Sports Nutrition: Current Trends and Fads

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Disclosures

- Speaker, New England Dairy
- Advisory Board, Wheat Foods Council
- Royalties from *Nancy Clark's Sports Nutrition Guidebook*

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Five trends & fads popular among athletes

1. "Eating Clean" / orthorexia / RED-S
2. "Carbs"
   - —"Fattening"
   - —"Waste of calories"
3. Protein
   - —Supplements
   - —Vegan athletes and plant-based diets
4. Intermittent Fasting
5. Keto
   - —For weight management
   - —For endurance


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Current trend #1:

Eating "Clean"

- *I've stopped eating red meat.*
- *I'm staying away from foods with added sugar.*
- *I've started using pink Himalayan salt*
- *I've switched to almond milk.*
- *I've cut our carbs with dinner; I have a big salad instead*

Are there are unintended consequences to eating "clean"?

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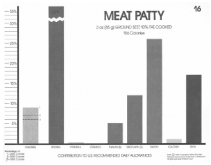
Unintended Consequences to *No Red Meat*: Reduced intake of a nutrient-rich food

Red meat is:

–Nutrient-rich

–Excellent source of:
- Iron
- B-vitamins
- Zinc



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Iron-deficiency is prevalent among athletes

- 2% of men in the general population.
- 14% of females in the general population

- **5-11%** of male athletes
- **15-30%** of female athletes

How much better could these athletes perform???

CDC Statistics
Sim et al. *Eur J Appl Physiol* 2019 (7):1463

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Unintended consequences of *No Salt:* Reduced intake of Iodine

- Table salt is an excellent source of Iodine. In 1920, iodine was added to salt eradicated iodine deficiency
- Iodine is needed to produce thyroid hormone
  —Low thyroid = slows metabolism
- Low iodine is associated with infertility
- Iodine deficiency in the mom can affect brain development in her infant

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Common sources of Iodine

Source of Iodine	Amount (ug)
Iodized salt, ½ tsp	200
Saltwater fish, 4 oz	130
Milk, 8 oz	**120**
Meats, 4 oz	15-30
Fruit, serving	0-4
Vegetables, serving	0-4
RDA, adults	150
RDA, pregnant RDA, breastfeeding	220 290

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Unintended consequences of *Cutting out refined grains*

- Reduced intake of *enriched* and *fortified* bread, cereal, pasta, etc.
  —Less iron, zinc
  —Fewer B-vitamins, including folic acid

Dietary Guidelines:
Half or more of grains should be whole grain.
This is not a "compromise."

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Refined grains are enriched with important vitamins & minerals

Food (1 serv)	Iron (DV)
Quaker Oatmeal, old fashion	8%
Quaker oats, instant, 1 packet	40%
Puffins	4%
Cheerios	45%
Kashi	10%
Trader Joe's Bran Flakes	45%
Rice, brown	4%
Rice, white	8%

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Folic Acid for athletes of child-bearing age

Observational study with 45,300 children —
Women who took folic acid supplements (multi-vitamin pill) before and/or during pregnancy were 50% less likely to have children with autism.

S. Levine, JAMA Psychology 75(2):176-184

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Current trend #1 ⇦ #2

"I've cut out carbs and I feel so much better…"

Q. What were you eating before?

A. The S.A.D. Diet (**S**tandard **A**merican **D**iet)

Each person is an experiment of one

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Why some athletes might choose to limit "carbs"

Comments from an ultramarathoner….

"I love my Paleo Diet. I live on meats, nuts, and fats and eat only a very few low-carb fruits and veggies, such as berries and spinach…

"This keeps me from bingeing on bagels, crackers and pasta. I've lost 8 pounds and I feel great…"

Is Paleo (or Keto) a way for some people to manage dysfunctional eating?

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Carbs are actually performance enhancing

Exercise	Example	G Carb/lb body wt/ day	G Carb/kg /day
Light	Low intensity (Walk, golf)	**1.5 - 2.25**	3 - 5
Moderate	~1 hour per day moderate intensity	**2.25 – 3.5**	5 - 7
High	1 – 3 hour/day mod-high intensity	**2.5 – 4.5**	6 - 10
Very high	Extreme 4-5 h/day mod-high intensity	**3.5 – 5.5**	8 - 12

For a 150 lb athlete: 450-825 g carbs/day (1,800-3,300 carb-calories)

