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Title: Impact of the winter break period on the Morphological profile of U19 footballers in the 2nd Algerian division

(Case study: Sportive Union Chaouia club-Oum El Bouaghi)

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Abstract

This research is part of an evaluation of the effect of the winter break on the morphology of U19 football players in the Algerian second division. The main objective was to determine changes in body characteristics such as weight, body mass index, fat mass, muscle mass, and bone mass between the end of the first half of the season and the beginning of the second.

The study was conducted at the Union Sportive Chaouia club, located in the Oum El-Bouaghi province, with a group of 26 U19 players. It took place over 21 days, from December 21, 2024 (before the test) to January 11, 2025 (after the test), coinciding with the winter break. Anthropometric measurements were taken before and after this period following standard protocols.

The results revealed a slight increase in weight (from 63.58 ± 5.47 kg to 64.07 ± 5.43 kg) and body mass index (from 19.89 ± 0.92 kg/m² to 20.04 ± 0.78 kg/m²), but without statistical significance. In contrast, a notable increase in fat mass was observed (from 10.34 ± 0.92 kg to 10.53 ± 0.78 kg, $p < 0.05$), while muscle mass decreased significantly (from 29.34 ± 2.99 kg to 29.01 ± 3.04 kg, $p < 0.001$). Bone mass showed a slight, non-significant decrease (from 3.20 ± 0.41 kg to 3.16 ± 0.44 kg).

These findings indicate that the winter break, although brief, leads to significant changes in body composition, including an increase in fat mass and a reduction in muscle mass. These variations reflect the effects of partial deconditioning due to decreased training intensity. It is therefore essential to develop personalized maintenance programs during this period to mitigate the negative impacts on body composition and ensure an effective return to training in the second half of the season.

Keywords: the winter break period, the Morphological profile, U19 footballers, 2nd Algerian division, VO_{2max}, body fat, muscle mass.

1. Introduction:

Physical preparation is a key element of a footballer's performance, regardless of how it is implemented (isolated exercises, integrated exercises, or match-specific training). The organization of planning, programming, and training sessions must be precise and depends on multiple factors. As Claude Puel explains: "The physical trainer is like a chef who must carefully measure and combine ingredients to create the best possible content for his players." This quote highlights the challenges of our profession: we must constantly reassess and adapt our training methods according to the players available and the phase of the season.

The winter break, a period during which matches are suspended in winter, represents a crucial moment in the football cycle. It allows players to rest both physically and mentally. However, little research has focused on its influence on the morphology of U19 footballers, particularly in North Africa and specifically in Algeria.

The winter break, which occurs midway through the football season, is an important time for athletes, teams, and sports organizations. Typically implemented during the colder weeks, this period offers players the opportunity to relax and recover physically and mentally after what is often a challenging first half of the season. More than just a rest period, this break also has strategic implications: it facilitates tactical adjustments, team management, and coincides with the winter transfer window, a crucial period for player transfers. However, the length and even the existence of this break vary depending on the country and climate, leading to discussions about its importance and its effect on athletes' performance and health. For young, growing footballers, the winter break often coincides

with physical changes (height, weight, body fat) and developmental trends (strength, endurance, speed). Research conducted on female athletes under 19 years of age revealed that this transition phase led to an increase in body fat and a decrease in VO_2max and muscle strength, compared to results after the pre-season (prepa-physique.net, 2025).

As well as during the adolescent growth spurt, which occurs around this age, variations in physical and physiological characteristics, as well as maturity levels, can be observed among young people of the same age. These differences therefore influence their athletic performance and team selection decisions for competitions (Čaušević et al., 2023).

Furthermore, young boys exhibit seasonal variations in neuromuscular control, suggesting a potentially higher risk of injury after a break.

In professional sports teams, shorter winter breaks have led to an increase in training-related injuries, particularly to the knees. Conversely, clubs that benefit from a complete rest period see fewer days of absence due to injuries. (Physical Preparation, 2025)

In Algeria, even with the winter break in the second division (U19), no studies have been conducted on its consequences for young athletes. Morphological characteristics, including anthropometry and physical abilities, can be influenced by a shorter or different training period (physical preparation, VMA, muscle maintenance, etc.).

