onkopedia

AYApedia

Exercise and sport

Recommendations from the society for diagnosis and therapy of haematological and oncological diseases

DGHO
DEUTSCHE GESELLSCHAFT FÜR HÄMATOLOGIE UND MEDIZINISCHE ONKOLOGIE

Publisher

DGHO Deutsche Gesellschaft für Hämatologie und
Medizinische Onkologie e.V.
Bauhofstr. 12
D-10117 Berlin

Executive chairwoman: Prof. Dr. med. Claudia Baldus

Phone: +49 (0)30 27 87 60 89 - 0

info@dgho.de
www.dgho.de

Contact person

Prof. Dr. med. Bernhard Wörmann
Medical superintendent

Source

www.onkopedia-guidelines.info

The information of the DGHO Onkopedia Web Site is not intended or implied to be a substitute for professional medical advice or medical care. The advice of a medical professional should always be sought prior to commencing any form of medical treatment. To this end, all component information contained within the web site is done so for solely educational purposes. DGHO Deutsche Gesellschaft für Hämatologie und Onkologie and all of its staff, agents and members disclaim any and all warranties and representations with regards to the information contained on the DGHO Web Site. This includes any implied warranties and conditions that may be derived from the aforementioned web site information.

Table of contents

1 General information ... 2
1.1 Background ... 2
1.2 Physical activity, sports and exercise, training - what is what? ... 3
1.3 Tips for more movement in everyday life ... 3
2 Good to know ... 4
2.1 Sport and training recommendations ... 4
2.1.1 General information ... 4
2.1.2 How do I control the training load? ... 4
2.1.3 How do I know if a workout is easy or strenuous? ... 5
2.2 Acute therapy ... 5
2.2.1 Why should I move and exercise specifically during therapy? ... 5
2.2.2 What do I need to consider in terms of exercise and sports during medical therapy? ... 6
2.2.3 How strenuous should my training be under medical therapy? ... 6
2.2.4 How should my training be structured during medical therapy? ... 6
2.3 Follow-up care ... 7
2.3.1 Why should I be physically active after completion of therapy? ... 7
2.3.2 What are the current recommendations on exercise and sports in cancer follow-up? ... 7
2.3.3 How much recovery time should I have between my workouts? ... 8
2.3.4 Are there special facilities where I can train? ... 8
3 Tips and tricks ... 8
3.1 Side-effects ... 9
3.1.1 Polyneuropathy ... 9
3.1.2 Fatigue ... 9
3.1.3 Osteonecrosis (bone infarction) ... 9
3.1.4 Amputation/rotationplasty ... 10
3.1.5 Psychological and social stress ... 10
3.1.6 Advanced cancer ... 10
3.2 Exercise catalog ... 10
4 Links and further information ... 10
5 Experts' Affiliations ... 11
6 Disclosure of Potential Conflicts of Interest ... 12

Exercise and sport

Date of document: September 2018

Compliance rules:

- Guideline
- Conflict of interests

Authors: Wiebke Jensen, Simon Elmers, Sabine Kesting, Vanessa Oschwald, Jannike Baumann

for the National Expert Group on Exercise Therapy and Physical Activity in Oncology (NEBKO) - headed by Freerk Baumann and Joachim Wiskemann.

1 General information

1.1 Background

Modern therapy concepts in combination with various treatment methods improve the chances of healing and survival of cancer patients. However, cancer therapy can also cause the increased and intensified occurrence of acute and long-term side effects. Studies have shown that approximately two-thirds of AYAs suffer from therapy-related late effects. These include psychological and physical problems, such as polyneuropathy (therapy-related nerve damage), chronic pain, exhaustion, or diseases of the cardiovascular system. The latter are among the most common long-term consequences in childhood, adolescence and young adulthood survivors. Both therapy-related factors (e.g., type and total dose of chemotherapy or radiation in the area of the chest) and general factors, such as high blood pressure, elevation of fats (lipids) in the blood serum, obesity, age, previous diseases of the cardiovascular system, familial components, and gender are responsible for this.

