

How Exercise Can Help You Beat Cancer – The Ultimate Training Guide for Survivors



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Population Statistics

Currently, 1 in 4 deaths is attributed to cancer.

It has surpassed heart disease as the
1 killer in North America
(cancer = 27.2% of deaths, Heart disease = 26.4% [2004])
47% of diagnosed (all causes) will die from it

The WHO estimated that in 2002, 10 million new cancer cases were diagnosed world wide, with 62% of diagnoses resulting in death.

POPULATION TRENDS

Breast Cancer: Survival rates increasing
(In 1992, 82% five year survival;
in 2005, 86% survival rate)
1 in 9 women expected to develop breast cancer



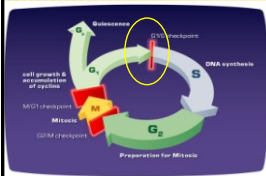
Prostate cancer survival rates increasing
(in 1992, 88% survival; in 2005, 91% survival)
Colorectal survival rates have not changed, but incidence is decreasing
Lung cancer survival rates are the same, but incidence among young people is rising!

CANCER CAUSES

?????????

- ✗ Cancer can be caused by many factors, all playing a role either individually or combined.
- ✗ Common causes are: internal hormonal environment, external environmental factors (pollution, UV exposure, etc.) smoking, genetics, age, diet, lifestyle, physical activity, other diseases, radiation, viruses, bacteria,
- ✗ You can reduce your risk of getting cancer, but you can never remove your risk of getting cancer

LIFE CYCLE OF CANCER



Loss of regulation between G1 & S phases leads to uncontrolled cell division of cancerous cells

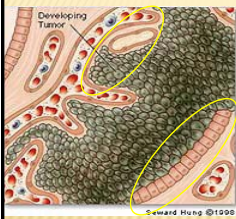
- ✗ exposure to some variable that mutates the DNA of a cell, causing it to lose ability to repair itself, or to regulate cell division i.e. Cell can grow and reproduce without control.
- ✗ Division of newly damaged cell, causing a growth of tumor tissue that the bodies immune system doesn't destroy.

LIFE CYCLE OF CANCER (CONTINUED)



- ✗ Normal cell growth stops when tissues grow into other tissues... NOT WITH CANCER CELLS!!
- ✗ Cancer cells continue to grow, even after hitting other tissues, creating a "crowding" situation
- ✗ Tissues being pushed against are exposed to forces they're not used to, can herniate or stop functioning all together.
- ✗ major problem with "benign tumors"

LIFE CYCLE (CONTINUED)



- ✧ With continued growth it has difficulty containing itself, begins to fragment cells, which migrate to other parts of body
- ✧ These fragments eventually lodge in distant tissues from original tumor, continue in their uncontrolled division, creating new growths
- ✧ "Metastatic."

LIFE CYCLE (CONTINUED)

- ✧ These new tumors set up in new tissues, continue to divide, and create more crowding on organs.
- ✧ Leads to organ failure, internal hemorrhaging, and infection.
- ✧ Determined by blood supply into the tumor, the proximity of the tumor to circulation, and the level of division of the tumor (how old the tumor is by number of times its' divided)



Healthy Lung Photo



Lung Cancer Photo

CHEMOTHERAPY



CHEMOTHERAPY

- ✧ "Treatment of cancer or other malignant diseases by the use of specific drugs that selectively destroy rapidly growing cells. Extremely high doses of these drugs are sometimes needed to kill tumor cells in advanced cases of some malignancies. These high doses will also kill the body's stem cells in the bone marrow and peripheral blood stream."

-ViaCell Technologies

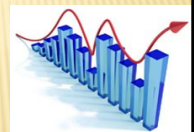
CHEMOTHERAPY (CONT)

- ✧ Essentially, chemotherapy is a poison, used to interrupt the cell cycle of cancerous cells, leading to cellular death
- ✧ Chemo does not know what is cancer & what is a normal cell, which produces the systemic side effects of treatment.