This research represents the first scientific evaluation of the direct impacts of the winter break on the morphology of young football players in Algeria. Its aim is to help develop appropriate training programs and to enhance knowledge about the effects of this break on adolescents involved in sports.

2. The objectives of this research are:

To measure how the morphological profile of U19 players in the Algerian second division changes before and after the winter break.

To provide useful advice for coaches and trainers to reduce negative impacts (loss of muscle mass and/or bone mass, increase in body fat) and prevent injuries upon return.

3. Hypotheses:

The cessation of football practice due to the winter break leads to an increase in weight among U19 footballers.

The cessation of football practice due to the winter break leads to an increase in the BMI of U19 footballers.

The cessation of football practice due to the winter break leads to an increase in body fat among U19 footballers.

The cessation of football practice due to the winter break leads to a decrease in muscle mass among U19 footballers.

The cessation of football practice due to the winter break leads to a decrease in bone mass among U19 footballers.

The objective of this research is to determine the evolution of some morphological parameters of U19 footballers who took a recovery period from the winter break for 3 weeks.

4. Methods and Tools:

This study was conducted over a 21-day period, from December 21, 2024, to January 11, 2025, for the pre-test, on football players from the Union Sportive Chaouia club in the Oum El-Bouaghi province.

4.1. The Study Population:26 male football players.

4.1.1. Inclusion Criteria:

Football players with the following characteristics:

• Age between 18 and 19 years.

• More than four years of training experience.

• A minimum of 6 hours of training per week, in addition to match training.

4.1.2. Exclusion Criteria:

• Subjects with a BMI below 18.5 and above 25 kg/m².

• Subjects who smoke.

• Subjects with any medical conditions.

• Subject who does not train regularly.

4.1.3. General characteristics:

The general characteristics of our sample are presented in the following table:

Table 1 : General characteristics of the sample.

Sample	**Average**	**Standard deviation**

Weight (kg)	63.58	5.36
Size (m)	1.79	0.06
IMC (Kg/m²)	19.89	0.90
Experience (ans)	8.69	2.32

4.2. Ethical Considerations:

The parents of the participants and their coaches were reassured that the data would be collected with respect for confidentiality and anonymity. This study did not entail any particular risk.

All coaches, including the study supervisor, signed an informed consent form regarding the purpose and experimental protocol of the study after informing the participants' parents.

5. Data Collection Method:

Data was collected through morphological measurements, functional examinations, and physical tests, which will be detailed below.

5.1. Equipment:

We used:

- A Geonaute (Decathlon) SCALE 500 digital bioelectrical impedance analysis (BIA) device to measure: weight, fat mass, lean mass, and bone mass.
- A plastic measuring tape: to measure height and waist circumference.

5.2. Experimental Protocol:

5.2.1. Height Measurement:

Materials:

• Plastic measuring tape.

• Wall.

• Sturdy plastic ruler.

Height was measured in centimeters using a plastic measuring tape fixed to the wall. The subject was standing barefoot, with their torso upright and eyes looking horizontally. The measurement was taken from the top of the head using a sturdy plastic ruler.

5.2.2. Weight, Fat Mass, Lean Mass, and Bone Mass Measurement:

Materials:

• SCALE 500 glass body composition scale.

Weight was measured using a SCALE 500 glass body composition scale, accurate to 0.1 kg. The subject stood barefoot on the scale with their torso upright.

The measurement was taken 2 hours after eating a meal, with an empty bladder, and at a constant room temperature. Using a large digital screen, the weight is displayed in kilograms (kg).

After 5 seconds, the percentages of body fat (BF), muscle mass (MM), and bone mass (BM) are displayed successively (Decathlon, 2020).

To obtain these three percentages in kilograms, simply multiply the percentage by the weight and divide by 100.

6. Statistical Tools:

The data were analyzed using the SPSS statistical program (version 20.0). The following were used:

• The Shapiro-Wilk test to measure the normal distribution of the data.

• The Student's t-test and the Wilcoxon test to compare means.

Quantitative parameters are presented as mean ± standard deviation.