Numerous studies from the field of adult oncology show that regular physical activity can improve disease- and therapy-related side effects. This includes not only sports and exercise, but also physical activity in everyday life. Exercise and sports have a positive effect not only on cardiovascular fitness, muscle strength and body composition, but also on fatigue, anxiety, depression, psychosocial complaints and stress (in the areas of education, work, family), self-esteem and quality of life. In addition, there is evidence of a lower risk of recurrence with regular and sufficient physical activity.

Accordingly, physical activity and sport can have a myriad of positive effects, for example:

Physical level

- Preserve or restore physical performance
- Improve of general fitness
- Strengthen the immune system
- Reduce fatigue

Psychological level

- Increase self-confidence
- Exert a positive influence on mood and well-being
- Aid in the acceptance or active confrontation with one's own (changed) body
- Encourage people to get back in touch with each other

- Take an active role in recovery

Social level

- Find joy and fun in the movement
- Doing sports together
- Exchange of experiences and information with similarly affected persons
- Promote communication

The spectrum of physical activity options is large. However, the right form of exercise for you depends on your personal goals and preferences. If you are uncertain, it may be useful to seek advice from a physiotherapist or sports therapist.

In addition, it is important to consider the individual medical therapy (e.g. after surgery) and possible disease-related situations (e.g. bone metastases) of a patient. As a general rule: before you start exercise and regular training, consult your attending physician.

1.2 Physical activity, sports and exercise, training - what is what?

In the following chapters, we will discuss physical activity, sports, exercise and training. But what exactly is the difference between these terms?

Physical activity is to be understood as a generic term for any physical movement of the skeletal muscles that leads to additional energy consumption. The term physical activity is understood to include both, leisure, as well as sporting activities.

Sport is a defined subset of physical activity, for which in particular physical performance, personal enjoyment and competitions are typical.

Exercise in this context also considers low-threshold sports and everyday activities.

Physical *training* is a subset of physical activity that is planned, structured, repeated, and targeted to improve physical fitness. Appropriate training can improve motor skills such as strength, endurance, coordination, agility and speed.

1.3 Tips for more movement in everyday life

Regardless of whether you are currently undergoing or have completed cancer treatment, getting enough exercise in your daily life has an immediate effect on your health. Everyday activities include bicycling more, such as to work, shopping or visiting friends, as well as taking the stairs instead of the elevator or escalator. Getting off the bus or train one stop earlier and walking the rest of the way also leads to increased physical activity in everyday life.

It is also possible to count the number of steps taken each day using an app or a portable activity tracker ("wearable"). The current recommendation is to take 10,000 steps per day to be more efficient and healthier - and you can tackle this as a daily challenge with friends.

2 Good to know

2.1 Sport and training recommendations

2.1.1 General information

Comprehensive training aimed at maintaining or improving physical performance includes the components of strength, endurance, speed, flexibility, and coordination, although speed is not a priority in oncological exercise therapy:

Strength

The goals of strength training are to build muscle in order to achieve a stable muscular core and to avoid injuries. If you want to start strength training without training supervision or therapeutic support, you should first train the large muscle groups with relatively low weights and higher numbers of repetitions (strength endurance training). Yoga and Pilates also count as strength-oriented training.

Endurance

Endurance training improves the overall performance of and economizes the cardiovascular system. Particularly suitable endurance sports are Nordic Walking, running, cycling, and swimming, provided there is no increased susceptibility to infection. During therapy, daily endurance training with shorter periods of exertion is recommended. Cancer survivors are advised to do at least either 150 minutes of moderate or 75 minutes of intense exercise per week. Alternatively, a combination of both exercise intensities is possible.

Flexibility

Stretching exercises should be an integral part of every workout. Try to perform the exercises slowly, in a controlled manner and avoid jerky movements, see exercise catalog.

