FUNCTIONAL BODY COMPOSITION BY BIOELECTRICAL IMPEDANCE ANALYSIS IN FOOTBALL PLAYERS: TOP LEVEL VS MEDIUM LEVEL

Levi Micheli M[1], Spedicato M[2], Pagani L[3]

[1]FIGC Technical Division University of Florence, Italy;
[2]U.S. Lecce Soccer Team, Lecce, Italy;
[3]Malta Football Association Physical Trainer, Malta, Republic of Malta

Introduction

Injuries occurring in sport are numerous. Rehabilitation can take weeks or months, depending on the severity of the injury. Rest and lack of physical activity during the period of rehabilitation, result in the reduction of various parameters of sport performance such as strength, endurance ([2]), but also changes in body composition ([3]).
The aim of our research is to provide the reference data on body composition and hydration of healthy soccer players, and to assess eventual differences between top and medium level players. These different parameters may in fact be an objective to be achieved before returning to the field of the injured player, because it can help prevent re-injuries ([1]).

Methods

174 Italian soccer (football) players (23.4±5.1 years, 181±6 cm, 76.5±7.6 kg) were divided into two groups: group AB (N= 87) consists of A and B division players; group D (N=87) consists of D division players.
The subjects were examined by bioelectrical analyzer BIA 101 (Akern, Pontassieve, Italy), at rest during competition period, to find statistically significant differences in the anthropometric and bioelectrical parameters. We also analyzed the estimates of Body Cellular Mass (BCM), Body Cellular Mass Index (BCMI), Fat Mass (FM), Total Body Water (TBW), Extra Cellular Water (ECW) calculated by the software Bodygram pro. We also used the new Levi Muscle Index (LMI) in the process of validation. We fixed the significance at P> 0.0001.

Result and Discussion

The subjects of the AB group were significantly heavier than those of D group (Table1); the greater body weight is caused by a greater muscle development, (BCM and BCM%). The two groups did not differ statistically in body fat (FM and FM%); TBW and ECW were statistically higher in AB group, while there was not found a significant difference in ECW% (Table 2).

	Group AB	Group D	Difference
Age (years)	25.3±4.6	22.3±5.3	13% NS
Height (cm)	183±6	180±5	1% NS
Weight (kg)	79.6±6.9	73.4±6.9	9%**
BMI (kg/m²)	23.9±1.5	22.6±1.7	6%**

Table 1: anthropometrical characteristics of the subjects.

	Group AB	Group D	Difference
BCM (kg)	40.4±3.8	35.8±3.7	13% **
BCMI	12.1±1.0	11.0±1.0	10% **
BCM (% of body weight)	50.8±2.8	48.8±2.5	4% *
FM (kg)	12.9±3.4	12.2±3.1	5% NS
FM (% of body weight)	16.1±3.7	16.6±3.5	-3% NS
TBW (l)	48.9±4.4	44.7±4.1	9% **
ECW (l)	22.9±2.6	20.8±2.2	10% **
ECW (% of TBW)	46,7±1.5	46.3±1.3	1% NS

Table 2: Body composition estimates. *P<0.0001 **P<0.000001

	Group AB	Group D	Difference
RZ/H (resistance/height, Ohm/m)	254±26	278±27	-9%**
XC/H (reactance/height, Ohm/m)	33.6±4.2	34.3±3.8	-2% NS
PA (phase angle, degrees)	7.5±0.5	7.0±0.5	7%**
LMI	3.0±0.4	2.6±0.2	15%**

Table 3: bioelectrical parameteters. *P<0.0001 **P<0.000001

XC/H was not statistically different between the two groups, but RZ/H was significantly lower in the AB group; PA and LMI were significantly higher in the AB group (Table 3).
Percentage differences of the analyzed parameters ranging between 1% (ECW%, not significant) and 15% (LMI, highly significant). We can assume that the parameters with more consistent differences, between the two groups can be related with football performance.

Conclusion

The top level football players statistically differ from medium level football players in weight, BMI, BCM, BCM%, BCMI, TBW, ECW, PA, RZ,H and LMI, while we did not detect significant differences in height, age, FM, FM%, ECW% and XC/H. The new index of muscle development (LMI) demonstrates the best parameter to differentiate the two groups.

References

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