7. Results:

The results are expressed as descriptive values (mean ± standard deviation). We used the Shapiro-Wilk test to estimate the sample distribution and the Student's t-test to compare the means between the pre-test and post-test. If the sample did not have a normal distribution, we used the non-parametric Wilcoxon test.

7.1. Normality Test of Morphological Measurements:

The following table shows Shapiro-Wilk test values greater than 0.05 for all parameters of the studied morphological profile except for weight. This reflects a normal distribution of the sample for the four parameters. Therefore, we used the Soudent test to determine the nature of the difference between the pre-test and post-test for these parameters and the Wilcoxon test for weight.

Table 2 : Tests of Normality.

	Test	Kolmogorov-Smirnova			Shapiro-Wilk			
		Statistic	df	Sig.	Statistic	df	Sig.	
Weight	Pre-test	0,148	26	0,145	0,940	26	0,133	**S**
	Post-test	0,157	26	0,099	0,899	26	0,015	**NS**
BMI	Pre-test	0,174	26	0,041	0,952	26	0,252	**S**
	Post-test	0,152	26	0,127	0,933	26	0,093	**S**
FM	Pre-test	0,132	26	0,200*	0,959	26	0,366	**S**
	Post-test	0,092	26	0,200*	0,979	26	0,851	**S**
MM	Pre-test	0,116	26	0,200*	0,954	26	0,292	**S**
	Post-test	0,136	26	0,200*	0,942	26	0,152	**S**
BM	Pre-test	0,118	26	0,200*	0,953	26	0,265	**S**
	Post-test	0,111	26	0,200*	0,957	26	0,335	**S**

7.2. Morphological measurements:

Table 3: Difference in means between pre-test and post-test.

Test	Pre-test		Post-test		Wilcoxon test	df	Sig.
Weight (Kg)	63,58	5,47	64,07	5,43	-1,867	25	0,062
BMI (Kg/m²)	19,89	0,92	20,04	0,78	-1,633	25	0,115
Fat mass (Kg)	10,34	0,92	10,53	0,78	-2,644	25	0,014*
Muscul mass (Kg)	29,34	2,99	29,01	3,04	6,172	25	0,000***
Bone mass (Kg)	3,20	0,41	3,16	0,44	1,023	25	0,316

The weight of our group of footballers was 63.58± 5.47Kg at the end of the first phase of the competitive period, and it became 64.07±5.43Kg at the beginning of the second phase of the same period, our sample showed an increase in weight but it is not statistically significant as shown in the following figure.

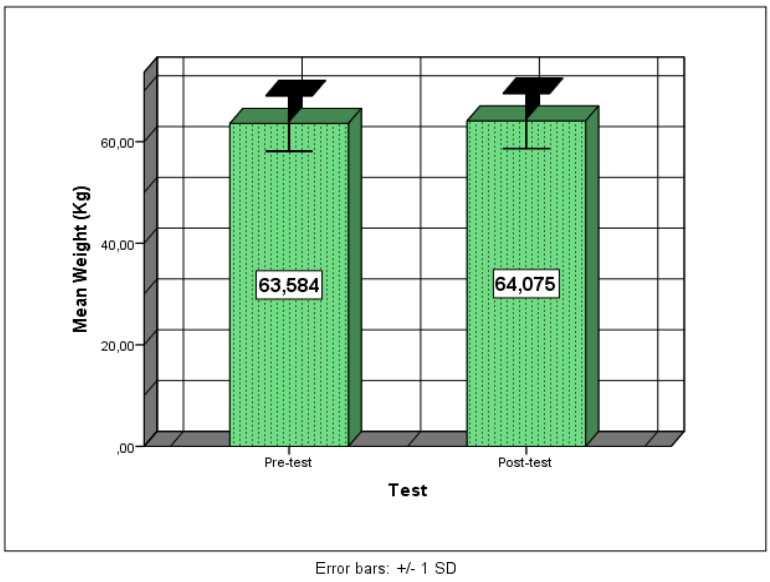

Figure 2: Comparison of pre- and post-test weight of footballers.