Coordination

You can also incorporate coordination exercises into each of your exercise sessions. Plan coordination exercises after a short warm-up, but before endurance and strength exercises, so that you can perform the exercises slowly and in a controlled manner, see exercise exercise catalog.

2.1.2 How do I control the training load?

The training load is generally determined by the following parameters:

- (1) Load intensity - How strenuous is the training?
- (2) Training volume - How long does my training last per training session?
- (3) Training frequency - How often do I train per week?
- (4) Number of repetitions/exercise duration - How many repetitions do I do per exercise or how long do I perform an exercise for?

Depending on how you choose the parameters, your workout will be more or less strenuous.

2.1.3 How do I know if a workout is easy or strenuous?

There are various ways to assess the correct training load. Both so-called objective and subjective criteria can give you information about the effort you exert during training:

- Objective criteria include measuring the heart rate or blood pressure. Look out for typical stress symptoms such as rapid breathing, sweating or even facial flushing.
- The Borg scale is commonly used to record the subjective feeling of exertion, see table 1. This scale assesses the individual feeling of exertion, beginning with a score of 6 ("not at all strenuous") and goes up to 20 ("maximum effort").

Table 1: Borg scale for recording the subjective feeling of stress

6	No exertion at all
7	Extremely light
8	
9	Very light
10	
11	Light
12	
13	Somewhat hard
14	
15	Hard (heavy)
16	
17	Very hard
18	
19	Extremely hard
20	Maximal exertion

Legend:
(modified from Borg G. Borg's perceived exertion and pain scales. Human Kinetics, Champaign, IL, 1998)

2.2 Acute therapy

2.2.1 Why should I move and exercise specifically during therapy?

During therapy, we often observe a deterioration in fitness and physical performance due to the cancer itself and treatment. However, strength, endurance, flexibility and coordination in particular are important for coping with everyday activities such as climbing stairs, carrying something or walking longer distances. Therefore during the therapy phase, maintaining your fitness and physical performance is of particular importance. In addition to being active in your daily life, a targeted workout can help you maintain your fitness level in the best possible way. However, there is often uncertainty about how to best design a training plan during therapy and what kind of exertion is even possible. In order to reduce uncertainty, you will receive a lot of information below on the subject of training during cancer therapy. Above all, it is important to remember that it is not a matter of doing the most intense sports possible; rather a certain regularity of training is important. This allows your body to get used to the strain. In addition, targeted exercise therapy can improve the side effects caused by the disease or therapy.

2.2.2 What do I need to consider in terms of exercise and sports during medical therapy?

Many studies have shown that performing physical training during therapy is safe and is not associated with any particular risk factors. The most important thing is to adjust your training so that you feel comfortable doing it.

- Please consider the following when planning your training whilst receiving medical therapy: choose a gentle and slow start for the workout.
- Adapt your workout to how you feel on a given day. Give yourself a lighter workout on days when you do not feel well and train more intensively on days when you feel good.
- In certain situations, strenuous sports and training should be paused or adjusted at the discretion of the attending physician, including:
    - Under ongoing chemotherapy infusion
    - For acute infections, especially with fever
    - In the event of pain and acute bleeding under stress. Your doctor can assess the current stress situation and evaluate any risk factors.
- It is advisable that you have a physiotherapist or sports therapist introduce you to the training. This can be your therapists at the clinic or at home. They can show you the exercises in detail, correct your form, help you create an exercise program, and give you helpful tips along the way.

Please discuss exercise and sports with your attending physician. He or she knows you, your condition and the therapy, can give you important information about exercise tolerance and prescribe exercise therapy/physiotherapy. If necessary, contact a specialist who can answer questions about medical clearance to exercise.

2.2.3 How strenuous should my training be under medical therapy?

Under medical therapy, your capacity for exercise might be different every day. Therefore, you should plan each workout according to your daily condition. Your training can range from "very light" to "somewhat hard", see Borg scale (table 1). Especially after hard exercise, it is important to allow your body time to recover and rest. Light exercises, mobilization and an active daily routine are still possible during recovery breaks.

