Case Study

NFSC 403

Patrice is a 28-year-old female triathlete who wants to participate in her first half ironman distance race (1.25 mile swim, 65 mile bike, 13 mile run). She is currently in early preparation phase of her training; her race is in 6 months. Her training currently consists of 2 hours of resistance training, 3 hours of swimming, 2-2.5 hours of running, and 3-5 hours of riding each week and will continue to gradually increase over the next 4-5 months (peaking at about 20-25 hours per week). Most of her workouts are at a moderate intensity right now.

Patrice is 5’5” currently weighs 126 pounds and is 18% body fat. Patrice is eating an average of 1800-2000 calories per day with about a 55% CHO diet. Like many athletes, she prefers to eat a higher protein diet because she wants to keep her muscle and she believes that protein gives her energy for her training. Lately she has noticed that towards the end of the week her workouts have been getting hard for her. She feels like she has “lead legs” when she runs and just generally feels fatigued for her long weekend bike rides, in fact on her last long ride she “bonked” and had to have her boyfriend pick her up and drive her home. She is also having difficulty maintaining her weight.

Show all work for calculations.

a. Using the Cunningham Equation and an activity factor (you choose), calculate Patrice’s RMR and recommended total caloric intake to maintain current weight. Is she consuming enough calories for her activity level? If not, how many calories do you recommend she consume to maintain her weight and current level of activity?

\[ \text{Cunningham: RMR} = 500 + 22(\text{LBM}) \]
\[ \text{LBM: 126 x .18 = 22.68} \]
\[ 126 - 22.68 = 103.32 \]
\[ 103.32/2.2 = 46.96 \]
\[ \text{RMR} = 500 + 22(46.96) \]
\[ = 500 + 1033.12 \]
\[ = 1533.12 \text{ kcals (to maintain weight)} \]
\[ 1533.12 \times 1.7 = 2606.3 \text{ kcals} \]

-Patrice is not currently consuming enough calories to maintain her body weight at the activity level she is partaking. I believe her activity level (factor) is 1.7 making my recommendation for her caloric needs to be at least 2600 kcals/day.

b. Calculate Patrice’s current intake of carbohydrate in grams per day and then in grams per kg. Is her CHO intake adequate for her sport and training? If not, what do you recommend (grams per kg and total grams per day)?

Current intake: 1800-2000 kcals, 55% CHO

990-1100 kcals/day
247.5-275 g/day

Current weight: 57.27 kg

275g/57.27kg = 4.8g CHO/kg

-Patrice’s CHO intake is not adequate for her endurance sport and training amount. I would recommend 7-12g CHO/kg because she is an endurance athlete (ends up being 400-687g CHO/day).

c. Use the caloric intake you previously recommended (from a) and your recommendation for daily CHO intake (from b) and figure out what the percent TCI would be based on the new recommendations.

\[ 400g/day \times 4\text{kcal/g} = 1600 \]
\[ 1600/2606.3 = 61.4\% \]
\[ 687g/day \times 4\text{kcal/g} = 2748 \]
\[ 2748/2606.3 = 105\% \]

-Based on new recommendations Patrice should be consuming 61-105% of her daily kcal intake from carbohydrates. Because 105% is not a plausible number, I would suggest sticking to ~60% of her intake be from carbohydrates.

d. Patrice will be participating in a 65 mile group ride in a couple of weeks. She would like to practice CHO loading and her race day nutrition during this ride. Calculate the grams/day of CHO she should be eating at the beginning of the week vs the end of the week based on the modern method of CHO loading.

At the beginning of the week Patrice should be consuming 50% of her kcals from carbohydrates, which is ~325g.

At the end of the week Patrice should be consuming 70% of her kcals from carbohydrates, which is ~456g.
e. What recommendations would you give to her in regards to her “race day nutrition”? She will be having breakfast 2 hours before her ride. How much CHO should she ingest with her breakfast and what types of foods would you recommend she eat for breakfast?

2g/kg body weight, 2 hrs prior to her event.

57.27kg x 2g CHO = 114.54g CHO in her breakfast.

-2 hours prior to an event you want to consume easily digested carbohydrate sources that are also low residue and familiar foods. Liquid carbohydrate forms are often suggested this close to start time.

f. Design a breakfast that provides the amount of CHO you recommend. List each food and the amount of CHO it provides and the total CHO for the breakfast.

Need: 115g CHO
- 2 slices of wheat toast 26.8g
- 4 Tbs peanut butter 6.2g
- 1 medium banana 27.0g
- 2 Gatorade Prime Prepare pouches 50.0g

110.0g CHO

Hydrate with plain water along the way as well.

g. How much CHO should she ingest during her ride and what types of foods/supplement should she eat?

Event lasting over 2.5 hours: 60-90 g/hr

- To avoid flavor fatigue, it is suggested to switch between CHO supplements and real foods, as well as consuming varying forms of sugars (glucose, fructose, sucrose, maltodextrin, etc.)
  - Supplements: Gu gels, Shot blocks, diluted sports drinks/fruit juice
  - Foods: pretzels, fig newton bars, banana, gummy bears

Hydrate with plain water along the way as well.

h. How many grams of CHO and protein should she have in her recovery drink immediately after her ride? How much CHO should she have in her recovery meal 1-2 hours after her ride? Design a recovery meal for her that reflects your recommendations. (no supplements) List each food and the grams of CHO that each food provides.

57.27 g CHO with 6-15 g Protein immediately after her ride
57.27g CHO within her recovery meal 1-2 hours after.

Meal: Panera Bakery’s Roasted Turkey & Avocado BLT on Sourdough bread ~49g CHO
  + ½ Medium Apple ~10.5g CHO
  =59.5g CHO

i. What would you tell Patrice in regards to her complaints about “lead legs” and poor performance at the end of the week? What would you say to her about the increased protein intake idea? Write your recommendations for Patrice in 2-3 paragraphs as if you were going to present it to her in person. Include any information or ideas you have that you feel are important.

- Over the course of the week your glycogen stores are not being replenished (glycogen fuels your muscles in endurance activities). At the beginning of the week your stores are high and ready to go, but because you aren’t consuming enough carbohydrates to replenish your stores fully, your legs are getting tired and feeling heavier at a faster rate.

- High protein diets are more focused on power athletes. Protein doesn’t give your body the type fuel it needs for the activities you are performing. I still encourage protein consumption, but suggest focusing on your carbohydrate intake before protein.
You are working towards competing in a half ironman. The exercise and training you are doing is mostly endurance based. With this type of activity, your body is using up glycogen for fuel, which is your body’s storage form of carbohydrates.

With your current diet pattern I see you are eating about 55% carbohydrates. In order for you to perform at your best, we need you to replenish those glycogen fuel stores so your body is able to keep going for longer periods of time. To do so, you will need to bump your carbohydrate intake up to at least 60% of your daily calorie intake.

If you are looking to carb-load before events, the most current way to do so is by eating 50% of your calorie intake from carbohydrates at the beginning of the week, and bumping up to 70% at the end of the week.

Make sure you are hydrated and fueled up before you exercising because that will have a big (positive) effect on your recovery time.