The BMI of our group of footballers was 19.89± 0.92Kg at the end of the first phase of the competitive period, and it became 20.04±0.78Kg at the beginning of the second phase of the same period, our sample showed an increase in BMI but it is not statistically significant as shown in the following figure.

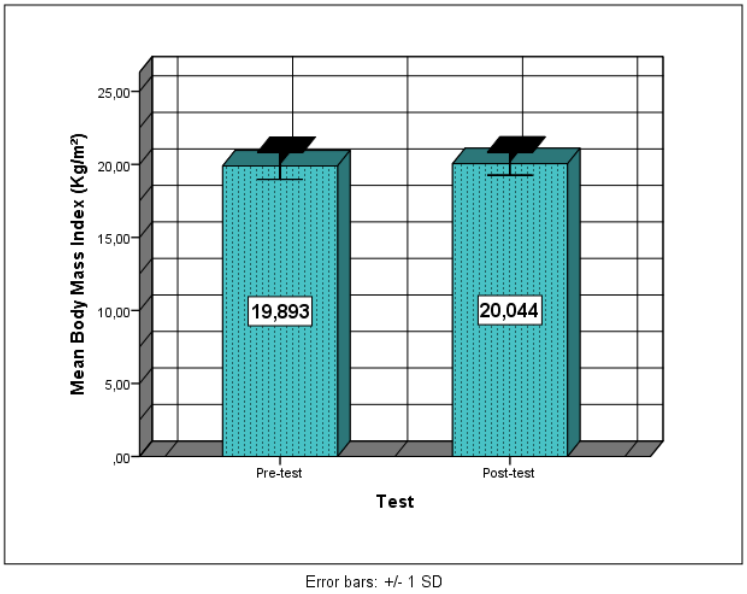

Figure 3: Comparison of BMI (Kg/m²) of the pre and post test of footballers.

The fat mass of our group of footballers was 10.34± 0.92Kg at the end of the first phase of the competitive period, and it became 10.53±0.78Kg at the beginning of the second phase of the same period, our sample showed a statistically significant increase in fat mass ($p<0.05$), as shown in the following figure.

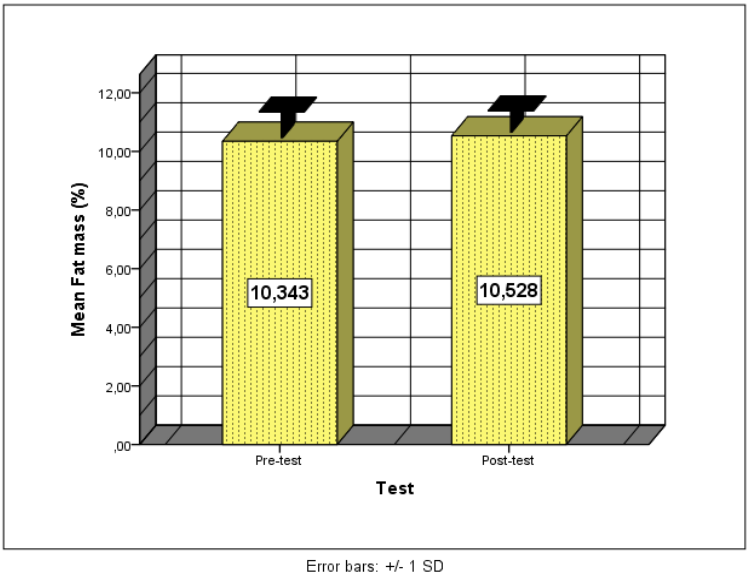

Figure 4: Comparison of fat mass (Kg) of the pre and post test of footballers.

The muscle mass of our group of footballers was 29.34± 2.99Kg at the end of the first phase of the competitive period, and it became 29.01±3.04Kg at the beginning of the second phase of the same period, our sample showed a statistically very highly significant increase in muscle mass ($p<0.001$), as shown in the following figure.

