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A KETOGENIC DIET'S EFFECTS ON ATHLETIC PERFORMANCE IN TWO PROFESSIONAL MIXED-MARTIAL-ARTS ATHLETES: CASE REPORTS

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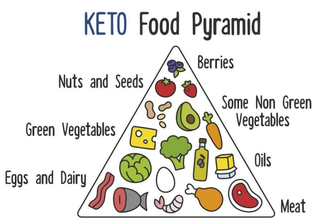
Introduction

Very low-carbohydrate, high-fat ketogenic diets (KD) are receiving increased attention for their effects on health parameters, with one of the consistently prevailing effects being body fat reduction. As such, KDs have become an attractive option for athletes competing in weight-class restricted sports, yet KDs have not been evaluated in nearly all athletic populations.

Purpose

The purpose was to examine the effects of an 8-week KD on body composition, strength, power, and anaerobic fatigue.



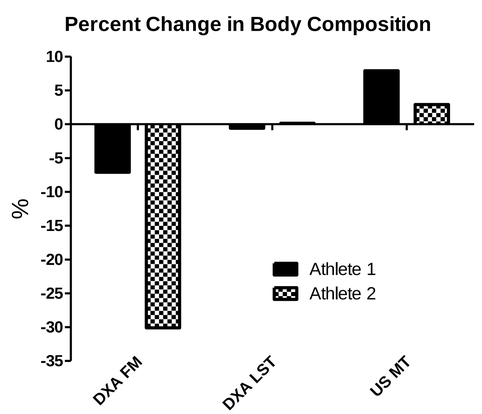
Methods

Two professional, weight-stable, mixed-martial-arts athletes (Athlete 1: 21 years, 77.35 kg, 179.6 cm; Athlete 2: 36 years, 94.45 kg, 187.8 cm) with more than three professional bouts who have not recently (>2 weeks) practiced a calorie- or carbohydrate-restricted diet participated in this study. Two testing sessions took place before and after a eucaloric 8-week KD intervention (5% carbohydrate, 75% fat, and 20% protein) while they continued their standard training. On each testing day, the athletes reported to the laboratory in a 10-hour fasted state. Upon arrival, each athlete submitted a blood sample, had their body composition measured using DXA (fat mass [FM] and lean soft tissue [LST]) and ultrasound muscle thickness (US MT), consumed a snack (210 Cals, 7g fat, 12g net carbohydrate, 20g protein), rested for 30 minutes, and then performed the performance tests. The order of performance testing is as follows: bench press 1RM, vertical jump height and power, a 30 second Wingate, and then 5 sets of 6 second Wingates. Peak power fatigue was calculated as the peak power difference between the final and first Wingate test. Watt:mass was calculated as average power divided by bodyweight, and Watt:mass fatigue was calculated as the difference between the final and 2nd Wingate set to account for the difference in test duration. Fasting blood ketones were assessed biweekly to ensure ketosis.

Results

Baseline blood ketones were ≤0.2 mmol/L, and blood ketones from weeks 2-8 were ≥0.3 mmol/L. Individual data and change values are presented in Table 1. Briefly, bodyweight decreased by 2.5-4.0%. Upper body strength either increased or did not change. Vertical jump height (+5.36-15.38%) and fatigue resistance relative to bodyweight (+98.04-151.52%) improved in both athletes, while other power measures were divergent between each athlete.

Variable	Athlete	Baseline	Post	Delta	Percent Change
Weight (Kg)	1	77.35	75.40	-1.95	-2.50%
	2	94.45	90.70	-3.75	-4.00%
Bench Press 1RM	1	94	102	8	+7.14%
(Kg)	2	102	102	0	0.00%
Vertical Jump Height	1	66.0	76.2	10.2	+15.38%
(cm)	2	71.1	74.9	3.8	+5.36%
Vertical Jump Peak	1	2626	2987	361	+13.74%
Power (W)	2	3310	3175	-135	-4.06%
Vertical Jump Peak	1	3.48	4.01	0.53	+15.23%
Velocity (m/s)	2	3.56	3.56	0.00	0.00%
Wingate Set 1 Peak	1	1094	1084	-10	-0.91%
Power (W)	2	1476	1478	2	+0.14%
Wingate Set 6 Peak	1	959	901	-58	-6.05%
Power (W)	2	1295	1384	89	+6.87%
Peak Power Fatigue	1	-135	-183	-48	+35.56%
(W)	2	-181	-94	87	-48.07%
Wingate Set 1	1	9.82	9.51	-0.31	-9.50%
Watt:Mass (W/Kg)	2	9.58	9.99	0.41	+11.13%
Wingate Set 6	1	11.39	10.76	-0.63	-5.53%
Watt:Mass (W/Kg)	2	11.65	13.41	1.76	+15.11%
Watt:Mass Fatigue	1	-0.51	-0.01	0.50	-98.04%
(W/Kg)	2	0.33	0.83	0.50	-151.52%



Conclusions

Professional-level mixed-martial-arts athletes may experience improved fatigue resistance without decrements in strength at a lower bodyweight following 8-weeks adaptation to a KD.

Practical Applications

In the present study, 2 professional mixed-martial arts athletes experienced mixed results, no change, or improvements in performance and a reduction in bodyweight following 8-weeks of a KD. Therefore, mixed-martial-arts athletes may use a KD for a possible benefit to athletic performance, while simultaneously easing the process of meeting weight requirements of their sport.

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