

FIMS Position Statement 2014

Physical activity and cancer

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Abstract

Cancer and its treatment are often associated with physical and psychosocial impairments that influence activities of daily living and can thus have a negative impact on quality of life. Some side effects can last for years, and cancer as well as the therapy itself can lead to a greater risk for other chronic diseases. Physical activity plays an important role within supportive care. There is growing evidence of the importance and effectiveness of physical activity during and after cancer treatment. However, the optimal components of exercise for each cancer type at a given treatment phase remain unclear, so that current recommendations primarily entail general physical activity guidelines including specific modifications and precautions. Further research is needed to investigate different doses and types of exercise to identify the optimal exercise prescription.

Keywords: physical activity, cancer, recommendations

Introduction

There were an estimated 12,7 million new cases of cancer (excluding non-melanoma skin cancer) and 7,6 million deaths from cancer worldwide in 2008¹. Cancer's causes are multi-factorial. Data show that besides genetic risk factors, life style factors play an especially significant role in carcinogenesis. Lack of physical activity is one of the known risk factors with ample evidence as having considerable influence on cancer prevention –particularly in colon and postmenopausal breast cancer². Moreover, the literature indicates positive effects of physical activity and exercise on patients' physical and psychosocial status during and after cancer treatment. Growing numbers of the elderly and increasing survival rates will create more and more individuals affected by cancer in the next few years. With 28.8 million cancer survivors (5-year prevalence) worldwide³, supportive care plays a key quality-of-life enhancing role in cancer treatment.

Cancer and its treatment often correlate with physical and psychosocial impairments. Depending on the type and combination of cancer treatment (surgery, radiation, chemo-, hormone, antibody therapy or stem cell transplantation) the procedure causes a number of side-effects which are individually pronounced to a greater or lesser extent. The main physiological problems are impaired bone-marrow function (anaemia, leucopaenia, thrombocytopaenia), loss of function (musculoskeletal, cardiovascular, respiratory, various organs) skin and mucous membrane irritation, infections, pain, numbness, lymphoedema or fatigue, to name a few. Psychosocially speaking, patients often suffer

from psychological distress such as depression or anxiety⁴. All together the side effects often induce immobilisation, leading to a reduction in physical capacity and therefore impairments in activities of daily living⁵ that negatively influence quality of life⁶. Many cancer survivors experience side effects even years after their cancer diagnosis. The most persistent problems are fatigue^{7,8} and the chemotherapy-induced peripheral neuropathy⁹ mainly caused by neurotoxic agents. Furthermore, the disease and its treatment lead to a greater risk for other chronic illnesses like heart disease or diabetes¹⁰.

Current state of research - Evidence from intervention trials

The number of publications focusing on physical activity and cancer has increased over the past decades. Initial efforts in this research field addressed the feasibility and safety of physical activity after cancer diagnosis, and several studies provided evidence thereof. There is now growing evidence of the importance and effectiveness of physical activity during and after cancer treatment. Various reviews and meta-analyses have revealed the positive impact of physical activity and exercise on physical and psychosocial outcomes¹⁰⁻¹³.

A current meta-analysis published by Fong et al.¹² includes 34 randomised controlled trials evaluating post-treatment physical activity interventions. The authors detected significant effects on body weight and body fat, endurance-capacity parameters (peak oxygen consumption, peak power output, six-minute walk distance) muscular strength and quality of life in studies involving different types of cancer. These findings appear to be consistent with results of previous meta-analyses¹³. However, there is also growing evidence supporting the positive effects of physical-activity interventions during active cancer treatment. After analysing the literature, Speck et al.¹³ pointed out significant small-to-moderate beneficial effects on physical and psychological outcomes (see table 1). Furthermore, various other relevant aspects seem to be positively influenced by physical activity (e.g. symptoms, side effects or duration of hospitalisation), although the evidence is lacking.

It should be noted that over 50% of the published studies focus on breast cancer patients^{14,15}, which limits their transferability to patients with other cancer diagnoses such as colorectal, or lung carcinomas, or different forms of haematological malignancies. Moreover, we know of no definitive recommendation on the right type of exercise, with the right intensity, duration, frequency and timing, because only a few studies to date have compared different modes of exercise¹¹. This multifarious field of research requires further investigation to close existing knowledge gaps, and more randomised controlled trials (RCT) with larger patient cohorts are needed.

Recommendations

Although there is insufficient evidence in the literature regarding optimal components of exercise for each cancer type at a given treatment phase, several guidelines on exercise testing and prescription have been published by different working groups based on the current state of research and experiences made by professionals working in this field. A current review published by Buffard et al.¹¹

presents and discusses existing guidelines for physical activity and cancer. This includes recommendations by the American College of Sports Medicine (ACSM)¹⁰, the American Cancer Society (ACS)¹⁶, the Exercise and Sport Science Australia (ESSA)¹⁷, the British Association of Sport and Exercise Science (BASES) and the Comprehensive Cancer Centre of the Netherlands (CCCN)¹⁸. In 2010, the ACSM released a statement including the results of a roundtable on exercise guidelines for cancer survivors¹⁰, currently the most detailed and most widely recognised guideline in the field. Cancer survivors are defined therein as all cancer patients from the time of diagnosis until the end of life.

