



UNIVERSITÀ
DEGLI STUDI
FIRENZE

FLORE

Repository istituzionale dell'Università degli Studi di Firenze

New equation to estimate body fat mass in international-elite soccer referees

Questa è la Versione finale referata (Post print/Accepted manuscript) della seguente pubblicazione:

Original Citation:

New equation to estimate body fat mass in international-elite soccer referees / Cristian Petri, Victor Hugo Teixeira, Pascal Izzicupo, Giorgio Galanti, Angelo Pizzi, Gabriele Mascherini. - In: INTERNATIONAL JOURNAL OF SPORT NUTRITION AND EXERCISE METABOLISM. - ISSN 1526-484X. - ELETTRONICO. - 30:(2020), pp. S1-1-S1-14. [10.1123/ijsnem.2020-0065]

Availability:

The webpage <https://hdl.handle.net/2158/1196121> of the repository was last updated on 2020-05-30T10:34:54Z

Published version:

DOI: 10.1123/ijsnem.2020-0065

Terms of use:

Open Access

La pubblicazione è resa disponibile sotto le norme e i termini della licenza di deposito, secondo quanto stabilito dalla Policy per l'accesso aperto dell'Università degli Studi di Firenze (<https://www.sba.unifi.it/upload/policy-oa-2016-1.pdf>)

Publisher copyright claim:

La data sopra indicata si riferisce all'ultimo aggiornamento della scheda del Repository FloRe - The above-mentioned date refers to the last update of the record in the Institutional Repository FloRe

(Article begins on next page)

Abstracts From the December 2019 International Sport + Exercise Nutrition Conference in Newcastle upon Tyne

Day 1 Orals: Performance Theme

Tuesday, 17th December 2019

14.00

Dietary intake of Gaelic football players during game preparation and recovery

C Ó Catháin, J Fleming, M Renard, D Kelly

14.15

Enriching a lower dose of mycoprotein with branched chain amino acids does not stimulate protein synthesis rates to the same extent as a higher dose of mycoprotein in rested and exercised skeletal muscle of healthy young men

AJ Monteyne, MO Coelho, TSO Jameson, C Porter, DR Abdelrahman, TJA Finnigan, ML Dirks, FB Stephens, BT Wall

14.30

Equation based on anthropometry to predict body fat percentage by DXA in elite youth soccer athletes

A Batista, D Granja, R Borrego, E Carolino, C Caetano

14.45

Sports nutrition knowledge of Gaelic football players

M Renard, A Anton-Solanas, D Kelly, C Ó Catháin

15.00

New equation to estimate body fat mass in international-elite soccer referees

C Petri, VH Teixeira, P Izzicupo, G Galanti, A Pizzi, G Mascherini

15.15

Is it necessary to ingest carbohydrates and fluids during 10 km open water swimming in top-level competitions?

G Olcina, R Timón, I González-Pérez

Dietary Intake of Gaelic Football Players During Game Preparation and Recovery

C Ó Catháin¹, J Fleming², M Renard¹, D Kelly¹

¹Department of Sport and Health Sciences, Athlone Institute of Technology, Ireland

²Department of Health Sciences, St Mary's University, Twickenham, London, UK

It is well established that dietary intake can influence performance and modulate recovery in invasion-based team sports such as soccer, and rugby. However, very limited research currently exists examining dietary intake of Gaelic football players. This research aimed to examine the dietary intake of Gaelic football player's 2-days prior to competition, on game day, and for 2-days post competition in order to assess if 1) player's

intake is in line with current sports nutrition recommendations; 2) if intake varies from day to day, and; 3) if playing level (Elite Vs. Sub-elite) influences intake. A five-day paper-based food diary was completed by 45 players (25 elite and 20 sub-elite). Playing level had no effect on energy, carbohydrate, or fat intake, but elite players consumed 24 % more protein than sub-elite. Average intake of energy was 2938 ± 618 kcal.day⁻¹, carbohydrate was 3.7 ± 1.4 g.kg bm⁻¹.day⁻¹, and fat was 1.3 ± 0.6 g.kg bm⁻¹.day⁻¹. Elite players consumed 2.2 ± 0.7 g.kg bm⁻¹.day⁻¹ protein, whereas sub elite consumed 1.8 ± 0.6 g.kgbm⁻¹.day⁻¹. Day-to-day variation in carbohydrate intake was apparent (Day 1 (Training) > Day 5 (Training) by 21 %; Day 3 (Game day) > Day 5 by 29 %), but this did not take place in a manner that reflected purposeful nutritional periodization. Regardless of playing level, players consumed inadequate amounts of carbohydrate to support optimal performance and recovery and consumed protein and fat in line with general sport nutrition guidelines. However, given the unique demands placed on Gaelic football players, it may be necessary to develop Gaelic Football specific nutrition guidelines. Despite this, to address the displayed nutritional inadequacies, it is necessary to design and implement Gaelic football specific nutrition education-based interventions.