AND, ACSM, DC Nutr Athl Perf Position Statement 2016

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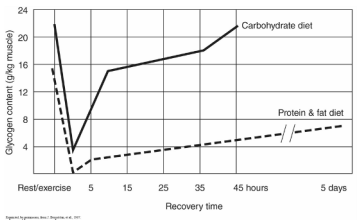
Carbohydrates refuel depleted muscle glycogen



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Example: 150-lb (68 kg) athlete

Exercise	Example	G Carb/lb body wt/ day	Daily carbs
Moderate	~1 hour per day moderate intensity	2.25 – 3.5	**340 - 420 g**
High	1 – 3 hour/day mod-high intensity	2.5 – 4.5	**375 - 675**

1-lb box (uncooked) spaghetti:
336 grams carbs = 1,345 cals

AND, ACSM, DC Nutr Athl Perf Position Statement 2016

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A problem—

Sample "Low Carb" and "Clean" Training Diet

	Sample menu	*Cals*	*g Carb*
Breakfast	Spinach-cheese omelet Turkey bacon	400 200	1 --
Snack	Almonds	200	8
Lunch	Grilled chicken on a salad Oil + Vinegar Dressing	300 300	5 --
Snack	Protein bar	200	16
Dinner	Salmon (6 oz cooked) Pile of broccoli (3 cups cooked)	350 150	-- 30
Total	*11% of total calories*	*2,100*	*60 g*

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Hard exercise + low carb diet = needless fatigue

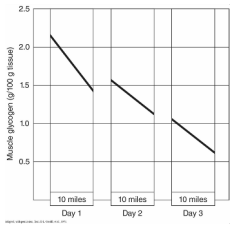

Chart: Nancy Clark's Sports Nutrition Guidebook, 5th Edition

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Lack of carbohydrate hurts ice hockey performance

- During a hockey game, muscle glycogen declines 38-88%.

A motion analysis of elite ice hockey teams showed:

- Players with high (60%) carb diet skated 30% more distance- and faster than the players who ate standard diet (40% carb).

In the final period:

- The high carb group skated 11% more distance.
- The low carb group skated 14% less than in first period.

Akermark, *Int'l J Sports Nutr 6:272-84*, 1996

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"But I eat lots of fruits & veggies for carbs…"

- **One large bagel (60 g carb - 300 cals) =**
- 16 strawberries + 1 cup blueberries + 1 medium banana

- **Sandwich + 100-calorie bag pretzels (62 g carb) =**
- 24 cherry tomatoes + 2 (7") cucumbers + 2 (8") carrots +
- 2 large peppers + 5 cups greens

- **2 cups pasta (84 g carb;** 1/4 lb uncooked**) =**
- 2 c cooked kale + 8 spears broccoli + 3 cups cooked zucchini sauteed with 1 large onion

Grains can be helpful for athletes who train hard!

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Unintended consequences to cutting out sugar: Cravings, cheating, guilt…

Cravings for sugar are often related to hunger …

If you hold breath for too long, you will *gasp for air*

If you with hold food for too long, you'll *grab for sugar*

Is something wrong with having some fun foods?

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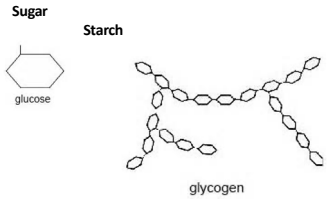
Carbohydrates 101



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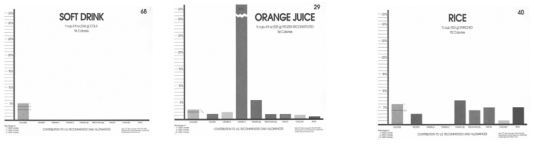
Nutritional Value of Carbohydrates



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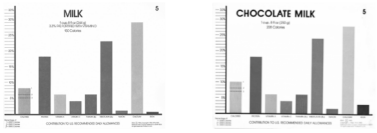
Please:

Pay attention to not just the *sugar* but the *nutrients* that come with the sugar



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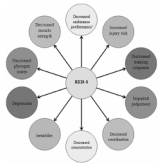
Unintended consequence of "clean eating": Relative Energy Deficiency in Sport (RED-S)

Chronic energy deficit due to overexercising, underfueling or both
- —Consciously (as with an eating disorder)
- —Subconsciously (as with "eating clean")

RED-S impairs physiological functioning:
- —Lowered metabolic rate
- —Amenorrhea (in females)
- —Decreased libido (in males)
- —Higher risk of injuries and stress fractures
- —Reduced performance



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How to assess if an athlete is eating *too* healthfully and *too* clean…

- Do you wish that you could just eat "normally" and not worry about the foods' quality?
- Do you ever wish you could spend less time thinking about food and more time enjoying meals?
- Is it hard for you to eat a meal prepared by someone else?

