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Blood And Breath Ketones Demonstrate Acute Insensitivity To Daily Nutritional Variation In Keto-adapted Female Bodybuilder

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Ketogenic contest preparation has become more prevalent in the bodybuilding community. However, few studies have explored the effect of minor nutrient fluctuations on daily blood and breath ketone values during prolonged in-season dieting.
PURPOSE: To evaluate acute relationships between diet and ketone levels in a competitive bodybuilder.
METHODS: We tracked an IFBB professional female bodybuilder for 75 consecutive days of ketogenic contest preparation. Independent variables were daily kcals consumed, proportions of fat, protein, and carbohydrate, amounts of sodium and potassium, total fluid volume, and coffee intake. We also estimated daily caloric expenditure using a FitBit Charge 3 activity tracker. Dependent variables were blood ketones measured with a Keto-Mojo device and breath ketones measured with a Ketonix Professional Breath Ketone Analyzer. We collected a fasted test each morning and repeated testing at night. Linear regressions evaluated relationships between independent and dependent variables. The prior day's behaviors served as predictors for fasted ketones; the same day's behaviors were used to predict nighttime values.
RESULTS: Daily nutritional intake was 1604.8 ± 498.6kcal, composed of 123.9 ± 42.4g fat, 92.9 ± 24.7g protein, and 28.8 ± 13.9g net carbohydrate. Fluid intake was 221.3 ± 47.3oz, sodium was 8.1 ± 1.9g, potassium was 6.8 ± 1.1g, energy expenditure was 1841.0 ± 228.6kcal, fasted blood ketones were 1.0 ± 0.3mM, and breath values were 148.8 ± 62.6ppm. Holding energy expenditure constant, linear regression found no effect of kcal, carbohydrate, protein, coffee, or potassium consumption on fasted ketone levels ($p>0.150$). Modest associations emerged with fat, fluid, and sodium. Holding energy expenditure constant, increased fat intake predicted elevated blood ketones ($p=0.048$; 95% CI of β=0.000 to 0.005) but not breath values ($p=0.231$). Lower breath ketones were predicted with more fluid ($p=0.016$; 95% CI of β = -0.845 to -0.088) and sodium ($p=0.042$; 95% CI of β = -0.017 to -0.000). Neither fluid ($p=0.893$) nor sodium ($p=0.195$) predicted blood values. No associations were found between any predictor and nighttime ketones ($p>0.250$).
CONCLUSIONS: Ketone levels remained relatively stable in the presence of acute fluctuations in nutrition and hydration in a dieting bodybuilder.

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Effects Of Increased Energy Availability On Energy Metabolism And Blood Indices In Healthy Young Men

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Previous studies showed that low energy availability (low EA) condition affects resting energy expenditure (REE) and blood indices such as insulin-like growth factor-1 (IGF-1). Skipping breakfast may lead to low EA, as it reduces daily energy intake. In addition, skipping breakfast reduces protein intake, which may affect blood nutrition markers and muscle protein breakdown.
PURPOSE: To examine the effects of increased EA on energy metabolism and blood indices in healthy young men.
METHODS: Ten healthy young men who are habitually skipping breakfast participated in this study (age: 24 ± 4 years). Two conditions of EA-adjusted meals with low EA (LEA) and high EA (HEA) were provided one week each. In the LEA condition, the subjects skipped breakfast as usual and consumed meals of EA less than 30 kcal/kg FFM/day. Then, the subjects consumed three meals per day of EA more than 45 kcal/kg FFM/day in the HEA condition. All measurements were conducted after ingestion of each EA diet. REE was measured using the Douglas bag method (REE_m), predicted REE (REE_p) was calculated using the formula for Japanese people, and the ratio of REE_m to REE_p was calculated (REE_{ratio}). Early morning fasting blood indices were measured, and 3-methylhistidine (3-MH) as an indicator of muscle protein breakdown was measured using 24-hour urine storage.
RESULTS: IGF-1 (LEA: 170.7 ± 43.0 ng/mL, HEA: 198.1 ± 43.2 ng/mL, $p<0.05$) and transthyretin level (LEA: 23.4 ± 3.4 mg/dL, HEA: 27.1 ± 4.0 mg/dL, $p<0.05$) were significantly higher in the HEA than the LEA condition. Retinol-binding protein level was below the reference value (2.7 - 6.0 mg/dL) in the LEA condition, however, significantly increased after the HEA condition (LEA: 2.5 ± 0.5 mg/dL, HEA: 2.9 ± 0.5 mg/dL, $p<0.01$). REE_{ratio} (LEA: 0.92 ± 0.08, HEA: 0.99 ± 0.09) showed a tendency to improve after the HEA condition.
CONCLUSIONS: This study indicated that adequate EA with three meals per day, even for a short period of time, might improve blood protein indices and IGF-1 level. Examination of adequate EA on energy metabolism and muscle protein breakdown requires long-term intervention.

E-31 Impact of the Covid-19 Pandemic

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Investigating The Impact Of Covid-19 On Perceived Stress Levels Of Division II Student-athletes

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PURPOSE: To assess perceived stress levels of Division II student-athletes (SAs) following the interruption of their training and competition due to the COVID-19 pandemic. It was hypothesized that perceived stress during the pandemic would be higher in COVID positive SAs compared to quarantined SAs and those SAs who were not diagnosed/ not quarantined.
METHODS: Division II SAs (n = 99) completed an online, self-reported demographics questionnaire, COVID-19 questionnaire, and the Perceived Stress Scale (PSS) at one time point. The 10-item PSS measures the degree to which situations in one's life are appraised as stressful (For example: *How often have you been upset because of something that happened unexpectedly?* 0 = *Never* to 4 = *Very Often*). SAs were placed into three groups based on their COVID-19 status: tested positive with or without symptoms (n = 41); quarantined due to close contact (n = 34); or no direct interaction with COVID-19 (n = 24). One-way ANOVA was used to determine the differences in perceived stress levels among SA groups. An alpha level of $p \leq 0.05$ was set for statistical significance.
RESULTS: PSS scores were not statistically different ($p > 0.05$) between positive diagnosis of COVID-19 (19 ± 7), quarantined due to close contact (19 ± 7), and not diagnosed nor quarantined (22 ± 8) SA groups.
CONCLUSIONS: The results refuted the hypothesis that SAs who tested positive for COVID-19 reported higher perceived stress levels than those who were undiagnosed-quarantined or those neither diagnosed nor quarantined. Interestingly, the data demonstrated that SAs who were not diagnosed nor quarantined due to COVID-19 demonstrated similar perceived stress to those SAs who tested positive for COVID-19. Per this finding, it was thought that SAs not exposed to COVID-19 or having to quarantine may have experienced higher stress levels due to the fear of contracting the virus. In addition, these SAs may also have had elevated stress due to their teammates testing positive for COVID-19 and missing competition, training, or team practice. It was unclear how the relationship between PSS scores and COVID-19 interaction may have impacted athletic performance and preparedness during the 2020-2021 athletic season.

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Associations Between Perceived Social Support, Perceived Competence And Physical Activity In Hong Kong Children With Disabilities During The Covid-19 Pandemic

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PURPOSE: The COVID-19 pandemic has caused adverse impacts on physical activity (PA) and psychosocial health in children with disabilities. The aim of this study was to examine the associations among their perceived social support, perceived competence, and participation in PA, and to determine the predicting effects of perceived social support and perceived competence towards PA during the lockdown of the COVID-19 pandemic.