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Weight Gain in Breast Cancer Patients Receiving Adjuvant Chemotherapy: **The Role of Exercise**

by Lisa A. Workman,
MA, BPE, CSEP-PFLC, AFLCA

Breast cancer, characterized as a mass of irregular cells that form a tumour in one or both breasts, is the most frequently diagnosed non-skin cancer in women and is the second leading cause of cancer death¹. These startling facts have led researchers to investigate the relationship between breast cancer and exercise. It is generally believed that exercise can have a positive effect on breast cancer patients (women who are currently receiving active treatment of any type) and survivors (women who are done active treatment). The positive benefits of being physically active, pre- or post-cancer diagnosis, vary from quality of life issues² and depression³ to physical functioning^{2,4} and side effects of breast cancer treatment such as decreased fatigue³. Exercise may also be beneficial in the prevention of breast cancer itself^{5,6}, during treatment for breast cancer, during palliation, and/or post treatment and resumption of normal life².

Breast cancer patients may undergo many different forms of treatment such as chemotherapy, radiation therapy, hormonal therapy, and surgery. In addition, patients may receive adjuvant therapy, which is any treatment administered after the primary treatment to increase the chances of a cure by eliminating any remaining cancer cells. Adjuvant therapy may include radiation therapy, chemotherapy, hormonal therapy, or a combination of these therapies^{7,8}.

Is weight gain a side effect of breast cancer treatment?

Within the literature, weight gain is evident as a common side effect for women during and after adjuvant therapy. Despite the belief that weight loss is a side effect of breast cancer treatment, numerous researchers have demonstrated weight gain in women while receiving adjuvant therapy^{9,10,11}. More specifically, research has indicated

that breast cancer patients receiving adjuvant chemotherapy have the greatest average weight gain during treatment^{12,13,14}.

Weight gain and health risk for breast cancer patients receiving adjuvant chemotherapy

Dixon, Moritz, and Baker¹⁵ were the first to establish weight gain as a side effect of adjuvant chemotherapy in a select group of females with cancer. Additional research has been conducted over the past two decades¹⁰. Researchers suggest that weight gain may occur in 50% to 75%^{10,16} of breast cancer patients undergoing adjuvant chemotherapy with some studies suggesting that it may be as high as 96%^{10,17}. Furthermore, research indicates that on average weight gain is between 2.0 kilograms and 6.2 kilograms over a twelve month period^{18,19,20} and that one in four women gain over 10 kilograms¹³. As well, the literature suggests that there is loss of lean body mass

along with gains in overall body mass. This process is called sarcopenic obesity. This indicates that the net gain in this situation is likely fat mass^{21,22}. Nevertheless, Goodwin et al.⁹ state that approximately only 20% of women receiving adjuvant chemotherapy maintain a stable body weight or lose body weight during treatment.

Little evidence has shown the health risks of weight gain during adjuvant chemotherapy. Camoriano et al.²³ found that there was a 1.5 times greater risk of relapse and a 2.8-fold increase in risk of death in breast cancer patients who gained weight when receiving adjuvant chemotherapy. Due to the lack of additional data, it is difficult to determine conclusively if women who gain weight are at a higher risk of recurrence and death. At the very least, weight gain in breast cancer patients receiving adjuvant chemotherapy is more distressing than other side effects of treatment and this could have detrimental effects on quality of life^{18,24}.

Why does weight gain occur?

Most researchers agree that the mechanism of weight gain in women receiving adjuvant chemotherapy remains unknown^{10,24,25}. Some possible mechanisms have been suggested in the literature, however.

First, menopausal status — where researchers have found that pre-menopausal breast cancer patients are more likely to gain more weight than their post-menopausal breast cancer counterparts during adjuvant chemotherapy^{14,21,25}. This may be due to the transformation pre-menopausal women undergo during adjuvant chemotherapy: ovarian function is frequently interrupted, which often results in early menopause in younger women^{21,26}. Early menopause during treatment may be a catalyst for the additional weight gain in pre-menopausal women during adjuvant chemotherapy.

Second, adjuvant chemotherapy drugs may play a role in the weight gain in women by the drug regime (e.g., single versus multiple chemotherapy agents)^{17,21,25}, drug dosage²¹, duration of treatment^{10,17,21}, and drug administration either orally or intravenously (IV)^{10,25,27}. Furthermore, two chemotherapy agents often used with adjuvant chemotherapy — prednisone and tamoxifen — have demonstrated some influence on weight gain during treatment^{13,28}.