Karin Kratina PhD RD

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How to assess is an athlete is eating too healthfully and too clean…

- Do you look for ways that foods (such as white bread, chocolate milk) are unhealthy for you?
- Do you feel guilt or self-anger if you stray from your diet?
- Have you put yourself on a nutrition pedestal and wonder how others can possibly eat the foods they eat?

Karin Kratina PhD RD

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Summary:

Tips for trendy "clean eaters"

Red meat:	Choose alternate sources of iron
Salt:	If you crave salt, eat it.
Carbs- fattening:	Excess calories are fattening
Carbs-waste of cals:	Good sources of iron, folic acid, muscle fuel
Refined grains:	Half of all grains can be refined
Refined sugar:	Birthday cake *is* a healthy food!

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It's time to change how we talk about food and weight!

Traditional Language	Preferable Language
Bad food	Fun food, a treat
Good food	Nutrient-rich food
Junk food	Say the actual name of the food (Cheetos, chips, soda, etc.)
Healthy diet	Balanced diet
Diet & exercise	Taking care of your body

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Current trend #3

High protein diets for athletes

I slam down a protein shake the minute I finish lifting weights.

I add protein powder to my morning coffee, for breakfast on the run.

How many protein bars are OK to eat in a day?

What do you think about these amino acids supplements…?

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How much protein does your body require?

	150 lb. person	Gram Pro / LB body wt	Gram Pro / KG body wt
Current RDA	**60**	**0.4**	**0.8**
Athletic adult	**75 - 110**	**0.5 - 0.75**	**1.2 - 1.5**
Growing teen athlete	**105-150**	**0.7 - 1.0**	**1.5 - 2.0**
Adult building muscle mass	**105-150**	**0.7 - 1.0**	**1.5 - 2.0**
Adult restricting calories	**120-150**	**0.8 - 1.0**	**1.7 - 2.0**

150 lb. athlete might require 75 - 150 grams of protein / day

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Most athletes eat a "high protein" diet *without* protein supplements

Example of a "high protein" baseline menu

	Protein-rich food	Protein (g)	Calories
Breakfast	3 eggs or 6 whites	20	90
Snack	1 c cottage cheese	30	200
Lunch	4 oz deli turkey	25	120
Snack	8 oz. Greek yogurt	20	140
Dinner	8 oz salmon	60	350
Total		**160**	**900**

150 lb. athlete might require 75 - 150 g Pro/day

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Today's buzz-word: *Protein Pacing*

327 male and 226 female Dutch athletes (strength, endurance and team sports)

Meal	Percent of daily protein eaten /meal meal	Percent athletes who ate <20 g Protein/meal
Breakfast	19%	58%
Lunch	24%	36%
Dinner	38%	8%

Gillen et al IJSNEM 27 (2); 105-114 2017

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Protein Pacing to optimize muscle-building

Distribute protein evenly throughout the day

- Plan for about 20 g protein x 4 meals
- Eating more than 20 g protein/meal ≠ more muscle
- Dieters, in particular, want protein in each meal

20 grams protein:

3 eggs
Can tuna
Chiobani + handful almonds
PB&J sandwich + milk
2/3 c Cottage cheese
Chicken thigh

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Choose protein + carbs in combination

Protein: Builds and repairs muscles
Carbs: Fuel muscles
Goal: 3 x more carbs than protein

Eggs + oatmeal
Chocolate milk
Recovery shake: milk/Greek yogurt banana, PB
Sandwich (not just a salad)
Spaghetti + meatballs

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Protein and vegan athletes

- *I've cut back on eating meat to help save the environment.*
- *The thought of killing animals to eat them turns me off…*
- *I want to eat healthier, so I'm cutting out meat and dairy foods*
- *I watched Game Changer on Netflix … that convinced me to eat a vegan diet.*

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Vegan athletes: Can they get enough protein? Yes … but do they ?

- EPIC-Oxford Study 17.5-year follow-up of 29,400 meat eaters, 8,000 fish eaters, 15,500 vegetarians, and 2,000 vegans
- Data adjusted for BMI, lifestyle, socio-economic factors
  - Vegetarians and vegans tend to have lower BMI than meat-eaters
- Risk of bone fractures highest in vegans
  - Due to lower calcium intake? Protein intake?
  - Does their lower BMI translate into reduced bone density?

