# Mass and body composition particularities of rugby compartments

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## Abstract

The aim of this study is to identify and underline the morphological particularities of Romanian professional rugby players. This aspect can contribute to the improvement of training contents. The hypothesis of this study is that body mass values of the two compartments are in conformity with the optimal standards for this sport. The study included the players of the team Stejarii București, which comprises the best players of the Romanian championship. Among the 32 tested players, 17 are forwards and 15 backs. Evaluations were done by positions, and we drafted tables with arithmetic means and standard deviations for each position. We took several anthropometric measurements for the rugby players, thus determining the qualitative level of the body mass between the two compartments. The findings indicate that players have a certain level of morphological adaptation to specific effort by the post they occupy within the team. The players feature a hypertrophy of the muscle tissue, a phenomenon specific to strength sports. However, some of the players also had a significant amount of fat mass, which contributes to less impressive performances.


***Key words**: fat body mass, lean mass*


## Rezumat

Scopul acestui studiu este reprezentat de identificarea și evidențierea specificului morfologic al jucătorilor profesionişti de rugby din România, aspect ce poate contribui ulterior la îmbunătăţirea conținutului antrenamentului. În realizarea acestei lucrări am pornit de la premisa că valorile de masă și compoziție corporală ale celor două compartimente se încadrează în standardele optime ale ecestui sport. Studiul s-a desfăşurat pe jucătorii echipei Stejarii București, o selecționată a celor mai buni jucători din campionatul intern. Din cei 32 de sportivi testați, 17 sunt jucători ai compartimentului de înaintare și 15 componenți ai liniei de ¾. Evaluările au fost făcute pe posturi, mediile aritmetice şi abaterile standard la nivelul fiecărui post au fost întabelate. S-au efectuat măsurători antropometrice ale jucătorilor de rugby, determinând nivelul calitativ al masei corporale între cele două compartimente. Rezultatele indică faptul că jucătorii au un nivel de adaptare morfologică la efortul specific, în funcţie de postul ocupat în echipă. Jucătorii testaţi prezintă o hipertrofie a ţesutului muscular, fenomen specific sporturilor de forţă. Cu toate acestea, stratul de ţesut adipos este mare, la unii dintre jucători, fapt ce contribuie la diminuarea performanţelor sportive ale acestora.


***Cuvinte cheie**: țesut adipos, masă activă*

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## Introduction

Performance physical effort determines adaptive variations of the human body as a whole, starting with the somatic nervous system, coordinator of voluntary motricity and in charge with vegetative functions (cardiovascular, respiratory) and endocrine-metabolic functions, responsible for ensuring the energetic substrate of muscular effort.

There are numerous studies (1-3) in the scientific literature concerning the adjustment capacities of rugby players, mostly in countries with rugby tradition. In Romania, this subject has not been approached very much by specialists, considering the low popularity of this sport.

For this reason, in the following lines, we will outline the two compartments of the rugby team:

• The forwards, comprised of 8 players:
- *first line* – 2 props and a hooker;
- *second line* – two players;
- *third line* – two flankers and a lock.

• The backs, comprised of 7 players:
- *halves* – a scrum-half and a fly-half;
- *centres* – 2 players;
- *wings* – 2 players;
-*the full-back.*

The demands of each compartment and of each position are so diverse, that team unity is essential in attaining the objectives. Generally, rugby is a sport for all shapes and sizes, but it is also a sport of individual attributions and skills.

## Purpose

Considering the low popularity of this sport in Romania, there have been only a few assessments of players' exercise and effort adjustment capacity. For this reason, we decided to conduct certain morphological tests on rugby players within the first Romanian league. We compared the results between compartments, and our findings to those of existing studies and to the biological model of top players.

The purpose of this study was to identify and highlight the morphological particularities of professional rugby players in Romania, which can contribute to an improvement of training contents.

In this paper, we focus on the adjustment of rugby players' body composition to game-specific effort.

## Hypothesis

In this investigation, we have started from the idea that body mass and composition values of the two compartments range within the optimal standards for this sport.

