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Human Kinetics
CONFERENCE ABSTRACTS

Abstracts From the 6th Annual Congress on Medicine & Science in Ultra-Endurance Sports, October 11–13, 2019, Cape Town, South Africa

Introduction

The 6th Annual Congress on Medicine & Science in Ultra-Endurance Sports will be held October 11–13, 2019, in Cape Town, South Africa, in conjunction with the South African Sports Medicine Association Conference 2019. Details of this Congress, as well as past and future meetings, can be found at the Ultra Sports Science Foundation website: http://ultrasportsscience.us.

Ultra-endurance activities remain fertile ground for research since there are many unanswered questions directly related to these activities, and ultra-endurance activities can serve as viable models for other physiological or psychological stress. The Ultra Sports Science Foundation is pleased to be able to support some of this research through our grant-funding programs and the sharing of research findings at our annual international conference

Martin D. Hoffman, Sacramento VA Medical Center, Founding Member Ultra Sports Science Foundation

Participant Opinions and Expectations About Medical Services at Ultramarathons: Findings From the ULTRA Study

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Objective.—This work explores the opinions and expectations of ultramarathon runners about medical services and their perceived quality during ultramarathons. **Methods.—**Focused questions related to medical services at ultramarathons were included in the 2018 survey of Ultrarunners Longitudinal TRAcking (ULTRA) Study enrollees. **Results.—**Among the 1135-1156 respondents, 83.2% agreed that ultramarathons should provide at least a minimum level of medical support with basic first aid and emergency transport services rated as the most important medical services, and individuals with basic first aid training rated as the most important medical providers at ultramarathons. Participant safety was felt to largely be the responsibility of each runner as well as the race and/or medical director. Among 832 respondents having completed an ultramarathon in 2016-2018, their impression of medical services at 4853 ultramarathons was generally favorable. Of the 4.0% of times in which medical support was needed, it met expectations 74.0% of the time. Of the total of 240 different medical issues for which medical support was needed, blister management was the most common, accounting for 26.7% of issues. **Conclusions.—**Even though medical services receive minimal utilization during ultramarathons, ultramarathon runners largely believe that these events should provide at least a minimum level of medical support. Ultramarathon runners place a high onus for safety during ultramarathons on themselves, but they also place a high level of responsibility on race and medical directors, so it seems prudent for races to avoid a mismatch between runner expectations and the medical services actually provided.

Changes in Urinary Markers of Acute Kidney Injury After 10 km and 100 km Races

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Objective.—Acute kidney injury (AKI) is described as a relatively common complication of strenuous exercise. In clinical practice the diagnosis of AKI is based on increase of creatinine level. Serum creatinine rises about 24-48 hours after renal injury and is dependent on age, sex, muscle mass, diet and hydration status. Therefore after physical exercise diagnosis of AKI based on creatinine is overestimated. There are several urinary makers of AKI: albuminuria (uAlb), neutrophil gelatinase-associated lipocalin (NGAL), kidney injury molecule 1 (KIM-1) and cystatin C (CyC), which are used to diagnose early kidney dysfunction. **Methods.—**16 runners, mean age 37 ±8.1years participating in 100 and 10 km races were studied. Before and after the races blood and urine were taken to assess markers of AKI. Creatinine was measured in blood. Albumin, NGAL KIM-1 and CyC were examined in urine. **Results.—**All urinary makers of AKI and creatinine increased significantly after both races. There was no correlation between changes in creatinine and any of urinary markers of AKI.

	10 km race		100 race	
	Before	After	Before	After
Creatinine (mg/dl)	0.78±0.14	0.99±0.18*	0.85±0.13	1.2±0.27*
uAlb (mg/l)	5.7 (5-7.57)	40.67 (15.7-126.3)*	3 (3-9.55)	57.15 (27.4-305.7)*
uNGAL (ng/ml)	4.9 (0.85-8.3)	19 (9-30)*	4.4 (2.15-6)	30 (19-63)*
uKIM-1 (ng/ml)	0.44 (0.15-1.11)	1.29 (0.19-2.47)*	0.21 (0.08-0.78)	1.63 (0.58-2.49)*
uCyC (ng/ml)	45.95 (5.7-89.95)	117.7 (71.95-144.5)*	28.28 (2.4-88.5)	138.5 (115.9-155.6)*

*$p < 0.05$, Data were presented as mean±SD, or median (IQR)

Conclusions.—All urinary markers of AKI increased after long runs. These changes were dependent on race duration. The highest increase was noticed in the albuminuria and uNGAL. It is not clear if AKI markers can help to differentiate between functional and structural kidney injury.

Pelvic Fracture and Low Bone Density in a Long Distance Cyclist With a History of Nonclassic Congenital Adrenal Hyperplasia

