



WellSpring

Sharing physical activity knowledge

CENTRE FOR ACTIVE LIVING • FEBRUARY 2020 • VOLUME 31 • NUMBER 02

An optimal exercise option for breast cancer patients:

Combining aerobic and resistance exercise programs

Ki-Yong An^a, Andria R. Morielli^a, Dong-Woo Kang^a, Christine M. Friedenreich^b, Donald C. McKenzie^c, Karen Gelmon^c, John R. Mackey^a, Robert D. Reid^d, and Kerry S. Courneya^a

^aUniversity of Alberta, ^bUniversity of Calgary, ^cUniversity of British Columbia, ^dUniversity of Ottawa

Introduction

Previous studies have reported that exercise has many benefits on physical and mental health in cancer patients. During chemotherapy, exercise improves quality of life,^{1,2} treatment-related symptoms,³⁻⁵ physical fitness,³⁻⁶ chemotherapy completion rate,^{5,6} and possibly even survival⁷ in breast cancer patients.

Two important questions are: what type of exercise and how much exercise is optimal for breast cancer patients?

To answer these questions, we designed the Combined Aerobic and Resistance Exercise (CARE) Trial to compare the effects of different types and doses of exercise performed during breast cancer chemotherapy.⁴

The Combined Aerobic and Resistance Exercise (CARE) Trial: different doses and types of exercise

Between 2008 and 2014, the CARE trial was conducted at three sites in Canada, including the Cross Cancer Institute in Edmonton, Alberta, the Ottawa Hospital Cancer Centre in Ottawa, Ontario, and the British Columbia Cancer Agency in Vancouver, British Columbia.

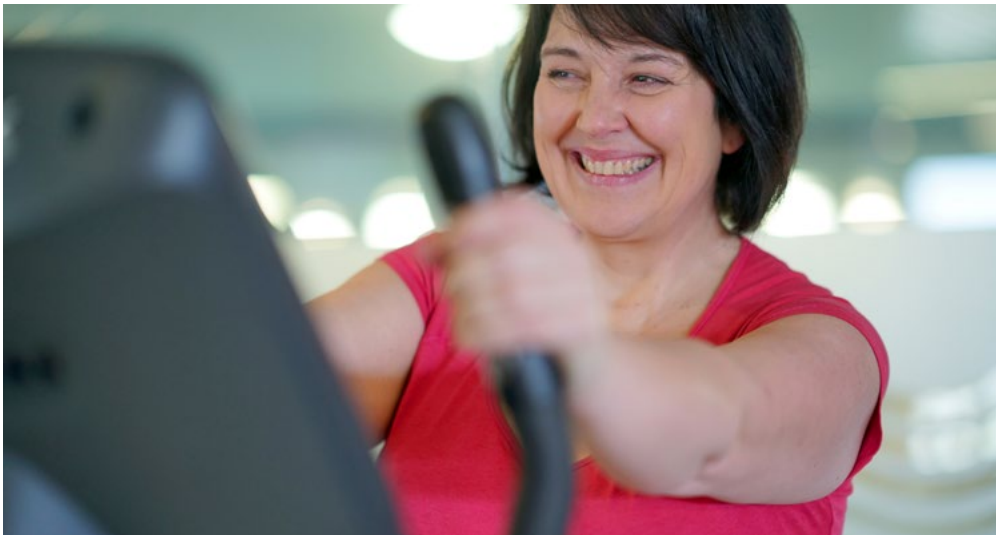
Participants (301 in total) with stage one, two, or three breast cancer were in the CARE Trial and assigned to one of three exercise program groups:

1. **Standard group:** a standard dose of 25-30 minutes of vigorous aerobic exercise (e.g., bike, treadmill, elliptical, and/or rowing machine) three times per week.

S U M M A R Y

Being physically active while battling breast cancer can have many benefits to one's health. However, how much exercise is best and what types of exercises are most beneficial?

This WellSpring provides an overview of the benefits as well as exercise recommendations.



2. **High dose group:** a higher dose of 50-60 minutes of vigorous aerobic exercise (e.g., bike, treadmill, elliptical, and/or rowing machine) three times per week.
3. **Combined exercise group:** a higher dose of 50-60 minutes of combined aerobic (e.g., bike, treadmill, elliptical, and/or rowing machine) and resistance exercise (e.g., leg press, leg extension, leg curl, calf raise, chest press, seated row, triceps extension, biceps curl, and curl-up) three times per week.

All participants started the exercise intervention within one to two weeks of their first chemotherapy treatment and completed the intervention within three to four weeks after their final chemotherapy treatment.