Finally, any time weight gain is being analyzed, it must be noted that energy balance is a key factor. Changes to energy balance (e.g., a positive energy balance) such as

Table 1: General Aerobic Exercise Recommendations for Cancer Survivors and Early Stage Cancer Patients

*Modified from Courneya et al. (2002)

Exercise Parameter	Exercise Prescription
Mode	Activities that involve large muscle groups such as walking and cycling. Modify exercise mode based on acute or chronic treatment effects from surgery, chemotherapy, and/or radiation therapy.
Frequency	3 to 5 days/week. Daily exercise (lower intensity and shorter duration) may be preferable for deconditioned cancer patients.
Intensity	Moderate intensity based on patient's current fitness level and the severity of side effects from treatments. 50-75% of VO2max or HRreserve 60-80% HRmax RPE of 11-14
Duration	20 to 30 minutes. May require multiple intermittent shorter bouts (e.g., 5 to 10 min) with rest intervals for deconditioned patients or those experiencing side effects of treatment.
Progression	Increasing frequency and duration. Only when frequency and duration goals are achieved should intensity be increased. Progression should be slower and more gradual for deconditioned patients or those with severe side effects of treatment.

increased energy intake^{10,20,26}, decreased energy expenditure (exercise or physical activity)^{18,20,24}, and decreased resting metabolic rate (RMR)^{10,21,26} all influence the weight gain seen in breast cancer patients undergoing adjuvant chemotherapy.

The role of exercise during adjuvant chemotherapy

Due to the mounting evidence of weight gain during adjuvant chemotherapy, it is

pertinent to assess whether exercise can control or help reduce instances of weight gain during treatment. Irwin et al.²⁰ state that maintaining or increasing physical activity levels after breast cancer diagnosis may minimize post-diagnosis weight gain because physical activity is associated with weight maintenance in healthy women. In the general overweight and obese population, exercise is an intervention that can effectively reduce body weight and improve body composition²⁹.

Table 2: General Resistance Training Recommendations for Healthy Breast Cancer Survivors

Exercise Parameter	Exercise Prescription
Mode	Thera-band or tubing, light hand weight exercises and/or weight machine exercises
Frequency	2 to 3 days/week. A minimum of one day off between workouts is advised.
Intensity	Approximately 60-65% of estimated 1RM. Patients should use a very light weight to start, and increases should be small (<10% of weight/week) and gradual.
Duration	Two sets of 10 repetitions increasing to 15 repetitions
Muscle groups and exercises	Legs (leg press, hamstring curl, calf raises), back (seated row, lat pulldown), chest (chest press), arms (biceps curl, triceps extension), abdominal and low back (crunches, back extensions). *Note: Shoulder press may not be recommended due to the pull on the surgery or incision site
Progression	Increase repetitions per set. Once patients are able to complete two sets of 15 repetitions, they can increase to three sets of 15 repetitions. Only after three sets of 15 repetitions are easily completed can the resistance be increased. For each increment of resistance, decrease the number of sets to two and progress as before.
Comment	Patients should include a stretching component (~10 min) after a progressive warm up and at the completion of their workout session. Patients may have physiotherapy-prescribed exercises that facilitate a stretch for their chest and shoulder, which may be tight and have limited ROM as a result of surgery and radiation treatment.

*Modified from Courneya et al. (2002)

In addition, exercise and a decrease in body weight has beneficial effects on other health factors (e.g., improved insulin sensitivity, lower blood pressure, improved lipid profile)³⁰. Fulton et al.³¹ state that exercise can increase fat oxidation and prevent loss of lean body mass. In addition, Ross, Janssen, and Tremblay³² indicate that exercise can reduce approximately 25% of the loss of lean body mass in weight reduction practices. Thus, prescribing exercise interventions for breast cancer patients in conjunction with adjuvant chemotherapy or after such treatment may assist in the maintenance of body composition (fat mass and fat-free mass) and/or reduce the amount of weight gain.

In general, Mock et al.³³ and Pickett et al. studied breast cancer patients who were assigned to the treatment group (usual care plus aerobic walking exercise) or the control group (usual care) in two randomized controlled studies. They found that most breast cancer patients were able to maintain high levels of exercise even with mul-

tipl symptoms and side effects. Therefore, it can be assumed that exercise (aerobic) can be safely incorporated into a treatment program for breast cancer patients^{33,34}. As well, Rock and Demark-Wahnefried³⁵ suggest that resistance training may be beneficial for breast cancer patients receiving adjuvant chemotherapy due to the potential for decreasing lean body mass with treatment. Overall, current research literature demonstrates that exercise can be a potential intervention for weight maintenance during adjuvant chemotherapy^{8,19,22,36,37,38} or weight loss after treatment has commenced³⁹.