2.2.4 How should my training be structured during medical therapy?

During cancer therapy, it is recommended to partake in daily endurance training with shorter periods of exertion. Endurance training can include, walking, cycling or light jogging. You should aim to exercise for at least 10 minutes at a time - if possible. Depending on how you feel, you can always increase your goal by a little, allowing you to be active for up to 60 minutes or more per day. Whilst in hospital, training can also be divided into several smaller sections throughout the day.

In addition to endurance training, targeted strength endurance training is recommended during medical therapy. Lower intensities and higher numbers of repetitions (15-20 repetitions) characterize this training. Weight and number of repetitions should be adjusted in order to sufficiently fatigue the muscles during exercise, subsequently making the training feel increasingly strenuous. If exercise intensity is too low, the weight should be increased rather than the number of repetitions. Strength endurance training can be performed either under supervision on equipment or with your own body weight and, if necessary, using smaller additional weights

(see exercise catalog - where you will also find examples of coordination and flexibility exercises that should be part of every workout).

2.3 Follow-up care

2.3.1 Why should I be physically active after completion of therapy?

Exercise and sports play a crucial role not only during, but also after the completion of therapy. Physical activity can positively influence your performance, quality of life and disease- and therapy-related symptoms. It can reduce the risk of cardiovascular disease and osteoporosis (bone loss), as well as the risk of tumor recurrence. A long-term goal for cancer survivors should be the integration of exercise and sport as an inherent part of your everyday life.

2.3.2 What are the current recommendations on exercise and sports in cancer follow-up?

International professional societies, such as the *American College of Sports Medicine* and the *American Cancer Society,* advise avoiding inactivity and returning to pre-disease activity levels as soon as possible. Accordingly, after therapy ends, both the amount and intensity of activity should be increased when compared to the period during medical therapy.

Recommendations on physical activity and exercise in cancer follow-up:

- Any form of exercise is better than no exercise. Extending the recommendations over time also promotes the occurrence of positive health effects.
- Adults should engage in either at least 150 minutes of moderate or 75 minutes of intense endurance-based exercise per week. Alternatively, a combination of both exercise intensities is possible.
- Optimally, activities should be performed for at least 10 minutes at a time, and spread evenly throughout the week.
- It is currently recommended to additionally perform strength training at least twice per week.
- Strength training can be done with the help of your own body weight, with small-sized equipment (dumbbells or elastic bands) or using weight machines.
- It is recommended to perform exercises to strengthen large muscle groups, i.e. chest, leg and back muscles.
- Strength training should be perceived as strenuous (Borg 14-16, see Table 1).
- Always include coordination and mobility exercises in your training (see exercise catalog)

Examples of moderate and intensive activities are shown in Table 2.

Table 2: Examples of moderate and intensive activities

Moderate activities	Intensive activities
Leisurely cycling	Cycling faster than 15 km/h
Walking, brisk walking	Jogging, brisk running
Light gymnastics	Gymnastics, intensive gymnastic exercises
Leisurely swimming, water gymnastics	Fast swimming for time, swim lanes
Leisurely Badminton	Badminton
Standard and formation dancing	Aerobic Dance
Moderate ball sports	Running-intensive ball sports (soccer, football)

2.3.3 How much recovery time should I have between my workouts?

Depending on the type of load (moderate or intensive training) and individual conditions (age, gender, etc.) the amount of rest time require can vary. While the break after a moderate activity should be about 24 hours, the body may need up to three days to fully regenerate after an intense load.

In addition, warm-up (approx. 10-15 min) and cool-down (approx. 5-10 min) times should be taken into account for both before and after the respective activity.

Not allowing sufficient rest and recovery time long-term can have serious consequences. These include a decline in performance and concentration, sleep problems, or an increased susceptibility to illness. Those who achieve a targeted training incentive and adhere to their breaks will not only have fun, but will also benefit from training and improve both their health and performance.

