Exercise Testing and Prescription in CANCER

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Cancer is a characterized by the uncontrolled growth and spread of abnormal cells resulting from damage to deoxyribonucleic acid (DNA). Most cancers are classified according to the cell type from which they originate.
About 78% of all cancers are diagnosed in individuals ≥55 year.
Treatment for cancer may involve surgery, radiation, chemotherapy, hormones, and immunotherapy. In the process of destroying cancer cells, some treatments also damage healthy tissue. Patients may experience side effects that limit their ability to exercise during treatment and afterward.

Exercise Testing

A diagnosis of cancer and curative cancer treatments pose challenges for multiple body systems involved in performing exercise or affected by exercise.
Cancer and cancer therapy have the potential to affect the health-related components of physical fitness (*i.e.*, CRF, muscular strength and endurance, body composition, and flexibility) as well as neuromotor function.
No assessments are required to start a light intensity walking, progressive strength training, or flexibility program in most survivors.
There is no evidence the level of medical supervision required for symptom limited or maximal exercise testing needs to be different for patients with cancer than for other populations.
The evidence-based literature indicates one repetition maximum (1-RM) testing is safe among survivors of breast cancer.
Steps to follow for the exercise prescription.

1. Assess current physical activity level
2. Assess past physical activity level
3. Evaluate weight and BMI
4. Assess blood pressure
5. Check for anemia
6. Assess functional status
7. Determine disease status
8. Assess physiological systems
9. Evaluate need for assistive devices
10. Assess bone and muscle strength
11. Determine risk level
12. Plan appropriate exercises

Exercise Prescription

Survivors of cancer should avoid physical inactivity during and after treatment. A single, precise recommendation regarding the FITT principle of Ex Rx is not possible, given the diversity of the population affected by cancer.
The American College of Sports Medicine (ACSM) expert panel on guidelines for exercise in adult survivors of cancer concluded, there is ample evidence exercise is safe both during and after treatment for all types of cancer.
American

Cancer Society's recommendation of 30‑60 min of moderate-to-vigorous intensity PA at least 5 days/week (194,244).
However, that the FITT principle of Ex Rx recommendations for individuals with cancer that follow are based on limited literature. The appropriate FITT recommendations will vary across the cancer experience and require individualization of the Ex Rx.
Exercise professionals should use good judgment in deciding the level of exercise supervision needed on an individual basis.

Type ➟	Aerobic	Resistance	Flexibility
Frequency	3-5 Days per Week	2-3 days per week	2-3 days per week Daily light stretching being most effective
Intensity	Moderate (40-59%) of VO2Max 64-75% of HR_{max}	Start with Low Resistance <30% of 1RM. Progress with smallest increase possible	Move ROM as tolerated
Time	75-150 Min per week	At least 1 set of 10-12 repetitions	10-30 hold for static stretching
Type	Prolong, Rhythmic activity using large muscles groups (walking, cycling, swimming)	Free Weights, Resistance machines, Weight bearing functional tasks targeting all muscle groups	Stretching or ROM of all major joints or muscle groups Concentrate on restrictions

Exercise Prescription consideration in Cancer

- Slower progression may be needed compared to healthy adults. If leads to an increase in fatigue exercise should be reduced to a level that is better tolerated.
- Survivors who have completed treatment can gradually increase exercise duration when tolerated and without exacerbation of symptoms or side effects for all activities.
- Individuals with lymphedema should wear a compression sleeve during resistance training activity.
- Flexibility exercise can be implemented even during active treatment. Focus on joints in which a loss of ROM occurred because of surgery, corticosteroid use, and/or radiation therapy.
- Evidence indicates even those currently undergoing systemic cancer treatments can increase daily PA sessions over the course of 1 month. Several short bouts per day rather than a single bout may be useful, particularly during active treatment.

Special Considerations

- Up to 90% of all survivors of cancer will experience cancer-related fatigue at some point.
- Survivors with metastatic disease to the bone will require modification of their exercise program (e.g., reduced impact, intensity, volume) given the increased risk of bone fragility and fractures.

- Cachexia or muscle wasting is prevalent in individuals with advanced gastrointestinal cancers and may limit exercise capacity, depending on the extent of muscle wasting.
- There may be times when exercising at home or a medical setting would be more advisable than exercising in a public fitness facility.
- Exercise should be stopped if unusual symptoms are experienced (e.g., dizziness, nausea, chest pain).