



## Body Composition Evaluation Prior and Posterior Strength Training Intervention

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### ABSTRACT

Objective: Evaluate the body composition of students who practice weight lifting exercises based on four variables: Total Weight (TW), Fat Percentage (%F), Fat Weight (FW) and Fat-Free Weight (FFW). Check eventual changes regarding body composition after strength training exercises followed by a personal trainer. Results: of the 30 individuals who participated in this research, there was an average TW decrease (from 69,5 kg to 68,9 kg), %F (from 23,78% to 21,31%) and FW (from 16,45 kg to 14,57 kg), and a FFW increase (from 53,07 kg to 54,40 kg). Conclusion: therefore, it can be noticed that strength training accompanied by a personal trainer, in a long term, occasioned in fat-free mass and mineral bone density gains

### KEYWORDS

Body fat. Personal trainer. Body composition. Total weight.

### Introduction

On the last few years, there has been a significant increase on the number of people who has opted to start weight lifting (WL). One of the main benefits one can get from practicing weight lifting is strength increment along with an increase in muscular resistance and fat-free body mass gains (HUMBURG, *et al*, 2007). WL consists of a high-intensity activity and thus can culminate in body fat loss due to the increase of the overall energy expenditure (JANUÁRIO, 2010).

Besides that, WL has also shown benefits as it can control some coronary diseases risk factors. It is possible to realize that weight lifting trainers acquire better development of skeletal muscle as they raise the muscles mechanic actions and facilitate Everyday Activities (EA) performance (BRAITH & STWEART, 2006).

Sedentary individuals present a high percentage of visceral and subcutaneous fat, and these factors cause a higher risk of cardiovascular diseases, such as: atherosclerosis, high blood pressure, heart failure, among others (BRAITH & STWEART, 2006).

### Methodology

A longitudinal research was performed with 30 people (17 women and 13 men), consisting a group average of 33 years old. These individuals practiced strength trainings at Sport Life gym in Fortaleza (CE) and they all followed personal trainer instructions. All of them practiced strength training at least 3 times a week.

The research was conducted from June 2006 to September 2015. The individuals' ages were within the interval of 20 to 55 years old, and two tests were carried out in two different dates with at least a 14-month difference between them. The participants' body compositions were evaluated based on comparisons of fat percentage (%F), total weight (TW), fat weight (FW) and fat-free weight (FFW).

The recommended fat percentage values were classified according to the ACSM (American College of Sports Medicine; 1986). For men: very low (5%), below average (6 to 14%), average (15%), above average (16 to 24%), very high (25%). For women: very low (8%), below average (9 to 22%), average (23%), above average (24 to 31%), very high (32%)

The program Microsoft Excel 2016 were used as a tool in order to evaluate the variables total weight and fat percentage.

### Results and Discussion

In both tests, each individual's TW, FFW, FW and %F were analyzed and compared to the respective values checked before the exercise interventions.

On average, among the thirty people, there was a slight decrease on the variables cited above. For the TW, the average on the first test was 69,52 kg and 68,97 kg on the second test; regarding the FFW, 53,07 kg before and 54,40 kg after the intervention – along with the increase of the FFW, it is valid to affirm that there also was an increase in the mineral bone density. On the first evaluation, the group presented a %F of 23,78% (16,45 kg of FW), whereas on the second evaluation, the %F was 21,31% (14,57 kg of FW) (Table 1).

| AVERAGE - TW (total weight) kg | AVERAGE - FFW (fat-free weight) kg | AVERAGE - %F | AVERAGE - FW (fat weight) kg |
|--------------------------------|------------------------------------|--------------|------------------------------|
| 69,52                          | 53,07                              | 23,78        | 16,45                        |
| 68,97                          | 54,40                              | 21,31        | 14,57                        |

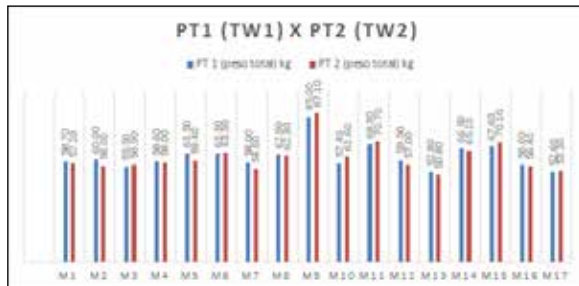
**Table 1 – Mixed group's averages.**

All of the 30 individuals were separated into two groups according to their gender: masculine with 13 people (ages varying between 21 and 42 years old) and 17 people in the feminine group (ages varying between 20 and 55 years old).