Vegetarian and vegan diets and risks of total and stie-specific fractures: results from the prospecitve EPIC-Oxford study Tong T, P Appleby, A Armstsrong et al BMC Medicine 18, 353, 2020

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Sample 1,800 calorie vegan diet

Food	Leucine	Protein	Calories
B: 2 slices whole wheat bread	0.5 g	10 g	200
2 Tablespoons peanut butter	0.5	8	200
1 cup soymilk	0.5	7	100
Sn: apple, 1 medium	0.03	0.5	100
L: Salad: greens + veggies	0.3	4	50
1/2 c chick peas	0.8	6	100
4 T sunflower seeds	0.9	12	350
1 T oil	--	--	100
Sn: ¼ c hummus	0.2	3	100
10 baby Carrots	0.03	0.5	50
D: 1/3 cake tofu, (100; 12 g	1.1	12	100
Brown rice, 1 cup cooked	0.4	6	250
broccoli, 2 cups (100; 7 g)	0.5	7	100
	5.76	76	1,800

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Leucine in foods (Goal:2.5 g/meal every 3-4 h)

Animal Food	Leu-cine	Cals	Plant food (swap)	Leu-cine	Cals
Eggs, 2 large	**1.1 g**	155	Peanut butter, 2 T	**0.5 g**	190
Milk, lowfat 8 oz	**1.0**	120	Soy milk, lowfat	**0.5**	105
Tuna fish, 1 can	**2.3**	120	Black beans, ½ cup	**0.7**	110
Chicken breast, 3 oz cooked	**2.1**	150	Tofu, 6 oz extra firm	**1.4**	140
Cheese, 1 oz	**0.6**	115	Almonds, 3/4 oz	**0.3**	120
Beef, 5 oz cooked	**3.8**	265	Lentils, 1 cup	**1.3** g	225

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Comparing Protein: Plant-based vs Dairy Milk

Beverage	Calories/8 oz	Protein (g)	Cost/ ½ gal
Dairy milk, 2% Hood	130	8	$2.89
Almond milk, Silk original	60	1	$3.79
Oat milk, Silk Oat Yeah	90	2	$3.79
Pea milk, Ripple	90	8	$4.99 (48 oz)
Soy milk, Silk vanilla	100	6	$4.39

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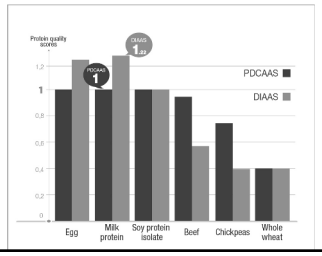
Protein quality counts



PDCAAS: Protein Digestibility Corrected Amino Acid Score (1993) capped at 1.0

DIAAS:
Digestible Indispensible Amino Acid Score (newer)

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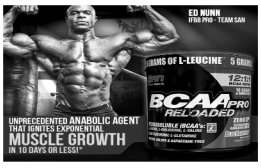
What about amino acid supplements…?



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How to get Essential Amino Acids

Protein source	Isoleucine (g)	Leucine (g)
MetRx Whey, 1 scoop	1.4	2.3
Chocolate milk, 20 oz.	1.5	2.5
Tuna, 6 oz. can	2.0	3.5
Cottage cheese, 1 cup	1.6	2.9
Chicken breast, 6 oz	2.4	3.2

*2.5 to 3.0 g leucine per meal triggers muscle protein synthesis

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Caution: Plant-based diets can be high in FODMAPS

Email from a runner—

Nancy, I decided to eat a vegan diet to help save the environment. I doubled my intake of beans, hummus, and other plant proteins. I ended up getting really bad diarrhea during my long runs.

More beans are *not* better … !!!!

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Trendy topic #4

Intermittent Fasting

Definition: I.F. does not restrict which foods to eat, but rather limits *when* to eat. For example, a 16/8 fast restricts the eating period to 8 hours, such as 11:00 a.m. to 7:00 pm. It involves skipping breakfast.

Supposed benefits:

- Reduces insulin levels, which enhances "fat burning"
- Promotes weight loss
  - -- Improves blood glucose control
  - -- Improves blood pressure
  - -- Improves blood lipids and cholesterol

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Intermittent Fasting & Athletic Performance

- Studies with 1) high-intensity, 2) endurance, and 3) resistance exercises have mixed results but are uniform in showing there is **no benefit** to athletic performance while fasting.
- More studies need to be done to evaluate specific fasting protocols during sport.