Exercise prescription for breast cancer patients

Courneya et al.⁴⁰ suggest general exercise guidelines for breast cancer survivors. Table 1 describes the aerobic exercise prescription and Table 2 describes the resistance exercise prescription. When an exercise professional is working with a breast cancer patient, it is imperative that he or she works alongside the oncologist, gener-

al practitioner, physiotherapist, and dietitian for a multidisciplinary approach. To that end, breast cancer patients regularly receive physiotherapy rehabilitation post-surgery that works on range of motion exercises in the upper extremities. Once formal rehabilitation is complete, breast cancer patients undergoing adjuvant chemotherapy need to include exercise in their lifestyles. A current example of a program for breast cancer patients and survivors is dragon boat training⁴¹. This could be similarly applied to a walking group who trains for major cancer walks (e.g., Breast Cancer 3-Day, Avon Walk for Breast Cancer, Race for the Cure/Run for the Cure). Overall, whether it is a group exercise setting or a personal training one-on-one setting, breast cancer patients who may encounter weight gain due to adjuvant chemotherapy should be encouraged to incorporate exercise into their daily lives.

References available on request.

Our Children Are In Crisis

by Sylvia MacIver, CALGARY

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-www.albertaparent.ca

The current generation of children may well be the first to have a shorter life expectancy than their parents.

Your children may not live as long as you will, depending on their genetics, lifestyle and eating patterns.

The gloomy forecast, blamed on the current "epidemic" of obese children in North America, comes by way of several respected epidemiologists, including the U.S. Surgeon General.

The International Obesity Task Force estimates that 10 per cent or 155 million children worldwide, between the ages of five and 17 are too heavy. Almost 45 million of them are obese. (Obese meaning 30 per cent or more over ideal weight.)

And the numbers continue to climb at an alarming rate.

Health Canada reports that the percentage of overweight children in this country is now three times as high as it was in 1981, and the obesity rate is five times as high. The Canadian Institute for Health Information says about half of all Canadians is overweight, including 15 per cent who are considered obese.

The Calgary Health Region reports that among girls as young as 4½, 23 per cent are considered overweight or obese; 26 per cent of four-year-old boys in the region are considered overweight or obese.

However, the prevention of childhood obesity has already taken shape. Across Canada a number of health groups have been orchestrating efforts between local and national government organizations, schools, parents, public health nurses and other stakeholders.

Unfortunately though, children who are currently overweight or obese have few options in search of a medically supervised and team-oriented approach to treating their weight problem.

Enter Canada's first privatized pediatric obesity clinic, which opened in Calgary this fall in a corner office at the Northland Professional Building.

Employing a team approach, the clinic treats obese children between the ages of five and 16 by combining behaviour therapy, nutrition education, physical activity and consistent medical monitoring.

Enrolment in the program begins with a referral from the child's

family physician. The 15 one-on-one behaviour modification sessions involve the patient, his or her parents or caregivers, and a team of clinicians in order to attain long-lasting lifestyle changes. These clinicians include Calgary Pediatrician Dr. Peter Nieman; Dr. Liann Meloff, a dietitian and psychologist; and Physical Trainer Grant Molyneux.

Cost of the program is \$2400, which includes three follow-up visits. (Note: some private health-insurance companies may cover the cost of the trainer, dietitian and psychologist.)

The clinic accepts referrals from throughout western Canada and in the months since the clinic's opening, it has received more referrals than expected and is overwhelmed with the success.

Enrollment in the program is based on three factors:

- Patients must be between the ages of five and 16 to participate;
- They must have a Body Mass Index (BMI) that's over the 95th percentile (obese) or between the 85th percentile and the 95th percentile (overweight);
- They must be ready to engage in weight-management efforts that involve long-lasting lifestyle changes.

Dr. Nieman, who will spend one day a week at the clinic, has tried to help more than 200 obese children over the years and is haunted by the fact that even preschoolers are showing a higher incidence of obesity than ever in our history.

It's disturbing to see children and teens with adult diseases, and it's moving to an earlier and earlier age, he says. The sad part is, many children already have some risk factors that include high blood pressure and high levels of cholesterol. Overweight preschoolers are of particular concern. Not only are these children more obese than ever but they also start their overweight pattern at an earlier age than ever before.

Dr. Nieman says that at least half of the children he sees have emotional causes for eating.

They've been either sexually abused, live in foster care, feel alone or are bored, he adds.

Sometimes if kids witness their parents fighting, he says, they will