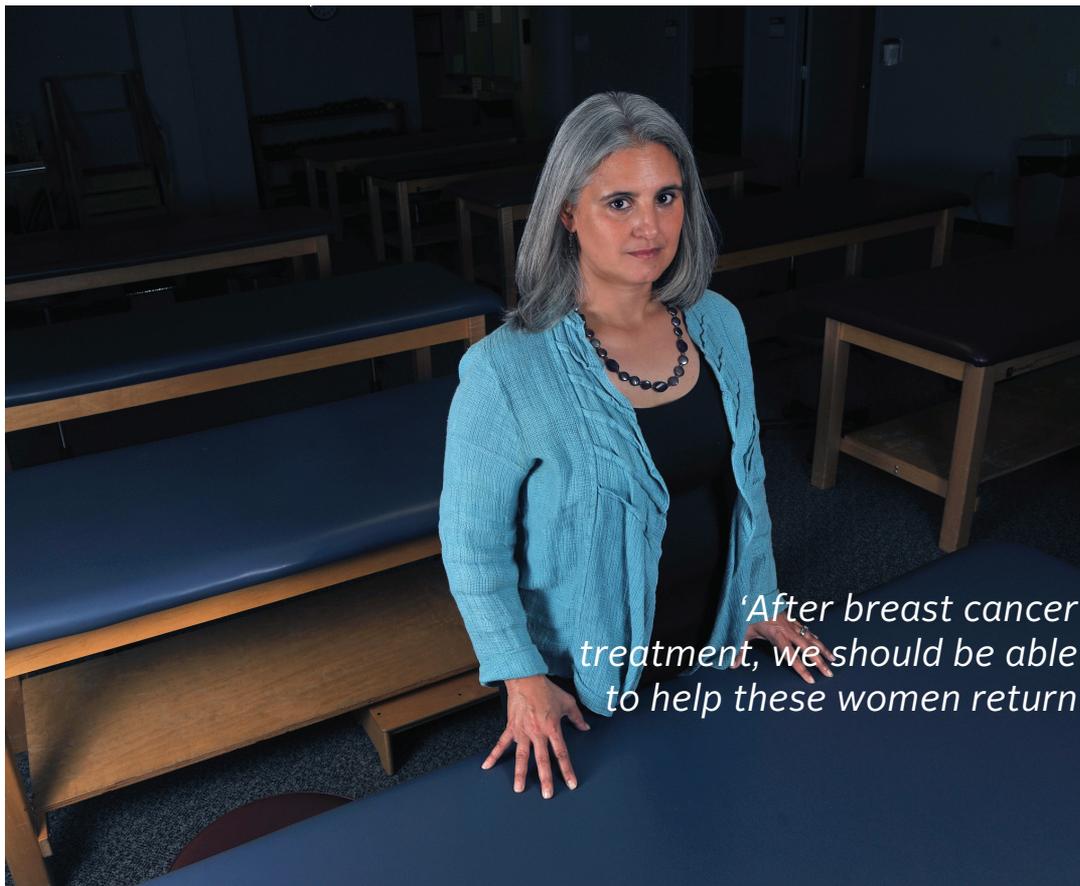
It's an easy solution in theory, but there's another catch. By the time most women begin noticing signs of lymphedema, it's too late for them to return to full function. Other limitations can be overcome through physical therapy and exercise.

Since 2007, Fisher has participated in multiple local and national studies to first confirm, and later, to determine best practices to address arm function limitations among breast

WHAT IS LYMPHEDEMA?

Lymphedema is a build-up of protein-rich fluid in tissues due to a blockage in or damage to lymph vessels. This blockage or damage limits flow of fluid through the body to the drainage points. It manifests itself as swelling, often in an affected limb.

—Assistant professor Mary Fisher



to the same level of quality of life they had before their diagnosis.'

—Mary Fisher

cancer survivors. Her initial findings have encouraged her to promote prospective surveillance — the practice of monitoring an affected group after a medical event to observe pattern development — and early intervention efforts to improve survivors' physical capabilities and prevent long-term functional limitations.

She considers prospective surveillance a paradigm shift in addressing the needs of all cancer survivors after treatment — a change Fisher says will improve the quality of life for men and women long after they've overcome cancer.