CHEMOTHERAPY (CONT)

- ✧ Chemo works on principle that normal cells still possess ability to repair themselves & regenerate, whereas cancerous cells don't
- ✧ Normal cells have the ability to regenerate as normal, and be able to produce new functional cells again.
- ✧ Given in cycles, allowing body time to regenerate new cells before the next cycle is given



CHEMOTHERAPY, SIDE EFFECTS



- ✖ side effects of chemo can be mild to very severe, even life threatening
- ✖ The most common are , hair loss, swollen joints, and reduced immune function

CHEMO, SIDE EFFECTS (CONT)

- ✖ Fatigue (carries for up to 6-12 months after treatment)
- ✖ Nausea, feelings of being sick
- ✖ Hair loss
- ✖ Inflammation of mucosal areas (mouth, nose, genitals, etc.)
- ✖ Effects on the heart (altered heart rate, blood pressure, SA rhythm)
- ✖ Skin disturbances (rashes, bruising, itchiness (extreme), sensitivity to light, sore)
- ✖ Loss of fertility (males and females)
- ✖ Allergic reactions
- ✖ Diarrhea, loss of appetite
- ✖ Development of chemotherapy-related tumors
- ✖ Massive, fast weight loss (up to/more than 30 lbs in one week!!!)
- ✖ Numbness or tingling in extremities
- ✖ Psychological damage (depression, hopelessness, social awkwardness, etc.)
- ✖ Increased sensitivity to smell

FATIGUE

- ✖ Considered by many to be the worst side effect of chemotherapy
- ✖ 72-95% of patients experience fatigue
- NCI, 2002
- ✖ Many become incapacitated following treatment, and many require sick leave from work
- ✖ Going to the gym does **NOT** sound like an option to many people on chemo



Healthy People

Tired

Exercise

Vitalized

Cancer Patients

Fatigued

Exercise

Vitalized

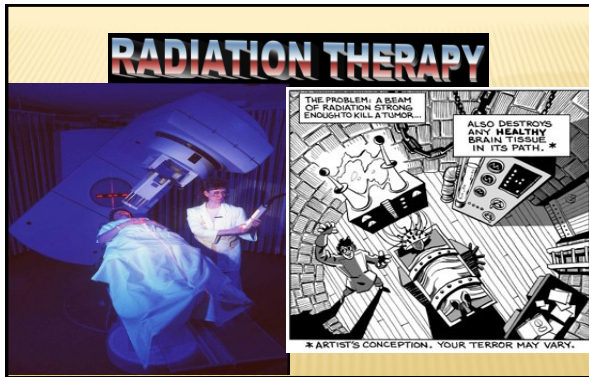
FATIGUE (CONT)



- ✖ Many people become "sick and tired of being sick and tired", and desperately want to get back to normal
- ✖ Adding low intensity exercise can help to improve their tolerance of treatment, improve their immune function, and make them "feel human again"

IMMUNOSUPPRESSION

- ✖ While receiving treatment, most patients experience a marked decline in immune function, leading to easy susceptibility to colds, flu's, and other illnesses and infections
- ✖ **"It's bad enough having to fight cancer but also having a cold all the time makes life even more difficult"** - Rocky Mountain Cancer Rehabilitation Institute Patient



RADIATION THERAPY

Machine radiation

Intravenous radiation therapy

- ✗ Typically used as its own combined with chemo
- ✗ Two types: external beam - precision beams of radiation targeted to right tissue depth & angle to hit tumor – many patients get semi-permanent tattoos to mark correct spots
- ✗ intravenous radiation therapy – IV line is hooked up with radioactive solution

RADIATION THERAPY

- ✗ concept behind radiation therapy is same as chemo
- ✗ Doesn't have drastic side effects of chemo, the major ones being fatigue (not as severe as chemotherapy), skin irritation around beam site, decreased blood count, nausea, increased susceptibility to infection
- ✗ often given prior to surgery to shrink/control the size of tumor, or after surgery to kill any existing cells in the area

RADIATION THERAPY (CONT)

- ✗ Used where surgery is not an option, or where chemo would not be considered an option (ability to cross the blood-brain barrier, non-vascularized tissues, etc.)
- ✗ Given 4-5 times per week, for as many weeks as the referring oncologist determines necessary

RADIATION THERAPY (CONT)

- ✗ Major side effect is fatigue, although not as severe as with chemotherapy.
- ✗ Exercise can help in the same way as with chemotherapy, but the radiation therapy patient may be able to push harder than the chemo patient because their fatigue is not as severe – slightly higher training intensities can be used at your discretion



ALTERNATIVE THERAPIES

- ✦ Practitioners looking for ways to improve their quality of life, aid in reducing the effects of their side effects, as well as for treatment of their disease
- ✦ Some of the most popular alternative therapies recommended for improving quality of life are: yoga, art therapy, aromatherapy, acupuncture, massage therapy, and....

EXERCISE!!!