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Background.—Nonclassic congenital adrenal hyperplasia (NCAH) is an autosomal recessive disorder which results in impaired cortisol biosynthesis and androgen excess. There is limited data on bone mineral density (BMD) outcomes in patients with NCAH. **Case Report.—**A 24 year-old female long distance cyclist presented for evaluation of pelvic pain two days after a low velocity bike crash. Her exam showed tenderness to palpation of the left pubic ramus, a positive single leg hop test and normal gait. X-ray revealed a nondisplaced fracture of the left inferior pubic ramus. MRI revealed an additional nondisplaced fracture of the ipsilateral sacral ala. Her medical history was pertinent for NCAH, which was diagnosed in her late teenage years during a workup for primary amenorrhea. She had never been treated, either with glucocorticoids or exogenous estrogen. She had a self-limited history of disordered eating during adolescence. Her current activity consisted of long distance multi-day bike-pack trips, racing road bikes, and distance running. She had a progesterone IUD but used no other medications. Dual energy x-ray absorptiometry scan showed low bone density with L1-4 Z-score -1.8. Serum calcium and Vitamin D were within normal limits. She was treated for her fractures and returned to activity. Discussion regarding her endocrine management plan was put on hold when she left for a 6 month bike-pack trip through South America. **Conclusions.—**Unexpected fractures in endurance athletes should prompt evaluation for underlying medical conditions. While low energy availability, secondary amenorrhea, and low bone density are common in endurance athletes, rare medical conditions should also be considered. We report a case of a long distance cyclist with a history of NCAH, no past treatment with glucocorticoids, and past low energy availability who presented with a pathologic fracture and low bone density.

The Impact of Post-Exercise Chocolate Flavoured Dairy Milk Beverage Consumption on Hydration Status in Endurance Athletes

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Objective.—The study aimed to comprehensively determine the impact of consuming a dairy milk beverage after prolonged strenuous exercise on hydration status. **Methods.—**Using a randomised crossover study design, 11 endurance male athletes consumed a chocolate flavoured dairy milk beverage (CM: 1.2g/kg carbohydrate and 0.4g/kg protein) or a carbohydrate-electrolyte beverage (CEB: isovolumetric with 0.76g/kg carbohydrate intake) after completing a 2h glycogen depleting exercise protocol in temperate ambient conditions (20-25°C, 40% RH). The recovery beverage was provided in three equal boluses over a 30 min period. Throughout the remainder of the 4h recovery period, participants were provided with water, towards a total fluid intake targeting 35ml/kg. Venous blood samples were collected, total body water (MBIA) and nude body mass were measured pre-exercise and throughout recovery. Whole blood samples were used to measure haemoglobin concentration and haematocrit to determine ΔP_V, while 50µl of heparin plasma was used to determine P_{Osmol} by freeze-point osmometry. **Results.—**Exercise-induced body mass loss (overall mean (SD): 1.4 (0.6) %; p=0.704), ΔP_V (-1.5 (2.6) %); p=0.187), and pre- to post-exercise P_{Osmol} (293 (6) to 295 (7) mOsmol/kg, respectively; p=0.297) did not differ between CM and CEB. During the recovery period, there was a main effect of time imposed by the rehydration intervention for P_{Osmol} (p=0.008), ΔP_V (p<0.001), and rating of thirst (p<0.001), but not total body water (p=0.830). No trial differences were observed. Total fluid intake did not differ between trials (CM: 24.2ml/kg vs CEB: 24.0ml/kg; p=0.907). However, there was greater fluid retention (CM: 85.8% vs CEB: 76.1%; p=0.021) with a corresponding lower urine output (CM: 248ml; CEB: 409ml; p=0.008) on CM. **Conclusions.—**Both CM and CEB resulted in complete rehydration during recovery from prolonged strenuous exercise. However, greater fluid retention was observed on CM, suggesting a superior rehydration fluid option over CEB.

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Does Training Status and Protein Intake Explain the Differences in Physical Performance Between Trained Endurance and Recreationally Active Older Adult Males?

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Objective.—The study aimed to examine whether differences in prerequisites to sarcopenia (i.e., skeletal muscle mass, strength and physical performance) exist between endurance trained (ET) and recreationally active (RA) older adults; and whether training status, age and protein intake have intended effects on these outcomes. **Methods.—**Using preliminary data from a larger clinical trial n=19 (ET n=9, RA n=10) older active adult males: (mean (SD) 62.5 (6.3) years, 78.07 (12.6) kg, 176 (7.6) cm, 27.7 (7.6) % body fat) that exercised ≥3x/week (217 (13) min/week) volunteered to participate in the baseline measurements. Body composition was determined by iDXA (GE LUNAR iDXA Narrow-Angle Dual Energy X-ray Densitometer), and strength by handgrip (dynamometer). Performance measures were determined by jump height (400S Force Plate with the XPV7 Diagnostic Test Software) and cardiorespiratory fitness (CRF) through an incremental bike test (Corival, InMed). PA and nutritional intake were determined by PAR-Q and 3-day food-fluid diary, respectively. Data were analysed (SPSS v25.0) for group differences and associations (Pearson's correlation coefficient) between strength and performance outcomes with protein intake and age. **Results.—**Significant between group differences were observed for lean body mass (ET: 60.4 (6.4) kg, RA: 53 (8.5) kg; p<0.05), jump height (ET: 19.7 (4.7) cm, RA: 15.6 (3.5) cm; p<0.05), and CRF (ET: 152.1 (32.06) watts/RQ, RA: 80 (36.1) watts/RQ; p<0.05). There was no significant group difference for handgrip (ET: 45.6 (7.59) kg, RA: 41.5 (4.2) kg; p=0.116). There were no significant correlations between age, protein intake, and weekly exercise volume with anthropometry, metabolic, strength and performance variables. However, higher levels of exercise intensity were positively correlated with higher lean body mass (r=0.452, p=0.05), CRF (r=0.723, p<0.05), but not jump height or handgrip. **Conclusions.—**ET presents favourable outcomes of lean body mass, CRF, and performance in comparison to RA. Exercise intensity appears to prompt these outcomes, suggesting ET may mitigate some of the sarcopenic effects associated with ageing.

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