STUDIES IN MOTION

Until the late 20th century, breast cancer diagnoses were often delivered behind a veil of shame and secrecy, with women quickly given mastectomies to remove the affected breasts, often without fully informed consent.

Breast cancer advocacy emerged in the 1970s when women began to talk more openly about their diagnoses and push for more involvement in their treatment. Prominent women like Shirley Temple Black, the former child star and U.S. ambassador, and First Lady Betty Ford lent their voices to the cause. Women began pushing for research, more sensitive medical care and treatment options that didn't

result in mastectomy as a matter of course.

Nearly 40 years later, it's clear such advocacy and awareness has worked. The long-term outlook for breast cancer survivors in the United States has never been better — in 2013, the National Institutes of Health reported a 90.5 percent survival rate five years after diagnosis, up from the 75 percent for women diagnosed between 1975 and 1977. Lumpectomy and radiation therapy, rather than mastectomy, are now the standard of care for early-stage breast cancer.

Because most survivors now live decades after their initial diagnoses, post-treatment complaints are emerging with greater frequency. As a physical therapist, Fisher began noticing a common trend among those who visited her for arm limitations. Quite a few had completed post-lumpectomy treatment in the past few months, or perhaps the past year or two, and complained of arm pain or limited function. Sometimes lymph nodes had been removed; in other cases, they had not.

"I can tell you this story over and over again," Fisher says. "Even if she didn't develop lymphedema, she can barely move her arm."

Fisher wanted to know how long the problems persisted after cancer treatment. While completing her doctorate in rehabilitation sciences at the University of Kentucky, she

began studying arm function in long-term breast cancer survivors. Her 24 years of clinical practice as a physical therapist at Miami Valley Hospital in Dayton also influenced her research.

Her dissertation findings confirmed that breast cancer survivors had limited motion compared to women who hadn't had breast cancer. This was especially true for left-handed women who had cancer on their right sides, and for right-handed women who had cancer on the left sides. Survivors also reported a slightly lower quality of life and slightly higher arm disability than women who hadn't had breast cancer.

Fisher then had to rule out other possibilities for decreased long-term arm mobility before attributing the change to cancer treatment. Perhaps the physical issues were simply part of the normal aging process? Or were other factors involved? Those questions hadn't adequately been addressed, she says.

To find out, she began conducting studies at UD in 2011 using healthy controls — 79 women who'd never had breast cancer or a shoulder injury or surgery — and compared them to 50 women who'd had breast cancer and treatments more than a year in the past. She put them through a series of tests, timing them as they picked up light objects and

placed them on a shelf, similar to an everyday activity like putting groceries in a pantry.

The survivors had more disability and less arm function than the healthy controls, regardless of age, she found.

In January 2013, Fisher joined a National Institutes of Health team working with the Walter Reed National Military Medical Center near Washington, D.C. The group has been collecting data since 2004 on the arm function of most women diagnosed with breast cancer who have received services at Walter Reed.

The study examined 150 women after breast cancer treatment. The group measured the women's arm functions at the study's start and at regular intervals thereafter — one, three, six, nine, 18, 24, 36 and 60 months out. The following year, the group began collecting data on healthy control subjects for comparison.

Researchers used a tool called a perometer to measure changes in limb volume, such as swelling in an arm. Their results showed that even a 5- to 10-percent increase in limb size was not reversible. But there was also good news. Prospective surveillance alerted health care providers to increases of less than 5 percent in limb volume. Patients and providers then employed aggressive management, and patients showed less disability long term.

"At the first hint of preclinical lymphedema, which is a 3-percent difference in arm volume from the pretreatment measure, they'll put a (compression) sleeve on the patient, teach her how to do manual lymph drainage and start an exercise program," Fisher says. "They've found it very effective in often reversing lymphedema."

The NIH team is now working to develop more sensitive tools to measure arm function and standard tests of muscular endurance for post-treatment evaluations, as none currently exist.

Limited arm function might be of less concern to survivors than the cancer itself, but Fisher believes cancer treatment shouldn't

rob women of what they enjoyed doing before their diagnoses, such as gardening, in Daley's case.

"Ultimately, if arm function is impaired, quality of life is often diminished," Fisher says. "That's what we're trying to address."

