A 10 year body composition case study of a 77 year old ultramarathoner

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DOI: 10.12920/jopola.2013.03

Abstract

The aim of our study was longitudinal monitoring of body composition in 10 years, a ultramaratoneta of 77 years, who started racing assiduously, at age 46. The athlete has completed a total of 18 ultramarathon of 100 km with a bp of 12h: 51 'obtained in 2009.

Faced with a bone maintenance highlighted DEXA examination, they detected the anomalies of water ratio intra / extracellular, which have no analogies in literature and in need of further study.

Keywords: Body composition, extreme endurance, body mass density, training.

Riassunto

Lo scopo del nostro studio è stato il monitoraggio longitudinale della composizione corporea negli ultimi 10 anni, di un ultramaratoneta di 77 anni, il quale ha iniziato a gareggiare assiduamente, all'età di 46 anni. L'atleta ha completato un totale di 18 ultramaratone di 100 km con un bp di 12h: 51 'conseguito nel 2009.

A fronte di una mantenimento della massa ossea evidenziato dall'esame DEXA, si sono rilevate delle anomalie del rapporto idrico intra/extracellulare, che non trovano analogie in letteratura e che necessitano di ulteriori approfondimenti.

Parole chiave: composizione corporea, estrema resistenza, densità di massa corporea, allenamento.

Introduction

Running is one of the most practiced physical activities in order to preserve the physical efficiency and slow down the process of aging. In recent years the number of individuals of advanced age who are dedicated to running and participated in competitions on paths much longer than traditional 42,195 km (26.2 miles) marathon, increased[1,2,3]. On long-term effects of the assiduous practice of drag racing extreme body composition in subjects over 70 are limited data available in the literature.

The goal of our study was the longitudinal monitoring of body composition in the last 10 years, of a 77 years old ultramarathon runner; Our subject started doing endurance work assiduously at the age of 46 years. Constant training (about 1920 km per years), led him to achieve: a best performance (b.p.) of 3h: 19' on 42 km at the age of 60, a best performance 5h: 50' on 50 km in 1990 (Pistoia–Abetone ultramarathon). He has completed a total of 18 ultramarathons of 100 km with a b.p. of 12h: 51' achieved in 2009.

Materials and Methods

The data regarding the body composition of our subject were collected 3 times in the last decade and scored by: Anthropometric measurements, dual-X-absorptiometry, bioimpedence. Body weight (BW) and body height (H), were performed according to conventional criteria and measurements procedures, to the nearest 0.1 kg using a Seca scale, 0.5 cm using a stadiometer incorporated with the scale respectively. Body mass index (BMI), was expressed as weight/height^2 (in kg/m^2). Total and segmental fat mass (FM), lean body mass (LBM) was expressed in kg, bone mineral content (BMC) in g and bone mineral density (BMD) in g/cm^2 and were measured using dual X-ray absorptiometry (DXA) total body scan Lunar radiation Corp. Madison, WI, USA, software ver. 3.6. 39.5 bioelectrical impedence (BIA) measurements were performed at two different times with a bBIA 101S, by Akern/RIL System-Florence Italy.

Anthropometric measurements were taken before and after the race. Weight loss of 2.5 kg was observed, which on

evaluation of body fluids, using BIA, was principally found to be due to loss of Intra cellular water (1.9 lt), followed by lean mass (0.5 kg) and extra cellular water (0.1 lt). Age-related decline in muscle mass and strength, is typically offset by gains in fat mass. However in our case over the course of 10 years there was a reduction in body weight of 2.6 kg, but a decrease in lean body mass of only 1.866 kg.

Discussion

Some authors believe that the lean mass represents more than 50% of bodyweight in young adults, this percentage tends to decrease with age, reaching 25% at 75-80 years. Age-related muscle loss is a result of reduction in the size and number of muscle fibers, possibly due to multifactorial processes which involve: physical activity, nutritional intake, oxidative stress and hormonal changes[2,3]. Many authors have reported that physical activity may have a primary protective role in adults, as regards to osteoporosis[4,5,6]. Numerous studies have concentrated on defining the most effective physical activity and the best type of training in adults in order to prevent or slow the process of bone demineralization. Although it is already a widely-accepted concept, the recommended intensity of high impact training (weight-bearing) in older age groups is debated to this day[6,7,8]. For example, resistance training combined with amino acid-containing supplements, in particular essential amino acid plus high concentration leucine is an effective combination in preventing age-related muscle wasting and weakness[9]. In our study we observed a tendency towards maintenance of LBM, in contrast with the literature, which has described muscle loss of up to 1-2% per year after the age of 50[10,11,12]. Similarly the FM did not increase over the ten year period. This is probably due to resistance training, and consequently we hypothesize that exercise may play a vital role in maintaining muscle integrity.

Tab. n°1: Body composition of our subject at 3 discrete times in the last decade

Our subject

	2003	**2008**	**2012**
Body Weight (kg)	67.5	63.0	64.9
Height (cm)	173.5	173.5	173.5
BMI (kg/m²)	22.42	20.92	21.55
Lean body mass (kg)	50.96	49.99	49.10
Fat mass %	20,7%	16,8%	20,3%
BMD (g/cm²)	1,140	1,104	1,068
BMC (g)	2895	2809	2666
Whole body Z-score	-0,1	-0,2	0,0

Tab. n°2 body composition by BIA (pre race and post-race 100Km ultramaraton 2012)

Evaluation of body fluids

	Pre-race	**Post-race**
Weight (kg)	64.9	62.4
TBW	41.5	39.5
ECW	21.0	20.9
ICW	20.5	18.6

TBW= Total body water ECW =Extra cellular water ICW = Intra cellular water

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Presented at XXXII Word Congress of Sports Medicine (Roma, Italy, 27th september 2012)