## Material and methods

This study comprised anthropometrical measurements of the players and recordings of adjustment conditions specific to rugby.

The study was conducted on the players of the team Stejarii București, which comprises the best players of the Romanian championship.

Among the 32 tested players, 17 are forwards and 15 backs. Evaluations were done by positions, and we drafted tables with arithmetic means and standard deviations for each position.

Among the morphofunctional measurements, we will highlight the following:
- body mass
- height
- brachial skin fold thickness
- subscapular skin fold thickness
- intercostal skin fold thickness
- abdominal skin fold thickness
- femoral skin fold thickness

Body composition was calculated by using the methods of the five skin folds on the right side of the body. This method has been used to calculate the body fat percentage of athletes from INMS, Bucharest. (1) Through this formula, we calculated the amount of lean and fat mass, as well as their percentages.

## Results and discussions

In the following lines, we present and discuss the results of measurements taken for the two compartments. It is well known that the two compartments have different characteristics, from the perspective of effort particularities, dominant motor skills and somatic constitution. However, we have chosen to present these data by comparison in order to underline the degree of specific adjustment to effort, by considering the proportions of the two compartments.

Figure 1 features the arithmetic means and standard deviations of measurements applied to the players of the two compartments.

| Statistical indicators | Age (years) | Body mass (kg) | Height (cm) | Arm-span (cm) | Lean mass (kg) | Lean mass (%) | Body fat (kg) | Body fat (%) |
|---|---|---|---|---|---|---|---|---|
| **FORWARDS** | | | | | | | | |
| MEAN | 22 | 108 | 188 | 194 | 83 | 77 | 25 | 23 |
| A. S. | 2.4 | 6.3 | 5.0 | 6.7 | 4.7 | 4.8 | 6.2 | 4.8 |
| **BACKS** | | | | | | | | |
| MEAN | 21 | 89 | 181 | 186 | 73 | 83 | 15 | 17 |
| A. S. | 2 | 7.5 | 6.1 | 7.4 | 5.6 | 3 | 3.5 | 2.9 |

**Figure 1.** Results of measurements applied to players of the two compartments

Similar studies on rugby players have generated different age means for the two compartments: forwards have a higher mean than backs (4). This phenomenon is mainly due to the different tasks of the two compartments and to the different importance of basic motor skills.

The mean age of the players of the two compartments is a follows: 22 for forwards and 21 for backs. Mean ages of both compartments are low, compared to those found in other studies. This phenomenon indicates a lack of game experience among the first-league players. We will also have to determine which anthropometric and physiological parameters are influenced by this low age mean and why.

The low age mean of these players is mainly due to the exodus of valued players to French and British championships. The players within our study are top players in the league. They have all the qualities required for top game, but they still lack the experience necessary to play in higher leagues.

The mean body mass of the two compartments is the following: 108 kg for forwards and 89 kg for backs. (Fig. 2) The weight difference comes from the distinct game tasks of the two compartments. (4)

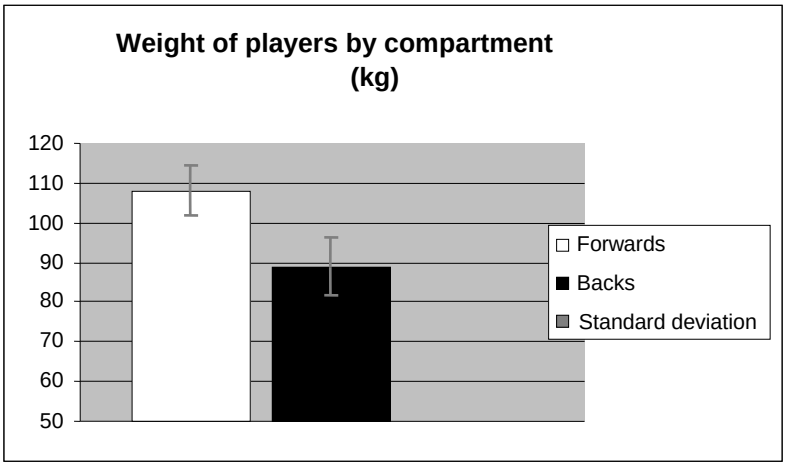


**Figure 2.** Mass of players within the two compartments

The means of both compartments range within the optimal limits for these compartments, featured in previous studies, too. Both means coincide to those of a study conducted in 2005 on 72 players of the most valuable league at that moment ("Super 12")(2)

