

Nordic walking and the Isa method for breast cancer survivors: effects on upper limb circumferences and total body extracellular water. A pilot study

Andrea Di Blasio¹, Teresa Morano¹, Giorgio Napolitano¹, Ines Bucci¹, Serena Di Santo¹, Sabina Gallina², Lucia Cugusi³, Francesco Di Donato⁴, Alberto D'Arielli⁵, Ettore Cianchetti⁶

¹Department of Medicine and Aging Sciences, 'G. d'Annunzio' University of Chieti–Pescara, Italy.

²Department of Neuroscience and Imaging, 'G. d'Annunzio' University of Chieti–Pescara, Italy.

³'M. Aresu' Department of Medical Sciences, University of Cagliari, Italy.

⁴Dietamovimento.it Laboratories, Montesilvano, Italy.

⁵Sportlab, Francavilla al Mare, Italy.

⁶Department of Medical, Oral and Biotechnological Sciences, 'G. d'Annunzio' University of Chieti-Pescara, Italy.

Online supplementary material

Materials and Methods

Subjects

The inclusion criteria for the breast-cancer survivors were: 40 < age < 55 years; no past and present chemotherapy; no present radiotherapy and lymphatic drainage; present hormonal therapy; cardiovascular and orthopaedic eligibility for Nordic walking; no endocrine diseases; lymphoedema lower than class 2 of the Clinical, Aetiological, Anatomical, Pathophysiological – Lymphoedema (CEAP-L) classification [1]; no dieting or use of nutritional supplements; no participation in any exercise programme during the prior 6 months to the study; and non-employed status.

Anthropometry and extracellular water assessment

A second level anthropometrist of the International Society for the Advancement of Kinanthropometry followed the guidelines of the Society [2] to measure weight, stretched stature, and the following circumferences of the upper limbs: relaxed arm (i.e., at the mid-acromiale-radiale® point); maximal forearm; mid-forearm (i.e., at the mid-point between the radiale® and stylium® points); and wrist (i.e., at the distal region of the stylium® point). A stadiometer with a balance-beam scale (Seca 220; Seca, Hamburg, Germany) was used to measure the participant weight and stretched stature, anthropometric tape (Cescorf, Porto Alegre, Brasil) was used for the circumference measurements, and a segmometer (Cescorf, Porto Alegre, Brasil) was used to locate the mid-acromiale-radiale® point and the mid-forearm. Anthropometric measures were reported to the nearest 0.1 kg and 0.1 cm.

Bodily extracellular water of the participants was determined using a hand-to-foot electrical bioimpedance technique, with a 50-kHz frequency bioelectric impedance analyzer (BIA 101; Akern, Pontassieve, Italy), 3 h after waking, and immediately after voiding, with the participants in a supine position, without any conducting garments.

References

- 1 Gasbarro V, Michelini S, Antignani PL, et al.: The CEAP-L classification for lymphedemas of the limbs: The Italian experience. *Int Angiol* 2009;28:315–324.
- 2 Stewart A, Marfell-Jones M, Olds T, de Ridder H: International standards for anthropometric assessment. ISAK, Portsmouth, 2011.