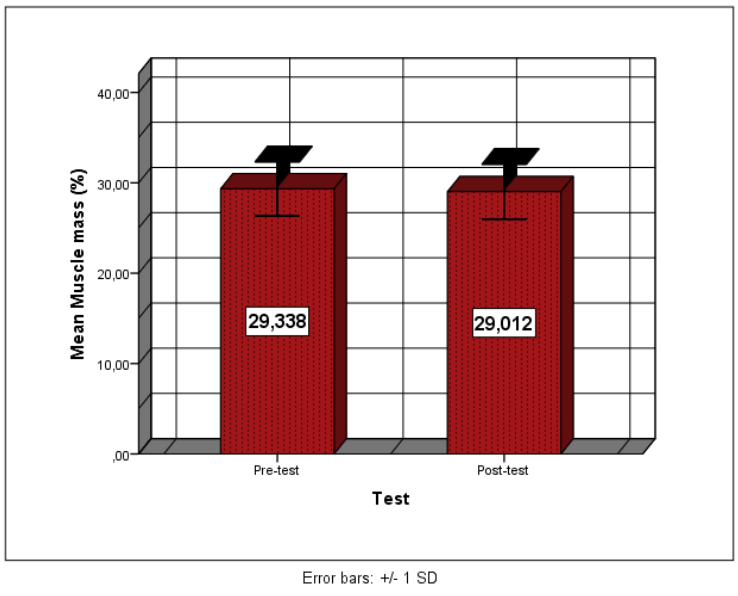

Figure 5: Comparison of muscle mass (Kg) of the pre and post test of footballers.

The bone mass of our group of footballers was 3.20± 0.41Kg at the end of the first phase of the competitive period, and it became 3.16±0.44Kg at the beginning of the second phase of the same period, our sample showed an increase in bone mass but it is not statistically significant, as shown in the following figure.

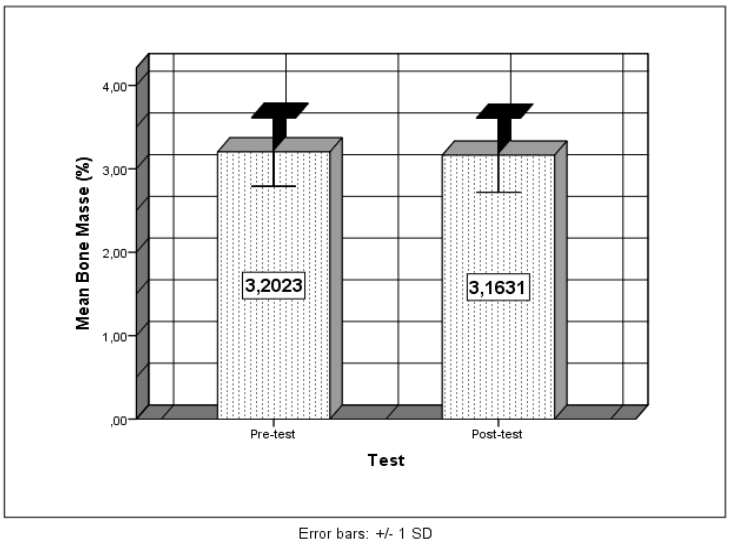

Figure 6: Comparison of bone mass (kg) in pre- and post-tests of footballers

8. Discussion:

The results of our research show slight differences in various morphological aspects among U19 footballers in the Algerian second division between the end of the first round and the beginning of the second, which coincides with the winter break.

Regarding weight, a small increase was noted, from 63.58 ± 5.47 kg to 64.07 ± 5.43 kg, without a statistically significant difference. This slight increase indicates that the break period did not cause significant weight gain for most players. Such stability can be explained by a gradual return to training before the start of the second round or by dietary control during the break. These results are similar to those of Silva et al. (2016) and Rebelo et al. (2013), who observed little weight variation during short breaks in young footballers.

Regarding body mass index (BMI), it increased slightly, from 19.89 ± 0.92 kg/m² to 20.04 ± 0.78 kg/m², without statistical significance. This trend mirrors that of weight and confirms overall morphological stability within the group. This result indicates that the ratio of body mass to height remained stable, demonstrating that there was no major morphological imbalance during the break. The relatively short duration of this period may not have allowed for significant structural changes.

