Original Article **Journal of Athletic Performance and Nutrition**
Volume: 7 Issue: 1 pp:47-54 2020

Considerations Regarding Body Composition in Trained and Untrained

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Received Date: 23.02.2020
Accepted Date: 05.07.2020

Abstract

Given the importance of the amount of visceral fat for the metabolic pathology, we evaluated the body composition in trained and untrained. The trained subjects taken from the study came from the Armony Club, Iași, România, the male ones being bodybuilders and the female ones aerobics practitioner. The results showed a lower percentage of visceral fat/body fat ratio in untrained men than in untrained men (control group), but not in the case of trained versus untrained women. The percentage of visceral fat of female subjects was significantly higher in the case of the untrained group (control). The reasons for the fact that the percentage of visceral fat is relatively higher in trained men may be represented by cortisol and testosterone discharges during physical exertion.

Keywords: Visceral Fat, Bodybuilding, Aerobics

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Introduction

Visceral fat is a risk factor for metabolic, cardiovascular and cancer diseases (Yang et al., 2017). In athletes, the mass of visceral fat increases with age, in both genders, but in adults over 65 and female athletes should be further investigated (Swainson, Batterham & Hind, 2019). Not only physical exercises, but diet also result in reduced visceral fat, diet leading to more subcutaneous fat loss, and physical exercises favoring decreased visceral fat stores (Verheggen et al., 2016).

Objectives

In obese women with metabolic syndrome, high-intensity exercise training reduces total abdominal fat, subcutaneous abdominal fat, and abdominal visceral fat, while low-intensity exercise training does not produce any significant changes in abdominal adipose tissue (Irving et al., 2008). A review study showed that moderate to high intensity aerobic training has the highest potential to reduce visceral adipose tissue, in both men and women suffering from overweight, without caloric restriction, after only 3 months (Vissers et al, 2013). A study on female subjects showed that after weight loss, both aerobic and strength exercises prevented the regaining of dangerous visceral fat (Hunter et al, 2010). One of the favorite leisure activities for men is bodybuilding, and for women aerobic gymnastics. In view of these considerations, in this paper we set out to evaluate the effects of practicing the respective leisure activities (bodybuilding and aerobic gymnastics) on the body composition.

Materials and methods

The research was conducted on 10 male subjects, who practiced bodybuilding as a leisure activity, and 10 female subjects, who respectively practiced aerobic gymnastics. Both groups performed leisure activities for at least 3 months at the Armony Club in Iași, România, following a regular program, under the supervision of the coaches. The control groups were 10 untrained men and 10 untrained women. For all participants in the study was determined body composition (percentage of body fat, percentage of muscle mass, percentage of visceral fat), as well as metabolic rate, using an OMRON body composition weiging **(**device that, besides weight, based on electrical impedance, displays body composition, and in correlation with age and height, metabolic rate). For the percentages of total fat, visceral fat, muscle mass, as well as for metabolic rate, the mean values and the one-way ANOVA significance test were calculated compared between the studied and control groups (within the same genus). The

respective physiological constants were compared between trained and untrained men, as well as between trained and untrained women, based on the significance coefficient "p", using the Microsoft Office package of functions. Based on the average values, the visceral fat/body fat ratio was calculated for the four groups studied.

Results

The results are presented in tables 1, 2, 3 and 4.

Table 1. Anthropometric data, body composition and metabolic rate of trained male subjects.

No.	Age (year)	Height (cm)	Weight (kg)	Total fat (%)	Muscle mass (%)	Metabolic rate	Visceral fat (%)
1	21	192	102	22,1	38,7	2067	8
2	50	177	69,4	8,2	44,5	1541	5
3	51	176	77,2	23,2	35,3	1671	9
4	45	185	105,4	19,8	37,2	2047	13
5	39	167	83	28,7	34,4	1799	14
6	32	181	98,4	31,5	32,5	1994	13
7	39	183	79	18,5	38	1734	7
8	39	172	89,5	27,5	34,7	1879	14
9	31	177	78,8	22,1	38,1	1751	8
10	32	172	70,3	17,3	41,1	1647	7
Average values				12,83	21.3684	1813	9,8

Table 2. Anthropometric data, body composition and metabolic rate of untrained male subjects.

No.	Age (year)	Height (cm)	Weight (kg)	Total fat (%)	Muscle mass (%)	Metabolic rate	Visceral fat (%)
1	25	186	81,1	18,6	40,1	1787	5
2	51	171	87	28,5	33	1810	14
3	39	180	92,2	30,6	32,3	1889	12
4	53	178	103,4	33,6	29,7	2002	18
5	39	177	91,5	27,6	34,3	1895	12
6	65	173	96,4	33,9	28,7	1881	19
7	37	183	100	29,1	33,3	2008	13
8	23	178	65,3	12	44,5	1591	2
9	22	169	94,3	31,2	34,5	1983	13
10	79	178	75,8	13,8	37,2	1578	8
Average values				16,41	20	1842.4	11,6

Table 3. Anthropometric data, body composition and metabolic rate of trained female subjects.