We compared the effects of these three different exercise groups after their exercise programs were completed. We found that those participants in the high dose and the combined exercise groups had better physical functioning, treatment-related symptoms, sleep quality, and physical fitness compared to participants in the standard exercise group.^{4,8}

Our team also sought to determine if the effects of exercise during chemotherapy would last after completing their chemotherapy treatment. To do this, our team looked at the long-term effects of these three exercises during chemotherapy on exercise behaviour, quality of life, treatment-related symptoms, psychosocial factors (e.g., stress, happiness, self-esteem, depression, anxiety, and sleep quality), and health-related fitness (e.g., aerobic fitness, muscular strength and endurance, lean body, and body fat) in breast cancer patients. Here are some of the long-term results of the study.⁹

The benefits of exercise during chemotherapy do not last long

Once the exercise program during chemotherapy was completed, participants were encouraged to continue both aerobic and resistance exercises. However, they were not provided with behavioural or exercise support, and they were free to do exercises of their choosing.

At 6, 12, and 24 months after treatment, we assessed participants' exercise behaviour, quality of life, treatment-related symptoms, and psychosocial factors. We also assessed their physical fitness at 12 months after the intervention.

Two important questions are:
1) what type of exercise and
2) how much exercise is optimal for breast cancer patients?



Unfortunately, the benefits of exercise did not last long after the program was completed. Specifically, the benefits of combined and high dose exercise on physical functioning, treatment-related symptoms, and sleep quality dissipated within 24 months. Participants who did the combined exercise during chemotherapy generally showed superior effects at 6 months, inferior effects at 12 months, and no difference in effects at 24 months for several psychosocial outcomes, such as stress, happiness, anxiety, and sleep quality. Participants in chemotherapy for longer terms showed no difference in the effects between the three different exercises on quality of life, treatment-related symptoms, and psychosocial factors.

Importance of continuous exercise after treatment

We also examined the association between continuing exercise after treatment and quality of life, treatment-related symptoms, psychosocial factors, and physical fitness.

Interestingly, participants who consistently exercised after treatment reported having a better quality of life, treatment-related symptoms, psychosocial factors, and physical fitness compared to those who were not exercising enough, regardless of which exercise they did during chemotherapy. These findings suggest that consistent exercise participation after treatment is important for breast cancer patients for improving and maintaining their physical and mental health gains. Exercising only during treatment is not enough for their continuous health management.

Combined aerobic and resistance exercise as an optimal exercise approach

Based on the CARE Trial, combining aerobic and resistance exercises may be the optimal exercise option for breast cancer patients and survivors. Although there was no difference between different exercise groups during chemotherapy on long-term quality of life, treatment-related symptoms, and psychosocial factors, participants who participated in the combined exercise had better muscular endurance and were doing more resistance exercise than those who participated in the high dose exercise. These findings suggest that performing resistance during chemotherapy may result in continued participation in resistance exercise and better muscular endurance after chemotherapy.

*Exercise guidelines for cancer survivors—
at least 150 min/week of moderate aerobic exercise and 2 days/week of resistance exercise.*

Moreover, after treatment, participants who maintained exercise following the exercise guidelines for cancer survivors—at least 150 min/week of moderate aerobic exercise and 2 days/week of resistance exercise—had superior effects for quality of life, treatment-related symptoms, psychosocial factors, and physical fitness compared to those who did only one or neither types of exercise.

Participants who met only aerobic exercise guidelines after treatment had more superior effects for quality of life, treatment-related symptoms, psychosocial factors, and physical fitness compared to those who met only resistance exercise guidelines or neither guidelines.

These findings indicate that the combined aerobic and resistance exercise during and after treatment may be the optimal exercise option for breast cancer patients.

Conclusion and take home messages

Our study supports several messages.

- Practitioners or exercise specialists should be aware of the ACSM exercise guideline for cancer survivors and recommend patients to follow the guideline.³
 - Aerobic exercise: at least 150 minutes per week of moderate aerobic exercise, or 75 minutes per week of vigorous aerobic exercise, or an equivalent combination
 - Resistance exercise: at least 2 days per week of resistance exercise for major muscle groups
- When recommending exercise, emphasize not only the importance of aerobic exercise, but also the importance of resistance exercise.
- Since continuous exercise is important during and after treatment to manage patients' physical and mental health, practitioners or exercise specialists should plan strategies that encourage cancer patients' to exercise consistently.

These findings provide evidence for the optimal types of exercise and dosage for breast cancer patients, during and after their treatments. Combining aerobic and resistance exercises would be a significant advancement in the supportive care that we can provide.