In the feminine group, the TW initial variation consisted of a lowest weight was of 52,60 kg and a highest of 85 kg, whereas after the intervention, the lowest weight measured was 50,80 kg and the highest 87,10 kg. Statistically, the TW did not vary; there was a slight variation on the FFW—from 44,19 kg to 45,21 kg; there was also a tiny visible variation on the %F – from 27,86% (17,42 kg) to 25,52% (16 kg) (Table 2).

| AVERAGE - TW (total weight) kg | AVERAGE - FFW (fat-free weight) kg | AVERAGE - %F | AVERAGE - FW (fat weight) kg |
|--------------------------------|------------------------------------|--------------|------------------------------|
| 61,61                          | 44,19                              | 27,86        | 17,42                        |
| 61,20                          | 45,21                              | 25,52        | 16,00                        |

**Table 2 – Feminine group's averages.**



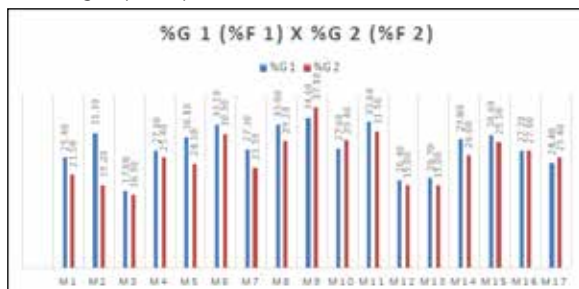
**Graph 1 – TW comparison before and after the intervention within the women group.**

None of the 17 women presented a very significant change on the TW, but the woman W5 (M5) had the largest variation, reduction of 4,10 kg, although there were women who had an increase on the TW (Graph 1).



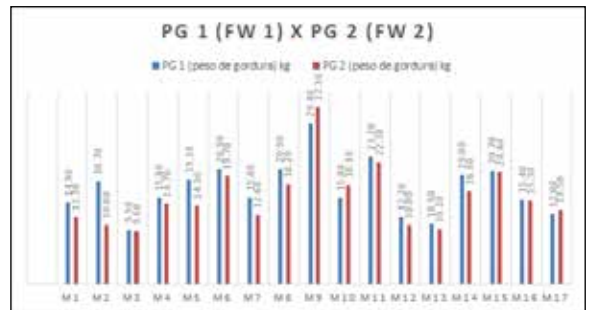
**Graph 2 – FFW comparison before and after the intervention within the women group.**

Statistically, there were not big changes on the FFW in the women group (Graph 2).



**Graph 3 – Fat percentage comparison before and after the intervention within the women group.**

Regarding the %F, some women presented significant and visible changes, for instance, women 2, 5 and 7 (M2, M5 and M7) were the ones who had the highest variations – M2: from 31,10% to 19,20%; M5: from 30,10% to 24,10%; and M7: from 27,30% to 23,10%. M9, M10 and M17 increased their %F (Graph 3).



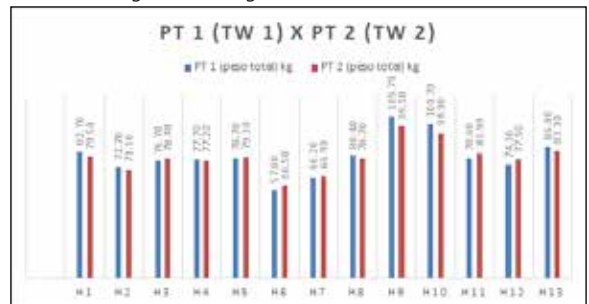
**Graph 4 – FW comparison before and after the intervention within the women group.**

According to the former graph, it is possible to see (in kilograms of fat) the difference between the values of before and after the intervention, in which women M2, M5 and M7 had the largest decrease. M2 reduced from 18,70 kg to 10,80 kg of fat; M5 reduced from 19,10 kg to 14,30 kg; and M7 went from 15,80 kg of fat to 12,60 kg. M9 and M10 were the ones who had the highest FW raise, approximately 3 kg and 2,3 kg, respectively (Graph 4).