STOPPING BEFORE IT STARTS

In 2010, Terri Baldasare, a former annual fund employee at UD, was more than a year out from the surgery that removed a cancerous lump in her breast. She traveled to South Carolina for a vacation and noticed her hand had swollen significantly after a day playing golf.

Baldasare, a Beavercreek, Ohio, resident and friend of Fisher's, was aware of the potential physical changes she could encounter after surgery, but she thought she had avoided them.

"A year and a half [later] ... you just never know," she says.

Lymphedema was the diagnosis. As part of her ongoing treatment, Baldasare, 66, now has to wear a protective sleeve, which compresses her arm to reduce swelling and promote lymph drainage. Fisher notes that lymphedema can develop at any point after treatment, even 20 years later.

Although Baldasare is managing her lymphedema through physical therapy and exercise, earlier examinations and treatment could have identified and prevented the swelling. Fisher says Baldasare's experience is common — by the time a woman notices swelling in her hands or arms, the condition is often irreversible, making prospective surveillance crucial.

Although lymphedema might be among the more painful conditions a survivor can experience, patients who don't develop the disorder could still find themselves struggling with arm pain. Fisher says some women move their arms and shoulders differently to avoid pain after surgery, a practice that ultimately worsens their condition and requires neuromuscular retraining

through physical therapy. A typical course of treatment can be four to six weeks of motion and strength training; that can increase to two to three months for lymphedema sufferers.

Avoiding arm dysfunction altogether is Fisher's ultimate goal for breast cancer survivors, but research shows that exercise and physical therapy can help mitigate existing limitations. She reviewed past studies from other researchers that debunked old myths, such as one suggesting that strength training was harmful for women after cancer treatment. In fact, it has been shown to reduce swelling and pain.

Establishing the importance of physical activity provided another piece to the puzzle. Fisher's next move would be testing other exercise practices to learn what could help women avoid or manage issues resulting from arm restrictions.

YOGA THERAPY

In 2013, Fisher received a University grant to study the possible beneficial effects of yoga for breast cancer-related lymphedema. Results of a seven-person pilot study indicated that yoga was a safe exercise.

Fisher continued the study in fall 2014, gaining funding from UD for studies examining yoga practice among women with lymphedema. One study primarily examined yoga and arm volume, while the other looked at yoga's effects on arm volume, along with balance and range of motion, in affected women.

Participants entered an eight-week yoga program. Devon Schmidt, an instructor at Day Yoga Studio on Brown Street near UD's campus, led two classes each week, and participants completed a third at home with a video. Some participants wore compression sleeves during the classes, and Schmidt modified poses as needed based on physical capabilities. Some did arm and shoulder stretches while holding on to a chair. Schmidt modified popular positions like the triangle, a standing pose that opens the chest and shoulders while stretching legs and hips, by placing blocks on the floor for participants who couldn't stretch their arms that far. [See diagrams, opposite page, for common yoga pose modifications.]

UD students pursuing their doctorates in physical therapy helped find participants and record data before, during and after the yoga class.

"It was amazing to hear their individual

In 2013, Fisher received a University grant to study the possible beneficial effects of yoga for breast cancer-related lymphedema. Results of a seven-person pilot study indicated that yoga was a safe exercise.

wall shoulder stretch

Helps loosen tight shoulders, chest and upper body.



triangle, with block

UTTHITA TRIKONASANA

Stretches legs, hips and other lower body joints, along with the shoulders, chest and spine. Use of the block helps students who can't fully reach to the ground.



forward fold, with chair

PRASARITA PADOTTANASANA

Stretches chest, shoulders and arms. Strengthens and stretches the inner back, legs and spine.

Stretches the hips, knees, ankles. Also increases flexibility throughout the spine, shoulders and chest.

twist, with chair

PARIVRTTA SUKHASANA



stories,” says Meghann Ford, a 2015 physical therapy graduate who worked with Fisher. “There were 10- to 15-year survivors, and women who were just going through another round of radiation. They were strangers when they first started, but by the time they finished, they were hugging, sharing stories and planning ways to meet after the class was over.”

For the first study, Ford and other students measured six participants’ arm volume, self-reported arm function, self-reported quality of life and hand grip strength. With the second study, which also included six participants, measurements for shoulder range of motion and balance were added, while hand grip strength was not measured.