Our results were similar to the work of Koulla Parpa and Marcos A. Michaelides. Body weight ($p=0.001$) and fat mass ($p=0.000$) increased significantly after four weeks of a substantial reduction in training volume. We conclude that the transition period negatively affected the players' anthropometric and performance parameters. (Koulla Parpa & Marcos A Michaelides, 2020)

Conversely, fat mass increased significantly ($p < 0.05$), rising from 10.34 ± 0.92 kg to 10.53 ± 0.78 kg. This increase reflects a certain relaxation of metabolism during the break, often linked to a reduction in training intensity and volume, as well as an increase in caloric intake. Other studies, such as those by Rebelo et al. (2014) and Caldwell et al. (2019), have also

observed an increase in fat mass after rest periods in young footballers, highlighting the sensitivity of this parameter to variations in training load.

Conversely, a slight decrease in muscle mass was observed, from 29.34 ± 2.99 kg to 29.01 ± 3.04 kg, a highly significant difference ($p < 0.001$). This decrease indicates a deconditioning effect, often observed after a period of reduced training load. The absence of intense exercise (strength training, specific training) during this break can lead to a decrease in muscle tone and contractile volume. These results support the research of Mujika and Padilla (2000), who showed that even short periods of inactivity can decrease lean mass and affect the neuromuscular qualities of athletes.

Our results were similar to the work of Aston Dommel and R. Drew Sayer, whose male athletes gained BMI and fat mass during extended winter breaks. However, unlike our study, no difference was observed in the changes in muscle mass. (Aston Dommel and R Drew Sayer, 2022)

Finally, a slight reduction in bone mass was observed, from 3.20 ± 0.41 kg to 3.16 ± 0.44 kg, without reaching a statistically significant difference. This is explained by the fact that changes in bone mineral density take longer to quantify. The fact that this component was maintained indicates a certain stability of the short-term osteomorphological profile, which is consistent with the findings of Malina et al. (2010) in young athletes.

Football also involves a multitude of high-speed actions, sprints, turns, jumps, and shots (Rebelo et al., 2013), and playing football from a young age has been shown to produce benefits in bone development, due to the impacts generated during the activity (Maillane-Vanegas et al., 2021). This can lead to an increase in bone mineral content and bone mineral density during growth (Hernandez-Martin et al., 2021).

In summary, these results show a moderate but tangible effect of the winter break on the morphological profile of U19 players. This change is primarily manifested by a slight increase in fat mass and a decrease in muscle mass. Even if these variations are minimal, they could have detrimental consequences on performance upon the resumption of competitions if adequate physical preparation is not adopted. It is therefore crucial to develop maintenance programs during the break, incorporating aerobic sessions, muscle strengthening and nutritional advice, to preserve the morpho-functional achievements of young footballers.

10. Conclusion:

The objective of this study was to determine the influence of the winter break on the morphological characteristics of U19 footballers playing in the Algerian second division. Our study aimed to verify whether this period of low activity or reduced training intensity affected morphological measurements taken before and after the winter break.

The results revealed minor but significant differences in certain morphological variables, notably body mass and body fat percentage. These changes are likely due to a combination of dietary modifications and a decrease in training frequency and intensity during the break. In contrast, factors such as height and limb circumferences remained relatively constant, suggesting that brief interruptions do not significantly affect the overall morphology of athletes.

These results underscore the importance of maintaining a structured and appropriate training program during the winter break to limit undesirable changes in body composition. Maintenance sessions aimed at improving aerobic endurance, strength, and flexibility could help preserve players' peak physical condition and accelerate their return to competition.

From a practical standpoint, coaches and physical trainers should implement regular monitoring during transition periods to ensure consistency in physical preparation and reduce the risk of deconditioning. Future studies could expand on this research by incorporating physiological and performance factors (such as VO_2 max, sprint speed, and muscle strength) to better understand the impact of seasonal breaks on the potential for success of young players.

The winter break is essential for recovery, but if poorly managed, it can negatively affect certain morphological characteristics of footballers under 19. Therefore, it is crucial to maintain a proper balance between rest and physical training to preserve athletic fitness and ensure optimal preparation for the second half of the season.

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