Concerning height, proportions are similar between the two compartments; the difference of means is 7 cm. Both forwards and backs range within the ideal height parameters for these players. (1, 2, 4) The only ones who failed to range within optimal values are scrum-halves, but the difference of mean between them and the ideal performer model is too small to affect their sports performance.(5)

It is known that the tasks of forwards and those of backs are very different; motor skills and their manifestation forms are found in different percentages. Therefore, the body composition of forwards and backs is different. While forwards are more massive, with a more consistent lean mass, the backs of a rugby team are more athletic, because their dominant motor qualities are skilfulness and powerful extension. (5) It is obvious that fat mass percentages should be as low as possible for both compartments, compared to the muscle mass, considering the energetic support of these players.

The lean mass difference between the two compartments is 10 kg; forward players have significantly larger body mass than back players. (Fig. 3) Standard deviations are relatively equal: 5 kg more or less. These are due to somatic differences between positions, within the same compartment.

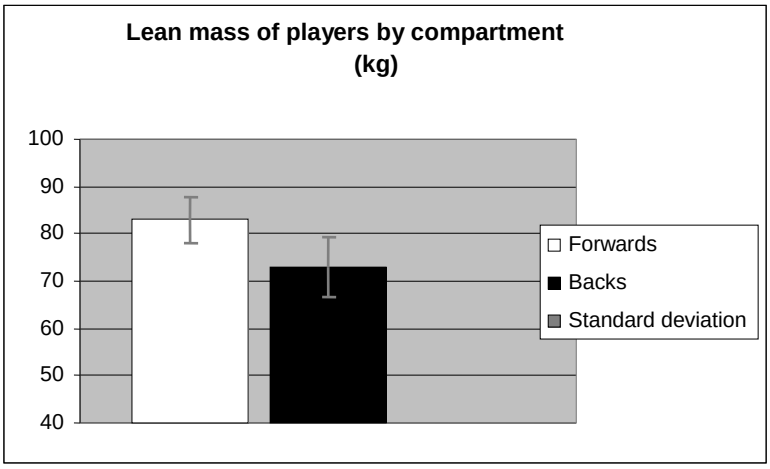


**Figure 3.** Lean mass of players in the two compartments

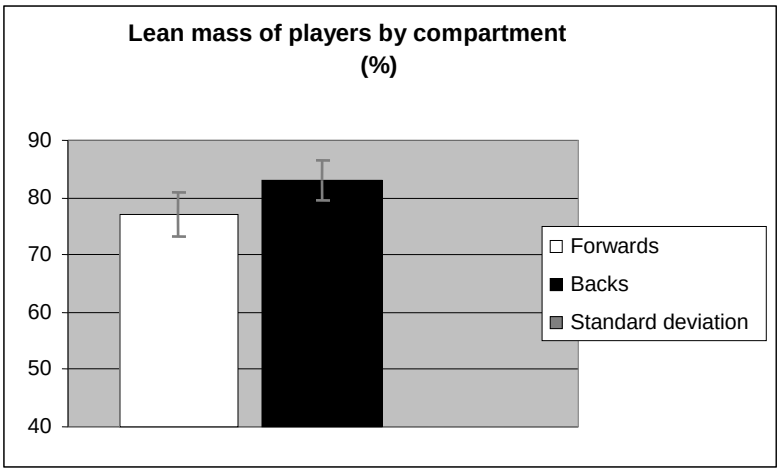


**Figure 4.** Lean mass percentage of players in the two compartments

Concerning the lean mass percentage, the players of our study scored as follows: forwards 77% and backs 83%. (Fig. 4) It is worth underlining that, though forwards have more lean mass compared to total body mass, they scored six percents lower than the mean of back players.