Enriching a Lower Dose of Mycoprotein With Branched Chain Amino Acids Does not Stimulate Protein Synthesis Rates to the Same Extent as a Higher Dose of Mycoprotein in Rested and Exercised Skeletal Muscle of Healthy Young Men

AJ Monteyne¹, MO Coelho¹, TSO Jameson¹, C Porter^{2,3}, DR Abdelrahman², TJA Finnigan⁴, ML Dirks¹, FB Stephens¹, BT Wall¹

¹Nutritional Physiology Research Group, Sport and Health Sciences, University of Exeter, UK

²Department of Pediatrics, University of Arkansas for Medical Sciences, Arkansas Children's Research Institute, Arkansas Children's Nutrition Center, Little Rock, Arkansas, USA

³Department of Surgery, University of Texas Medical Branch, Metabolism Unit, Shriners Hospitals for Children, Galveston, Texas, USA

⁴Marlow Foods Ltd, Station Road, Stokesly, North Yorkshire, UK

Mycoprotein is a fungal-derived sustainable protein-rich food source. We have previously shown that ingesting 70 g mycoprotein results in a robust stimulation of muscle protein synthesis rates. We aimed to determine if a lower dose (35 g) of mycoprotein enriched with branched chain amino acids (BCAA) stimulates muscle protein synthesis rates to the same extent as 70 g, in rested and exercised muscle of resistance-trained young men. Twenty males (age: 22 ± 1 y, BMI: 25 ± 1 kg/m²) took part in a randomized, double-blind, parallel-group study. Participants received primed, continuous infusions of L-[ring-²H₅]phenylalanine and ingested either 70 g mycoprotein (31.5 g protein: 2.5 g leucine, 1.5 g isoleucine, 1.9 g valine; MYCO; n = 10) or 35 g BCAA enriched (to match MYCO) mycoprotein (18.7 g protein: 2.5 g leucine, 1.5 g isoleucine, 1.9 g valine; ENR; n = 9), following a bout of unilateral resistance-type exercise. Blood

and quadriceps muscle were sampled before exercise and protein ingestion, and during a 4 h postprandial period to assess mixed muscle fractional protein synthetic rates (FSR). Postprandial plasma BCAA concentrations increased with protein ingestion in both groups ($P < 0.001$) but peaked more rapidly and to a larger degree in ENR compared with MYCO ($939 \pm 37 \mu\text{mol}\cdot\text{L}^{-1}$ at 30 min vs $608 \pm 28 \mu\text{mol}\cdot\text{L}^{-1}$ at 75 min, respectively). Mixed muscle FSR increased following MYCO (from 0.025 ± 0.006 to $0.057 \pm 0.004 \text{ \%}\cdot\text{h}^{-1}$ in rested, and 0.024 ± 0.007 to $0.072 \pm 0.005 \text{ \%}\cdot\text{h}^{-1}$ in exercised muscle; $P < 0.0001$) and ENR (from 0.031 ± 0.003 to $0.043 \pm 0.005 \text{ \%}\cdot\text{h}^{-1}$ in rested, and 0.027 ± 0.005 to $0.052 \pm 0.005 \text{ \%}\cdot\text{h}^{-1}$ in exercised muscle; $P < 0.01$) ingestion. FSRs increased to a greater extent following MYCO compared with ENR ingestion ($P < 0.05$), and postprandial FSRs were greater in MYCO compared with ENR ($P < 0.01$). We conclude that the ingestion of 35 g BCAA enriched mycoprotein stimulates resting and post-exercise muscle protein synthesis rates in healthy young men, but to a lesser extent compared with the ingestion of 70 g mycoprotein.

Equation Based on Anthropometry to Predict Body Fat Percentage by DXA in Elite Youth Soccer Athletes

A Batista¹, D Granja¹, R Borrego², E Carolino², C Caetano¹

¹Sport Lisboa e Benfica, Benfica Futebol Campus, Portugal

²Escola Superior da Tecnologia da Saúde de Lisboa, Portugal

The purpose of this study was to develop a predict equation to calculate body fat percentage in youth soccer athletes from skinfold measurements, considering dual energy X-ray absorptiometry (DXA) values as a reference. Eighty-one males aged 15 to 26 years old (18 ± 2 years; 73.0 ± 8.2 kg; 1.80 ± 1.7 m) from four different squads of an elite team participated in the study. The body fat mass was assessed through skinfold measurements at eight sites according to ISAK protocol, and by DXA. Correlation coefficients, bias, limits of agreement, and differences were used as validity measures, and regression analyses were used to develop soccer-specific prediction equations. Regression analysis generated an equation that includes skinfolds from three different sites (triceps, abdominal and front thigh) to calculate relative fat rate. The new equation for elite youth soccer athletes is the only validated equation that includes skinfolds across the body including lower-body sites.