Data was taken at the beginning and end of the yoga class, and for the second study, again at one month after the final class.

Results showed a significant decrease in arm volume after eight weeks, but no changes in the other measurements taken in the first study. With the second study, data showed a decrease in arm volume, an increase in arm flexion (raising arms straight up), an increase in quality of life and improved balance. Self-reported arm function showed improvement that wasn’t considered statistically significant, but quite significant from a clinical, or practical, perspective.

Daley, the octogenarian survivor, was a believer. “When I went to clean my flower beds that night in my garden after going to yoga class, I didn’t hurt as badly,” she says.

Schmidt wasn’t involved in data collection, but watching and listening to feedback from study participants also confirmed to her that yoga, notably the poses that involved stretching the arms and shoulders, had proven beneficial.

“I was actually surprised that they progressed so quickly,” Schmidt says. “I saw them improve as they progressed through the course, and some of them didn’t need modifications at all by the end of the eight weeks.”

Schmidt says some participants have continued to take classes at her studio, enrolling

in courses open to the public and doing modifications as needed.

Fisher’s study also showed the importance of maintaining an exercise regimen. Gains made during the class were not maintained by the time the one-month follow-up date arrived, data showed.

Daley says she noticed three months later how much worse she felt because she hadn’t continued her classes. During the summer, she decided to change that and enrolled in a weekly yoga class for cancer patients and survivors at Kettering Medical Center.

“It’s very basic, but it’s certainly been helpful,” she says.

LIFE IN FULL

Fisher’s long-term goals are simple: make the recovery from breast cancer treatment as effective as possible so survivors can return to the life they had before diagnosis. This, she says, requires a multipronged approach to find the most effective treatments, educate health care providers about prospective surveillance and make care accessible to all.

The UD studies address the first goal of figuring out what works best for breast cancer survivors’ arm functions. Fisher has seven publications and presentations scheduled for 2015, and four of her doctoral students – Ford, Minna Cho, Olivia Morris and Karissa Feucht – presented a poster at the National Lymphedema Network’s 11th International Conference in Washington, D.C., in September 2014. They also presented at the Combined Sections Meeting of the American Physical Therapy Association in Indianapolis in February 2015.

The topic, “Effects of Yoga on Arm Volume, Quality of Life, Self-reported Arm Function, Shoulder Motion, and Balance in Women with Breast Cancer-related Lymphedema,” received a Graduate Student Showcase Award in Physical Therapy at UD. All DPT students are required to participate in research projects.

“I had never really been into research before this, but the experience really opened my eyes to being a part of research studies in

the future,” says Ford, who’s now working at a skilled nursing facility in Springboro, Ohio. “This opportunity has opened a lot of doors for the four of us.”

Fisher is already beginning work on a study quantifying arm activity of women who had breast cancer on their non-dominant side. Her dissertation findings suggested that women with cancer on the side of their lesser-used arm experienced more long-term issues. She’ll now see if women with cancer in their non-dominant arm use that arm less than women who haven’t had cancer, effectively slowing recovery.

First, she is collecting data. Women who have had cancer and healthy women serving as controls are given activity monitors to wear on both arms for one week, and data from the two groups will be compared. Fisher has recruited 22 of 30 participants, and her study will continue through the end of the year.

Although studies are progressing, another paradigm shift might be required to fulfill Fisher’s other goals. Health care providers will need to encourage women to be acutely aware of potential physical changes after cancer treatment and immediately refer those women to physical therapy. University programs should educate students in health care fields about physical side effects so they can incorporate that knowledge in their future practices. Greater publicity – like this article – also increases awareness of lymphedema and other issues among those going through treatment and survivors.

Then there’s the issue of accessibility. Certain types of physical therapy could be out of reach for many lower-income women. Distance and lack of transportation could prohibit some from participating in physical therapy or exercise programs. Compression sleeves, a crucial element in lymphedema treatment, are costly and not often covered by insurance. Financial barriers prohibit survivors from managing their limitations effectively and prevent them from participating in everyday activities – whether they be jobs or hobbies.

Surviving breast cancer is a victory worth celebrating. After defeating it, survivors should be able to thrive as well. **UD**

Shannon Miller’s mother, Jennifer, is a breast cancer survivor. She has been cancer-free for 10 years.