Levy, E. and T. Chu. *Current Sports Medicine Reports.* 18(7): 266-269, 2019

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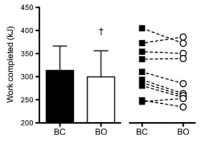
Intermittent Fasting (also known as "skipping breakfast") can impair afternoon exercise performance

- 10 male habitual breakfast eaters
- Two trials: 1. No breakfast
  2. 750 kcal. breakfast
- If no breakfast, ate 200 more kcal at lunch
- 5:00 pm Exercise test: 30-min. cycling (60% VO2 max) followed by 30-min. max exercise test
- Performed 4.5% better when ate breakfast



Clayton D et al. Med Sci Sports Exerc 2015 47(12):2645-52

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When an athlete asks about Intermittent fasting….

Ask: *WHY?*

-- To "fat adapt" to help with weight loss?

-- To "fat adapt" to enhance endurance performance?

-- To improve health? Reduce risk of diabetes?

How long do you think you could sustain I.F. lifestyle?

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Intermittent Fasting: Summary

Unlikely a good diet for an athlete….

The athlete's job is to:

—Surround the workout with food

—Fuel-up and refuel

—Consume protein every 4 hours

The bottom line: No more effective for weight loss than any other reducing diet
Most intermittent fasting studies are done with rats or unfit people.
Could potentially lead to overeating and binge eating

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Current trend #5

Keto Diet

Definition:
- Less than 50 grams a day of carbohydrate
- 75–80% of calories from fat
- 15-20% Protein (1.0-1.8 g protein/kg body weight)

Supposed benefits:
- Lose weight without feeling hungry
- Enhance "fat burning"
  -- Enhance endurance performance
- Lose body fat while maintaining/gaining muscle

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Keto diet for managing athletes' weight?

- 12 week study with recreational CrossFit athletes (31 y.o.)
  Keto Diet (n=7) vs. "Normal" Diet (n=5)
- Keto dieters ate about 500 fewer calories per day
  – lost more body fat
  – LDL cholesterol increased 35% (114 to 154 mg/d)
- No declines (nor improvements) in performance, despite lack of carb.

Kephart, W. C. Pledge et al. The three-month effects of a ketogenic diet on body composition, blood parameters, and performance metrics in Cross-Fit trainees: A Pilot Study *Sports* 6(1), 2018

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Ketogenic Diet and Gymnasts

8 elite-level male gymnasts Age 21 Trained 30 hours/week

Their standard diet: **47% carb**

Ate ~2,300 kcal (ad lib)

Keto diet x 30 days: **5% carb**; 55% fat, 2.8 g/kg (greens, meats, fish, olive oil)

Ate 2,000 kcal (ad lib)

Ketogenic diet does not affect strength performance in elite artistic gymnasts
A. Paoli et al. J Int Sox Sports Nutr 2012: 9:34

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Ketogenic Diet and Gymnasts

Performance test:
- Before and after keto
- 90 days later
- Before and after their usual diet.

On keto, lost 3.5 lbs total: 4 lbs fat lost and 0.5 lb muscle gained

Maintained ability to perform at same level

Better alternative to dehydration?

How long is it sustainable? What happens after the diet ends?

Ketogenic diet does not affect strength performance in elite artistic gymnasts
A. Paoli et al. J Int Sox Sports Nutr 2012: 9:34

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Keto Diet – for endurance athletes

Research suggests
—Athletes are able to train as well as (but not better than) when eating carb-rich sports diet

—Displacing carbs with protein & fat can hurt the ability to sprint and do high intensity exercise

—Training depleted a few times a week might offer benefits for highly competitive athletes.

Marquet, Burke, Hawley Med Sci Sports Exerc 2016 48(4):663-72

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The bottom line regarding Keto

- Adherence to any dietary program is a critical factor in its success
  —About 24% of people drop out of any-kind-of-diet research studies
- Most keto dieters start strong but phase out after 1-3 months
  —Especially true with people with obesity or diabetes
- Adhering to keto diet can be challenging unless the food is provided.
- Athletes are highly motivated to perform better, so adherence is better. But is adhering to keto going to make you a better athlete…?

Tzur A. Adhering to the Ketogenic Diet — Is it Easy or Hard? (Research review)
https://sci-fit.net/adhere-ketogenic-diet/

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Summary: Current Trends and Fads

"Clean Eating"
—You need not eat a perfect diet to have an excellent diet
"Carbs"
—Best source of fuel for athletes
—Both refined and unrefined offer important nutrients
Protein
—Supplements are unlikely needed
—Vegan athletes: plan wisely to get enough plant protein
Keto diet
—For weight management, think about sustainability
—For endurance, stay tuned for more research

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Questions? Comments?

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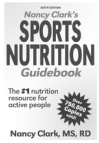

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