2.3.4 Are there special facilities where I can train?

Meanwhile, large hospitals often offer exercise and sports consultations. These centers can help you find a suitable training facility.

Furthermore, you can obtain information about exercise offers from self-help groups, cancer counseling centers, health insurance companies as well as local gyms and sports clubs.

There are now numerous sports clubs in Germany that offer exercise programs for patients in cancer follow-up care (rehabilitation sport "Sport in cancer aftercare") and are financially supported by the statutory health insurance companies, see Chapter 4: Further links and information.

3 Tips and tricks

In case of certain side effects of disease and therapy, specifically adapted training is particularly effective and can thus contribute to an improvement of the situation or reduce a decline in physical performance despite certain limitations.

3.1 Side-effects

3.1.1 Polyneuropathy

Peripheral polyneuropathy (PNP) refers to damage of the peripheral nervous system (especially in the feet and hands), which can manifest in symptoms such as tingling, numbness or pain. Sensory motor training (a type of balance training) and vibration training may be particularly suitable for improving PNP symptoms. You try to hold a chosen standing position, e.g., tightrope walk, one-leg stand, as still and stable as possible for about 20 seconds. Choose 3 to 5 exercises per workout, each of which you repeat 3 times. Remember to take sufficient rest periods (approx. 40 seconds) between exercises. Choose exercises that challenge, but do not overtax, you.

For younger patients (under 18 years of age), performing the exercises for a shorter time (10 seconds per exercise) while increasing the number of repetitions (5 repetitions per exercise) may be appropriate.

3.1.2 Fatigue

Fatigue symptoms affect a large proportion of all patients. This very stressful and limiting syndrome significantly restricts many of those affected - both during and for a long time after completion of therapy. In particular, fatigue can greatly reduce quality of life. Physical activity and training can bring about an effective improvement here in parallel with therapy. Exercise and training can have an effect on both, the physical and psychological health and, in addition to performance, can also have a positive influence on mood and stress. In adults, a positive effect on fatigue symptoms of strength, endurance and yoga has been demonstrated. However, the regularity of the training and the intensity are important: the units should be individually adapted to the current condition. Find a type of exercise that you enjoy as this makes it easier to motivate yourself regularly. Shorter and more frequent units are recommended. As a general rule, the more pronounced the fatigue symptoms, the more moderate the physical activity should be. After completion of therapy, if the symptoms are reduced, units should be intensified in order to bring about additional positive health effects.

3.1.3 Osteonecrosis (bone infarction)

Bone infarcts, so-called aseptic osteonecroses, can occur as a result of cancer therapies. Osteonecrosis predominantly affects large weight-bearing joints, such as the hip or knee. In the early stages, affected individuals are usually symptom-free and have little pain. Whereas in advanced stages, significant pain can occur whilst weight bearing but also at rest, and movement of the affected joints is significantly restricted. In addition to pain therapy and, if necessary, surgical procedures, mechanical relief (e.g., wheelchair, forearm crutches) and targeted physiotherapy are useful. Depending on the severity, it is advisable to consult a sports- or physiotherapist who will show you specific exercises to improve or maintain the mobility of your joints. Targeted exercise therapy should help to strengthen the muscles around the affected joints. It is important that movements place little weight on the joint (e.g. water gymnastics, cycling or light weight training). Training on a bicycle ergometer, for example, is highly advisable in cases of osteonecrosis of the femoral head, as it stimulates blood circulation and trains the muscles in the hip area; while at the same time, the joints are subjected to little stress. Stretching can also be incorporated into your training in consultation with your therapist.

3.1.4 Amputation/rotationplasty

For many adolescents and young adults who develop a malignant bone tumor, there is a chance of curing it if, in addition to chemotherapy, large parts of the affected bone are removed. The most commonly affected bone is the femur. The surgical method of rotationplasty has been successfully used in patients with a bone tumor near the knee.

