

# Benefits of Resistance and Aerobic Exercise Association to Nutritional Advice in Cancer Patients

## *Physical Exercise in Cancer Survivors*

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### 1 OBJECTIVES

In cancer patients visceral and subcutaneous fat is strongly related to an enhancement of the comorbidities (Stevinson C, 1990).

Correction of dietary habits and Physical Exercise (PE) are means used for the reduction of metabolic risk factors especially in these patients.

Aerobic exercise has been well studied but few data are available in case of combination with resistance exercise.

The aim of the study is to assess the effects of both exercise, resistance and aerobic, associated to correction of dietary habits in reducing the major risk factors (Dimeo F, 2008).

### 2 MATERIALS AND METHODS

Subjects studied:

15 survived breast cancer women (age T0:  $55.51 \pm 10.94$ , T6:  $56.19 \pm 10.85$ , weight T0:  $76.25 \pm 19.49$ , T6:  $75.96 \pm 17.91$  kg, height  $162.67 \pm 9.46$  cm) previously treated with chemotherapy were subjected to an home based exercise program that consisted of three sessions per week of exercise for a duration of about 1 hour.

The resistance exercises consisted of a program free of any additional weight, while endurance training included 30 minutes of brisk walking at 70% of maximum individual Heart Rate (HR) established at the 6 MWT (six minute walking test) and corresponding to the self perception of effort up to 6 in the reference scale CR10.

The cardiovascular parameters evaluated were:

- Heart rate and blood pressure at rest;
- Heart rate and respiratory rate during the 6MWT;
- Systolic and Diastolic Blood pressure and perceived exertion from CR10 scale at the end of the 6MWT test.

The functional parameters were:

- Sit & Reach for flexibility.
- Hand Grip test to estimate the overall static strength of the upper limbs.
- Chair Test was used to assess the strength of the lower limbs.

In addition to the cardiovascular evaluation, the anthropometrics parameters were included:

- from the data of height and weight was calculated Body Mass Index (BMI= Body Mass Index) (FAO, 2001).
- Circumference of waist/hip: for the measurement of the circumferences was used a tape metric not extensible, flexible and accurate (Holtain Limited, 1.5m Flexible Tape). From these two circumferences was calculated the Waist to Hip Ratio (WHO, 2008).
- Skinfolds : skinfolds were measured using a caliper Holtain (Holtain, Limited Tanner/Whitehouse Skinfold Caliper) (Fidanza F., 2007). We measured the *triceps*, *biceps*, *subscapular* and *supra-iliac* skinfolds. From the data of the thickness of skinfold was obtained body composition and, through the formula of Siri, fat mass and free fat mass (Durnin J.V, 1974).
- The bioelectrical impedance analysis was used to assess hydration status and distribution of body water. The bioelectrical impedance analysis was performed according to the recommendations of the NIH Consensus Statement. The measurements were carried out on the right side of the body (BIA-101, Akern-RJL Systems, Florence, Italy) (Kyle U.G., 2004). The data collect has been processed with the dedicated software (Bodygram pro 3.0) and the parameters derived were: weight, height, Body Mass Index (BMI), Phase Angle (PA), Free Fat Mass (FFM), Fat Mass (FM), Total Body Water (TBW), Extra Cellular Water (ECW), Intra Cellular Water (ICW), Body Cellular Mass (BCM) and Resting

Metabolic Rate (RMR).

These examinations were performed at the beginning (T0) and after 6 months (T6) of exercise program. Being an home based program, was given to each subject a food diary and a accelerometer (for at least 1 week a month) in order to assess the global lifestyle from PAL and eating habits. (Physical Activity Level) (F405, Fit.Life Inc., R&DB Center, Korea).

The food diary was represented by a pre printed paper in which patients reported, meal by meal, their food and water daily intake. The food diary was represented by a pre printed paper in which patients registered, meal by meal, their food and water intake for at least 7 days. The T0 food diary reports the lifestyle of patients before the trial. After T0, were suggested to patients the necessary corrections on their own lifestyle on the basis of American Cancer Society Guidelines. The T6 food diary represents the improvement assessment.

For the statistical analysis we used the Student t formula.

### 3 RESULTS

All parameters are reported in table 1. After 6 months of exercise a significant change for Subscapular skinfold ( $P < 0.02$ ), Body density, Fat Mass and Free Fat Mass ( $P < 0.03$ ). Bioelectrical data show an improvement for Total Body Water ( $P < 0.05$ ). From the 6MWT data, the Peak Respiratory Rate is significantly reduced ( $P < 0.04$ ). The functional parameters also showed a significant improvement of the number of repetitions from the Chair Test ( $P < 0.01$ ).

### 4 DISCUSSION

Both types of exercise and dietary recommendations were easily accepted in the cancer subjects, leading to greater adherence to the unsupervised exercise program of the population survived the neoplastic disease. The combinations of the two kinds of exercise, aerobic and resistance, along with nutritional advice, seems to improve significantly the main parameters strongly linked with cardiovascular risk factors that have a positive effect on the overall quality of life.

The present study has shown that in cancer survivors a short period of mixed aerobic and resistance

exercises improves aerobic exercise tolerance and muscle strength.

As the sample was composed by only 15 women, further and larger sample studies are needed to verify any possible additional difference of the data if the program is used in diverse sequence.

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