Sports Nutrition Knowledge of Gaelic Football Players

M Renard^{1,2}, A Anton-Solanas¹, D Kelly², C Ó Catháin²

¹School of Sport Health and Applied Sciences, St Mary's University, Twickenham, UK

²Department of Sport and Health Sciences, Athlone Institute of Technology, Athlone, Ireland

Nutritional knowledge is a key factor for consideration when evaluating the dietary intake of athletes. Associations have been established between higher nutrition knowledge and improved quality of dietary intake. Given the negative impact poor nutrition can have on performance, further investigation into athlete's nutrition knowledge is warranted. The abridged questionnaire for sports nutrition knowledge (A-NSKQ) (Trakman et al., 2018) is a validated questionnaire which assesses both general and sports nutrition knowledge. Gaelic football is an invasion-based team sport and the second most popular sport in Ireland. Inadequacies in players dietary intake have been observed, but no previous assessment of players nutrition knowledge has been made. This study examines players knowledge using the A-NSKQ and compares results by playing level, highest level of education obtained and history of formal nutrition education. The A-NSKQ was disseminated online to a convenience sample of male Gaelic football players ($n = 121$, mean age = 24 ± 5 y). This included 39 senior club players (sub-elite), 26 under 21 inter-county players (elite), and 56 senior inter-county players (elite). Total A-NSKQ score was

$42 \pm 12\%$, classified as "poor" and lower than previous findings. Gaps in knowledge were evident and included protein recommendations, micro-nutrients and supplementation. There were no differences between playing level, but when grouped by highest level of education those with master's degree demonstrated higher scores by 11% in comparison to leaving certificate (upper secondary) ($P < .001$, $d = 1.17$) and 11% in comparison to honours degree ($P = .016$, $d = 1.05$). Those with previous formal nutrition education also demonstrated higher scores by 10% ($P < .001$, $d = .93$). Gaelic football players would benefit from evidence-based educational interventions. Future research should consider assessment of both nutrition knowledge and dietary intake to examine any direct influence upon behaviour and subsequently sporting performance.

New Equation to Estimate Body Fat Mass in International-Elite Soccer Referees

C Petri^{1,2}, VH Teixeira³, P Izzicupo⁴, G Galanti⁵, A Pizzi⁶, G Mascherini⁵

¹A.C.F. Fiorentina, Florence, Italy

²Gatorade Sports Science Institute, PepsiCo Global Nutrition R&D, Beaumont Park, Leicester, UK

³Faculty of Nutrition and Food Sciences (FCNA), University of Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal

⁴Department of Medicine and Aging Science, "G. D'Annunzio" University of Chieti-Pescara

⁵Sports and Exercise Medicine Unit, Clinical and Experimental Department, University of Florence, Italy

⁶A.I.A., Italian Referees Association, Italy

In soccer referees, body fat mass (FM) is commonly estimated by skinfolds or dual-energy X-ray absorptiometry (DXA). The main aim was to cross-validate the skinfolds for quantifying body fat against a recent model of DXA and to develop a specific equation for this population. This study involved a group of 43 international-level, elite male soccer referees (age 39 ± 4 y) to participate in World Cup in Russia 2018. Methodology used for the assessment of body composition was made with the integration of anthropometry, skinfold thickness and DXA. Anthropometric measurements were taken following ISAK protocol. Percentage of FM from skinfold thickness was then calculated from the main eight equations most commonly used: 1. Yushaz (Yushaz 1962), 2. Faulkner (Faulkner 1968); 3. Eston et al. (Eston et al. 2005); 4. Durnin & Womersley (Durnin and Womersley 1974); 5. Reilly et al. (Reilly et al. 2009), 6. Deurenberg et al. (Deurenberg et al. 1991), 7. Suarez et al. (Suarez-Arrones et al. 2018) and 8. the mean of all of these equations as suggested Mascherini et al. (2015). All skinfold equations (with the exception of Eston) showed large-to-very large positive correlations (r from 0.71 to 0.78, $p \leq 0.01$) with DXA. All the sum of skinfolds showed moderate-to-very large positive correlations with DXA (r from 0.41 to 0.76, $p \leq 0.01$). The best equation found was $\text{FM}\% = 8.5 + (0.572 \times \text{supraspinal skinfold}) + (0.252 \times \text{abdominal skinfold})$ based on significance, coefficient of determination, and sample size, included supraspinal skinfold and abdominal skinfold ($P < .001$; $R^2_{\text{adj}} = .589$; $df = 40$). Almost all the equations showed positive correlations, but with different values in comparison with a recent model of DXA. Finally, the sum of skinfolds appears to be a good alternative when limited time and budget is available.

Is it Necessary to Ingest Carbohydrates and Fluids During 10 km Open Water Swimming in Top-Level Competitions?

G Olcina¹, R Timón¹, I González-Pérez²

¹Sport Sciences Faculty, University of Extremadura, Spain

²Department of Physical and Rehabilitation Medicine and Physiotherapy, Faculty of Health Sciences, University of Alfonso X El Sabio, Spain