To summarise: the general statement the ACSM make is that it is important to avoid inactivity and return to normal daily activity as soon as possible after surgery and to continue normal daily activities and exercise as much as possible during and after nonsurgical treatment. The same recommendations concerning aerobic exercise apply to cancer survivors as to the age-appropriate healthy American population, namely at least 150 min of moderate intensity or 75 min per week of vigorous intensity or the equivalent combination of moderate and vigorously intense aerobic physical activity, which concurs with recommendations from the World Health Organisation (WHO)¹⁹. For post-haematopoietic stem cell transplantation or deconditioned patients, it is preferable to exercise everyday with lighter intensity and lower progression of intensity. Resistance training exercises should involve all major muscle groups and be conducted twice a week with the aim of maintaining (during treatment) and increasing (after treatment) physical capacity as far as possible as long as certain precautions are taken into account.

The work of the ACSM roundtable¹⁰ also provides a detailed description of contraindications, precautions and possible modifications to adapt to patients' condition.

Besides absolute contraindications like fever or active infection, particular caution must be taken when patients are actively undergoing treatment. These patients can suffer from severe anemia and therefore dizziness, circulation problems, dyspnoea, chest pain, tachycardia or syncope. Moreover, severe thrombocytopenia leads to a higher risk of bleeding, and in case of impaired immune function, precautions are necessary to minimise the infection risk. According to the ACSM guidelines for exercise prescription²⁰ regarding cardiovascular and pulmonary contraindications for starting an exercise program: clinicians must keep toxic reactions to medications or radiation as well as cancer surgery in mind, as these can raise the probability of an adverse cardiopulmonary event. For patients with cardiopulmonary problems and those with other cancer-specific side effects (e.g. severe fatigue, bone metastases, peripheral neuropathy, arm and shoulder problems, lymphoedema), safety supervision is recommended. Impairments (secondary to cancer or not) can be multifactorial and patients may need individual training introductions and/or modifications in consultation with their physicians or therapists. Individuals who have received hormone therapy or those with bone metastases should be evaluated with regard to fracture risk. Cardiac conditions should be continually monitored medically according to existing guidelines²⁰.

Recommendations from the CCCN¹⁸ point out that exercise programs should be tailored to patients' individual fitness to obtain optimal training effects in aerobic and resistance training programmes. Assessments and exercise testing may therefore be useful to get information about a patient's physical condition and for better training oversight.

Put into practice

As there is evidence concerning the safety and feasibility of exercise for most cancer patients, it should be recognised as an important aspect of supportive care. It is the physician's responsibility to be informed about the importance of being active despite or even because of cancer diagnosis. Recent scientific research has refuted some issues previously considered as absolutely contraindicated for exercise (e.g. metastasis or lymphoedema). It is important to allay patients' fears and to motivate them by explaining the beneficial effects of exercise on physical and psychosocial capabilities at every phase of treatment and beyond. For patients who will undergo surgery or stem cell transplantation, a specific training programme is recommended that prepares them for this intensive therapy.

However, virtually all patients can safely begin an exercise programme at low intensity under supervision, many without supervision and medical evaluation; a sports medical check-up is recommended for some patients, especially those at an increased risk for cardiovascular problems e.g. after administration of cardiotoxic drugs or in case of severe physical deconditioning. Whether the exercise programme is done in a fitness facility or is home-based, patients should be supervised by professionals who are qualified for dealing with exercising individuals after cancer diagnosis.

The aim is to support patients with their particular needs and limitations. Due to their diseases' diverse courses and differently-pronounced side effects, patients must be treated individually. Interdisciplinary teamwork is therefore essential, especially during active treatment and in the early stages of rehabilitation. To ensure motivation and compliance, individual preferences for different types of activity should be integrated. Patients should ultimately maintain physical activity and try to attain an activity level recommended for the general public to reduce risk for other chronic diseases, and to provide long-term physical and psychosocial health that may influence overall survival.

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Table 1: Results of meta-analysis by Speck et al.¹³ including the effects of exercise intervention during and after cancer treatment

Outcome	during treatment				post-treatment			
	trials (n)	effect size (95%CI)	p-value	I ² (%)	trials (n)	effect size (95%CI)	p-value	I ² (%)
Physical activity level	12	0.38 (0.15-0.61)	0.001	46.6	16	0.38 (0.22-0.54)	0.0001	58.6
Aerobic fitness	17	0.33 (0.08-0.57)	0.009	73.0	14	0.32 (0.036-0.59)	0.03	65.6
Upper body strength	8	0.39 (0.12-0.65)	0.005	57.7	6	0.99 (0.67-1.32)	0.0001	14.6
Lower body strength	7	0.24 (0.07-0.41)	0.006	0	7	0.90 (0.12-1.68)	0.024	80.9
Body weight	8	-0.25 (-0.49- -0.00)	0.05	51.4	14	-0.18 (-0.31-0.06)	0.004	9.5
Body fat %	7	-0.25 (-0.48- -0.02)	0.04	39.0	15	-0.18 (-0.31- -0.05)	0.006	1.3
Quality of life overall	10	0.13 (-0.005-0.26)	0.06	0	16	0.29 (0.03-0.54)	0.03	84.8
functional	4	0.28 (0.02-0.54)	0.04	0	16	0.17 (-0.12-0.45)	0.25	84.7
fatigue	15	-0.01 (-0.35-0.33)	0.95	86.8	14	-0.54 (-0.90- -0.19)	0.003	84.9
anxiety	6	-0.21 (-0.39- -0.03)	0.02	0	7	-0.43 (-0.88-0.03)	0.07	69.5