EXERCISE AND DIET

- ✦ 1/3 of breast, colon, esophagus, kidney, and uterus cancers are attributed to excess body weight and physical inactivity
- ✦ 30-40% of all cancer diagnoses can be prevented by following a healthy diet, regular physical activity, and maintaining a healthy body weight.
- ✦ More than 60% of Canadians consume less than their required amount of fruits and vegetables
- ✦ More than half of Canadians are considered to be physically inactive

Canadian Cancer Society/National Cancer Institute of Canada: [Canadian Cancer Statistics 2005](#)

ACTIVITY AS ALTERNATIVE THERAPY

- | | |
|--|---|
| ✦ <u>Side effects of treatment</u> | ✦ <u>Effects of Exercise</u> |
| + Fatigue | + Increased energy |
| + Loss of muscle mass, gain of body fat | + Gain/retention of muscle mass, loss of body fat |
| + Decreased self confidence, body image, anxiety, tension and depression | + Increases confidence, body image, and stabilizes mood |
| + Reduced immune function | + Increased immune function |
| + Reduced functional capacity | + Increased functional capacity |
| + Decreased overall quality of life | + Improved overall quality of life |

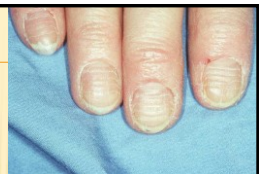
DESIGNING AN EXERCISE PROGRAM FOR CANCER PATIENTS



EXERCISE PRESCRIPTION

- ✦ Major areas of concern:
 - + Increasing cardio fitness
 - + Increasing strength, maintaining muscle mass
 - + Maintaining/increasing flexibility, especially around areas of surgical incision
 - + Maintaining/improving coordination and balance
 - + Having an outlet

EXERCISE PRESCRIPTION (CONT)



- ✦ Precautions:
 - + Check for any swelling in major joints and in fingers (common), as this can hinder what the person may be able to do for exercises
 - + Be aware of their treatment schedule, and allow your plan for them to be flexible
 - + Ensure the areas to be used are wiped down with disinfectant before and after each use

EXERCISE PRESCRIPTION (CONT)

- ✗ **The rules still apply:** progression, overload, periodization, individualization, adequate stimulus, and over training.
- ✗ Can still improve on current level of fitness, even while receiving treatment
- ✗ Can feel better about themselves/yourself, have an outlet, and get stronger throughout treatments
- ✗ Combining resistance training, cardio conditioning and flexibility has the greatest benefits to managing symptoms

PROGRAM DESIGN: MOBILITY DRILLS



PROGRAM DESIGN: STABILITY DRILLS



PROGRAM DESIGN: STRENGTH EXERCISES



SAMPLE PROGRAM DESIGN

✗ 1st week after treatment

Exercise	Sets, Reps	% Max	Rest	Frequency
Mobility circuit	2 sets of 10 reps	Body Weight	30 seconds	4-5x
Stability Circuit	2 sets of 10 reps	Body weight	30 seconds	2-3x
Low-intensity cardio	20 minutes	60% Heart rate max**		2-3x

**Calculate Heart rate max by 220-age

SAMPLE PROGRAM DESIGN

✗ 2nd week after treatment

Exercise	Sets, Reps	% Max	Rest	Frequency
Mobility circuit	2 sets of 10 reps	Body Weight	30 seconds	4-5x
Stability Circuit	2 sets of 10 reps	Body weight	30 seconds	2-3x
Strength Circuit	2 sets of 10 reps	Manageable , gauge by soreness and capacity	30 seconds	2-3x
Moderate-intensity cardio	20 minutes	70% Heart rate max**		2-3x

**Calculate Heart rate max by 220-age

SAMPLE PROGRAM DESIGN

✖ 3rd week after treatment

Exercise	Sets, Reps	% Max	Rest	Frequency
Mobility circuit	1 set of 10 reps	Body Weight	30 seconds	4-5x
Stability Circuit	2 sets of 10 reps	Body weight	30 seconds	2-3x
Strength Circuit	3 sets of 12 reps	Manageable, gauge by soreness and capacity	30 seconds	2-3x
Moderate-intensity cardio	30 minutes	70% Heart rate max**		2-3x

**Calculate Heart rate max by 220-age

SAMPLE PROGRAM DESIGN

✖ 4th week after treatment

Exercise	Sets, Reps	% Max	Rest	Frequency
Mobility circuit	1 set of 10 reps	Body Weight	30 seconds	4-5x
Stability Circuit	1 sets of 10 reps	Body weight	30 seconds	2-3x
Strength Circuit	3 sets of 8-12 reps	Working hard	30 seconds	2-3x
Moderate-intensity cardio	40 minutes	75-80% Heart rate max**		2-3x

**Calculate Heart rate max by 220-age

THANK YOU!! 😊

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