Participants who followed the exercise guidelines for cancer survivors had superior effects for quality of life, treatment-related symptoms, psychosocial factors, and physical fitness.



Additional resource:
www.cancerwa.asn.au/resources/2015-10-20-American-College-of-Sports-Medicine-Roundtable.pdf

Link to full publication:
<https://onlinelibrary.wiley.com/doi/full/10.1002/ijc.32493>

References

1. Courneya KS, Friedenreich CM. Relationship between exercise during treatment and current quality of life among survivors of breast cancer. *Journal of Psychosocial Oncology*. 1998;15(3-4):35-57.
2. Adamsen L, Quist M, Midtgaard J, et al. The effect of a multidimensional exercise intervention on physical capacity, well-being and quality of life in cancer patients undergoing chemotherapy. *Support Care Cancer*. 2006;14(2):116-127.
3. Schmitz KH, Courneya KS, Matthews C, et al. American College of Sports Medicine roundtable on exercise guidelines for cancer survivors. *Med Sci Sports Exerc*. 2010;42(7):1409-1426.
4. Courneya KS, McKenzie DC, Mackey JR, et al. Effects of exercise dose and type during breast cancer chemotherapy: multicenter randomized trial. *J Natl Cancer Inst*. 2013;105(23):1821-1832.
5. van Waart H, Stuiver MM, van Harten WH, et al. Effect of low-intensity physical activity and moderate- to high-intensity physical exercise during adjuvant chemotherapy on physical fitness, fatigue, and chemotherapy completion rates: results of the PACES randomized clinical trial. *J Clin Oncol*. 2015;33(17):1918-1927.
6. Courneya KS, Segal RJ, Mackey JR, et al. Effects of aerobic and resistance exercise in breast cancer patients receiving adjuvant chemotherapy: a multicenter randomized controlled trial. *J Clin Oncol*. 2007;25(28):4396-4404.
7. Courneya KS, Segal RJ, McKenzie DC, et al. Effects of exercise during adjuvant chemotherapy on breast cancer outcomes. *Med Sci Sports Exerc*. 2014;46(9):1744-1751.
8. Courneya KS, Segal RJ, Mackey JR, et al. Effects of exercise dose and type on sleep quality in breast cancer patients receiving chemotherapy: a multicenter randomized trial. *Breast Cancer Res Treat*. 2014;144(2):361-369.
9. An KY, Morielli AR, Kang DW, et al. Effects of exercise dose and type during breast cancer chemotherapy on longer-term patient-reported outcomes and health-related fitness: A randomized controlled trial. *Int J Cancer*. 2019.

ABOUT THE AUTHORS

Ki-Yong An, PhD, is a postdoctoral fellow at the Behavioural Medicine Lab in the Faculty of Kinesiology, Sport, and Recreation at the University of Alberta.



Andria R. Morielli, MSc, is a doctoral student at the Behavioural Medicine Lab in the Faculty of Kinesiology, Sport, and Recreation at the University of Alberta.

Dong-Woo Kang, MSc, is a doctoral student at the Behavioural Medicine Lab in the Faculty of Kinesiology, Sport, and Recreation at the University of Alberta.

Christine M. Friedenreich, PhD, is a Scientific Director at the Cancer Epidemiology and Prevention Research at Alberta Health Services and an Adjunct Professor and Division Head of Preventive Oncology at the Cumming School of Medicine at the University of Calgary.

Donald C. McKenzie, PhD, MD, is a Professor and Director at the Division of Sports Medicine in the School of Kinesiology at the Faculty of Education at the University of British Columbia.

Karen Gelmon, MD, is a Clinical Professor in the Division of Medical Oncology at the Department of Medicine in the Faculty of Medicine at the University of British Columbia and a Senior Scientist and Medical Oncologist at the BC Cancer Agency Vancouver Centre.

John R. Mackey, MD, is a Professor in the Division of Medical Oncology at the Faculty of Medicine & Dentistry at the University of Alberta and a Director of the Clinical Trial Unit at the Cross Cancer Institute.

Robert D. Reid, PhD, is a Deputy Division Head of Prevention and Rehabilitation at the University of Ottawa Heart Institute and a Full Professor in the Faculty of Medicine at the University of Ottawa.

Kerry S. Courneya, PhD, is a corresponding author of this article. He is a Professor and Director of the Behavioural Medicine Lab in the Faculty of Kinesiology, Sport, and Recreation at the University of Alberta and Canada Research Chair in Physical Activity and Cancer.