| AVERAGE - TW (total weight) kg | AVERAGE - FFW (fat-free weight) kg | AVERAGE - %F | AVERAGE - FW (fat weight) kg |
|--------------------------------|------------------------------------|--------------|------------------------------|
| 79,86                          | 64,69                              | 18,43        | 15,17                        |
| 79,13                          | 66,43                              | 15,80        | 12,70                        |

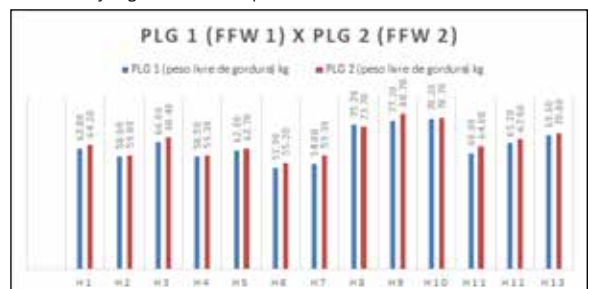
**Table 3 – Masculine group's average.**

Data from 13 men, in the age range from 21 to 42 years old, were collected and then analyzed. The TW initial variation consisted of a minimum of 57,80 kg and a maximum of 105,70 kg, whereas after the intervention the lowest value found in the group was 60,50 kg and the highest 99,50 kg. This masculine group, in average, did not show any elastic change, although the FW presented a significant variation – from 15,17 kg to 12,70 kg (Table 3).



**Graph 5 - TW comparison before and after the intervention within the men group.**

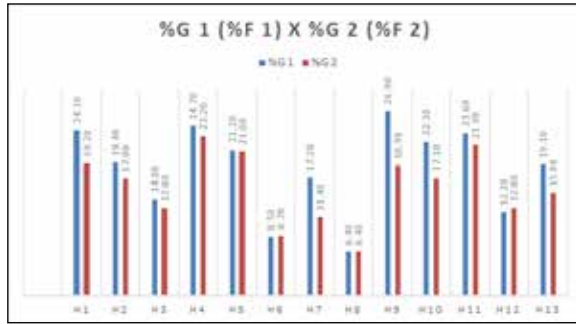
The most significant change observed in this study was between the individuals H9 and H10, who presented a loss of almost 6 kg each. However, the others' results were not very statistically significant (Graph 5).



**Graph 6 - FFW comparison before and after the intervention within the men group.**

Regarding the FFW, it was not possible to see any important variation, although the majority increased their FFW, which means that there was a lean mass gain, along with an increase on the mineral bone density (Graph 6).

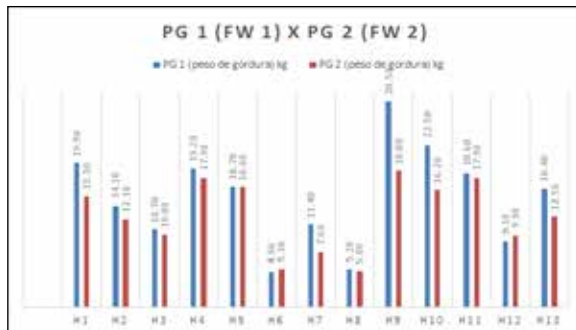
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**Graph 7 - %F comparison before and after the intervention within the men group.**

It is clear that the individuals decreased their %F down to 8%, approximately. The man 9 (H9) weighted 105,70 kg (26,90% of fat) before the intervention. After the trainings, his weight reduced to 99,5 kg (18,90% of fat) (Graph 7).

The most significant changes in FW can be seen in individuals H9 and H10, who, respectively, went from 28,5 kg to 18,8 kg and from 22,5 kg to 16,2 kg of fat (Graph 8).



**Graph 8 - FW comparison before and after the intervention within the men group.**

**Conclusion**

Therefore, based on the collected data, it is evident that the frequent practice of physical exercises, in this case strength trainings, along with personal trainers’ instructions, culminated in positive changes regarding the individuals’ body composition. Additionally, the majority of them reduced their %F and increased their FFW, which brings to the conclusion that they gained lean mass and raised their mineral bone density.

Despite the majority’s positive gains, it is necessary a continued and progressive strategy, because many of them still do not have appropriate fat percentages, which can endanger their everyday activities and also cause coronary diseases, heart failure, high blood pressure, among others.

In conclusion, it is vital that everybody involved in this research become aware of the risks of having inappropriate health factors and thus reach for means of improving their life quality. So, educative interventions about life quality, health promotion and healthy nourishment are good methodologies in order to raise awareness, even for people who already practice weight lifting.

**References**

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