Compared to optimal values for the two compartments, forward players scored rather low, but the other players are relatively close to the biological performer model. (1)

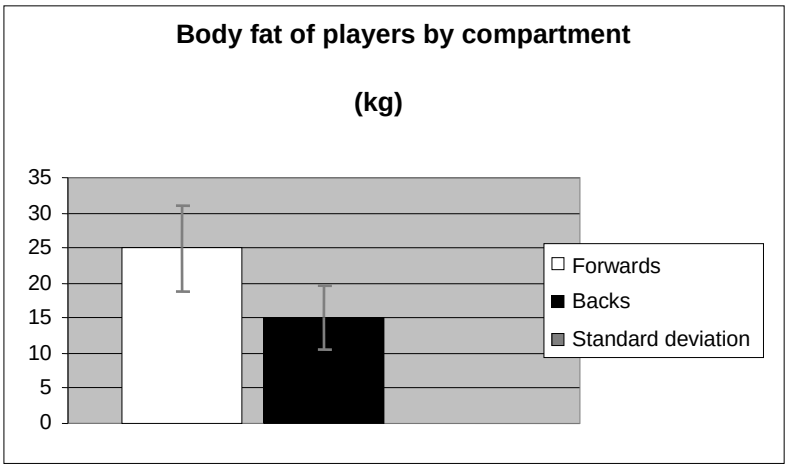


**Figure 5.** Body fat of players in the two compartments

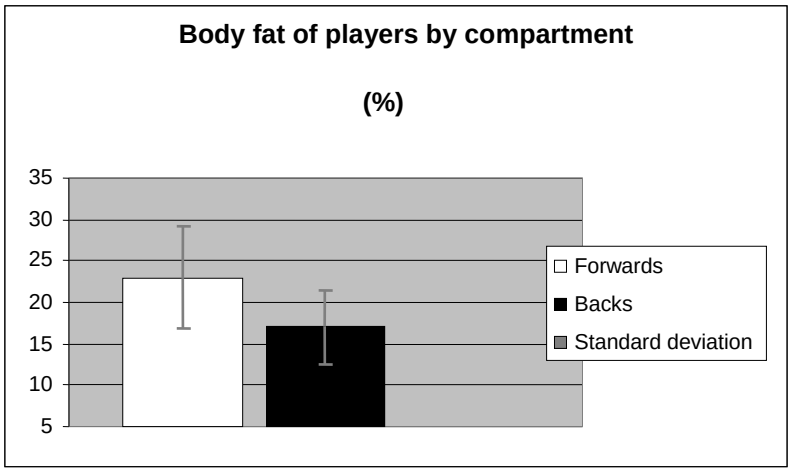


**Figure 6.** Body fat of players in the two compartments

The fat body mass of forwards and backs oscillates as follows: forward players 25 kg and back players 15 kg. (Fig. 5) The results of the two compartments are significantly different. Standard deviations indicate high oscillations between forwards and backs, a fact generated by the somatic demands of each position.

In percentages, the results of players oscillate as follows: forwards 23% and backs 17%. (Fig. 6) For this anthropometric indicator, too, forwards have exceeded significantly the ideal level, which is 15% for strength sports. *(6)* The backs have good means, compared to the biological performer model. Among them, it is worth noting the scrum-halves; though they did not have impressive scores for total body mass and height, their body composition ranges within ideal parameters for this position. In addition, full-backs scored in conformity with the require-ments for this position.

## Conclusions

- Though the age mean respects the specific difference between the two compartments, both age means are below ideal parameters for this sport. The exodus of valuable players to higher-ranked championships generates this phenomenon.
- The body mass of the players we tested ranges within ideal parameters. The weight means of both compartments coincide with those of players within more powerful championships.
- The body composition of the players we tested varies between the two compartments of the game. Hence, forwards have excess body fat, especially players of the first line, while the backs are very close to the ideal parameters for this compartment.

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