Physiotherapeutic measures are in the foreground after such surgical intervention and should help to improve the motor function and sensitivity of the operated leg, and to develop a normal gait pattern. Movement and sports therapy aim to help you learn new movement and sports possibilities, to trust your body again and experience it positively, and to strengthen your own movement competence.

3.1.5 Psychological and social stress

The diagnosis of cancer is very often life-changing and can lead to psychological stress and a reduced quality of life. Physical activity not only has numerous positive effects on the body, but also has an impact on the psyche and thus on well-being. Sharing experiences in a group with other patients can help with coping and with the new situation. Patients who are affected by depression and are psychologically very stressed are recommended to do endurance sports in the fresh air. Pay attention to what you benefit from and what activity you like doing!

3.1.6 Advanced cancer

Recent studies have shown that exercise therapy measures are also useful in advanced cancers and can improve subjective well-being, physical performance, control of disease- and therapy-related symptoms, and thus quality of life.

Specific exercise recommendations for patients in palliative disease situations are not yet available. Before starting any exercise, you should always ask your attending physician for advice on whether, and if so, how much exercise is suitable for you. At the beginning, exercise should only be performed under professional guidance.

This way the specialist can consider certain limitations and design a proper training (e.g., considering the risk of fracture in the case of bone metastases) program for you.

3.2 Exercise catalog

Exercise catalog

4 Links and further information

- ActiveOncoKids - Network to improve the promotion of sports and physical activity for children and adolescents during and after cancer
  http://activeoncokids.de
- Exercise and sport in cancer (Cancer Information Service):
  https://www.krebsinformationsdienst.de/leben/alltag/sport-nach-krebs.php
- Brochure of the NCT Heidelberg "Sport, Exercise and Cancer":
- https://www.nct-heidelberg.de/fileadmin/media/nct-heidelberg/fuer_patienten/beratung/bewegung/onkoaktiv/2020_nct_kvbw_sport_bewegung_und_krebs_k4

- At the German Sports Federation for the Disabled, you can find rehabilitation sports groups at:
  DBS | Sportentwicklung | Rehasportgruppe finden (dbs-npc.de)
- Interested parties can find sports offerings in the region on the website of the German Olympic Sports Confederation at:
  https://suche.service-sportprogesundheit.de
- German Cancer Aid provides an overview of the top oncology centers, which often offer counseling on lifestyle, exercise and sports, and nutrition:
  http://www.ccc-netzwerk.de/das-netzwerk/mitglieder.html
- Junges Krebsportal, hat diese Wegweiser-Funktion, mit der man an Berater in seiner Nähe verwiesen wird: https://www.junges-krebsportal.de/

5 Experts' Affiliations

Dr. phil. Jannike Baumann
Universitätsklinikum Hamburg-Eppendorf
Universitäres Cancer Center Hamburg (UCCH)
Martinistr. 52
20246 Hamburg
j.baumann@uke.de

Simon Elmers
M.A. Sportwissenschaftler
Universitätsklinikum Hamburg-Eppendorf
Universitäres Cancer Center Hamburg (UCCH)
Martinistr. 52
20246 Hamburg
s.elmers@uke.de

Dr. Sportwiss. Wiebke Jensen
Universitätsklinikum Hamburg-Eppendorf
Universitäres Cancer Center Hamburg (UCCH)
Hubertus Wald Tumorzentrum
Martinistr. 52
20246 Hamburg
wjensen@uke.de

Dr. rer. medic. Sabine Kesting
Fakultät für Sport- und Gesundheitswissenschaften
Technische Universität München
Campus D
Georg-Brauchle-Ring 60/62
80992 München
sabine.kesting@tum.de

Vanessa Oschwald
Deutsche Sporthochschule Köln
Institut für Kreislaufforschung und Sportmedizin
Am Sportpark Müngersdorf 6
50933 Köln
V.Oschwald@dshs-koeln.de

6 Disclosure of Potential Conflicts of Interest

According to the rules of the supporting professional societies