No.	Age (year)	Height (cm)	Weight (kg)	Total fat (%)	Muscle mass (%)	Metabolic rate	Visceral fat (%)
1	33	175	57,1	24	30	1339	2
2	23	170	57	24,8	31,6	1311	3
3	25	170	59,9	29,2	27,7	1311	3
4	46	168	56,2	31,1	27	1317	4
5	21	170	56,8	22,4	33,2	1313	2
6	34	168	55,6	27,1	29,4	1288	2

7	36	168	56,6	23,7	32,4	1303	3
8	37	170	54,4	26,6	28,2	1293	3
9	50	175	66,3	30,5	29,1	1434	5
10	32	167	54,4	14,9	38,4	1370	3
Average values				15,42	19,27	1327.9	3

Table 4. Anthropometric data, body composition and metabolic rate of untrained female subjects.

No.	Age (year)	Height (cm)	Weight (kg)	Total fat (%)	Muscle mass (%)	Metabolic rate	Visceral fat (%)
1	40	172	79,8	42,9	24	1531	7
2	42	160	58,9	35	26,5	1276	6
3	20	165	54,3	27,3	29,7	1254	3
4	24	160	68,8	41,3	25	1363	6
5	22	170	65,5	34,3	27,5	1385	4
6	21	165	53,5	25,9	30,4	1247	3
7	22	157	61,8	34,3	28,9	1290	5
8	23	154	48,5	25,8	31,1	1142	3
9	20	169	65,3	34	27,8	1378	4
10	23	170	68	22	34,5	1373	3
Average values				21	18	1323,9	4,4

The values varied insignificantly for the metabolic rate (which certifies the homogeneity of the lots), the body fat index and the percentage of muscle mass, between the groups of trained subjects and those of untrained subjects, both men and women. The exception was the percentage of visceral fat, only in the case of female subjects, which was significantly higher in the case of the group of trained persons (4,4 compared to 3). On the other hand, the results

show a visceral fat/body fat ratio lower in untrained men than in trained men (0,58 vs. 0,76), but not in the case of untrained women compared to trained ones (0,24 against 0,19).

Discussions

It is known that aerobic exercises preferentially lose deposits of visceral fat, this fact being argued by magnetic resonance measurements (Thomas et al., 2000). One explanation for the fact that men who practice bodybuilding as a free-time activity have a higher percentage of visceral fat may be that high-intensity physical exertion requires endocrine adaptation. The effects of cortisol are mediated by a glucocorticoid receptor, and the effects of testosterone by androgen receptors, the density of both being higher in visceral adipose tissue than in subcutaneous tissue (Bjorntorp, 1997). It is known that high intensity short-term workouts result in increased plasma testosterone (Devi et al., 2014). A study in moderately trained male subjects found that 30 minutes of exercise results in increased cortisol if the intensity is high or moderate, and the plasma level of the hormone decreases if the intensity of the exercise is less than 40% of the maximum oxygen volume (Hill et al., 2008). These preliminary results, if confirmed by future studies, indicate that in order to maintain metabolic health men must combine bodybuilding as a leisure activity with low intensity endurance training. It is known that men have more time for leisure activities, but nonetheless, women have a more positive leisure experience and time perspectives than men (Codina & Pestana, 2019). It will be necessary, therefore, a reorganization of the free-time sports program for bodybuilding lovers, in accordance with the recommendations on exercise prescriptions (Kafkas, 2019). In addition, the results of the study are important for training in performance sports (Kafkas, Çinarli & Kafkas, 2019), where body composition is a factor on which performance depends, but also in the sports activities of untrained (Kafkas et al., 2014).

Conclusions

1. In the trained women who practiced aerobic gymnastics as a leisure activity, the percentage of visceral fat was lower compared to the control group.

2. The percentage of visceral fat/body fat ratio was lower in untrained men than in trained men (bodybuilding), but not in the case of untrained women compared to those trained.

3. The increase in the percentage of visceral adipose tissue in men, probably explained by the action of cortisol and testosterone discharged after physical exertion, may be a reason for alternating bodybuilding workouts with those of low intensity endurance.

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Acknowledgments: the author thanks the management of the Armony Club in Iași, România, and the coaches Dan Luiuz, Bianca Cadăr, Mădălin Pușcașu, Bianca Grădinariu.