Nutrition Updates in Exercise and Sport: Addressing the confusion

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Disclosure

• Sponsored speaker, New England Dairy & Food Council
• Advisory Board, Wheat Foods Council
• Royalties, Nancy Clark’s Sports Nutrition Guidebook

The first words my clients say are either:

“I am so confused. What should I eat?”
or
“I know what I should eat. I just don’t do it.”

Today’s talk will focus on:
• Barriers to eating for health and high energy
• Tips to manage weight, fad diets
• Carbohydrate confusion
• Protein and supplements
• Fueling before-during-after exercise

Negative talk about food & weight

<table>
<thead>
<tr>
<th>Traditional Words</th>
<th>Preferable Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad food</td>
<td>Fun food, treat</td>
</tr>
<tr>
<td>Good food</td>
<td>Nutrient-rich food</td>
</tr>
<tr>
<td>Healthy diet</td>
<td>Balanced diet</td>
</tr>
<tr>
<td>Eating clean</td>
<td>Is processed food dirty?</td>
</tr>
<tr>
<td>Diet &amp; exercise</td>
<td>Self-care</td>
</tr>
</tbody>
</table>

Barriers to Eating Well for performance (and health)

• No time, too busy to food shop or to cook
• Love the taste of fatty, salty, sugary foods
• No healthy food around at the right times
• Lazy, don’t care
• Have limited money for food

One of the biggest barriers to optimal nutrition: Dieting to lose weight

The standard pattern:
• Go on the latest diet (Monday-Thursday)
• Binge eat (Friday – Sunday)
• Deny the body of valuable nutrients
• End up heavier than when first started dieting.
Media gives the wrong message

Don’t eat ... diet! Food is fattening.

Jared and the Subway Diet

If diets worked, everyone who has ever been on a diet would be lean.

MEDIA’S MESSAGE: People who diet become thin.

Indulge...You deserve a reward today!

People who get too hungry--

• tend to crave sweets and/or fats
• often make unhealthful food choices
• can easily overeat.

Goal: Prevent hunger. Frontload your calories

Hunger is physiological

Overeating can have little to do with willpower

• If you hold breath for too long, you will gasp for air
• If you withhold food for too long, you’ll grab for food

It’s very hard to win the war against hunger.

Less hunger = Better weight control

193 obese men and women (47 y.o.); free-living
1,400-1,600 cal x 16 weeks supervised; then follow-up in 32 w

Calorie Distribution: B 600 L 500-600 D 300-400
B 300 L 500-600 D 600-700

Bigger breakfast: more satisfying, less hunger; sustainable
Fewer cravings for sweets, carbs, starches, fast foods

<table>
<thead>
<tr>
<th></th>
<th>16 week</th>
<th>32 weeks</th>
<th>Total lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 calories</td>
<td>-33 lbs</td>
<td>Regained 25.5 lbs</td>
<td>-7.5 lost</td>
</tr>
<tr>
<td>600 calories</td>
<td>-30 lbs</td>
<td>Lost 15.5 lbs more</td>
<td>-45.5 lost</td>
</tr>
</tbody>
</table>

Jakubowicz Steroids 77:323-331 2012
How can I lose weight and have energy to exercise...?

What is an appropriate reducing diet that will:
- prevent extreme hunger
- allow adequate energy to survive your day?

Fuel by day & lose weight by night

*Do not:*
- “Delay eating” until later in the day
- Try to lose weight while exercising

Eating patterns of elite runners and gymnasts:
Athletes who routinely under-ate during the day had higher body fat than those who fueled evenly throughout the day.

Which diet works best?

Weight Loss outcomes: A Systematic Review and Meta-Analysis of Weight-Loss Clinical Trials with a Minimum 1-Year Follow-Up. Franz M. et al.; J Amer Diet Assoc. 2007 (10); 107:1755-1767

- No difference in weight loss based on type of diet (low carb, high pro, low fat)
- At 6 months, weight loss tends to stop
- Exercise alone: no weight loss at 12 months
- Rate of weight regain is slower with professional counseling
- For health benefits, weight loss of 3% to 5% is meaningful.

Different types of obesities need different types of treatments

Obesity should be treated as a medical (not a personal) problem

<table>
<thead>
<tr>
<th>High insulin secretion</th>
<th>High protein diet works well</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low response to fullness (genetic)</td>
<td>Pre-portioned food</td>
</tr>
<tr>
<td>High response to food cues</td>
<td>Keep food out of sight</td>
</tr>
<tr>
<td>Learned preference for junk food</td>
<td>Unlearn them! (starts early in life)</td>
</tr>
<tr>
<td>Binge eating</td>
<td>Tailor treatment to the cause</td>
</tr>
<tr>
<td>Dislike of exercise</td>
<td>Find pleasurable movement</td>
</tr>
</tbody>
</table>

How to estimate your energy needs

*Your body needs fuel for—*

- Resting metabolic rate: \( \text{Wt} \times 10 \text{ cals/lb} \)
- Daily activities: \( \pm 50\% \text{ of RMR} \)
- Purposeful exercise: \( +300-600 \text{ cals/hr} \)

Example: Estimating calorie budget

*140-lb active person*

\[
\text{RMR (Wt \times 10 \text{ cal/lb})} = 1,400 \text{ calories}
\]

Daily activity (\( \pm 50\% \text{ RMR} \)) = 700

Purposeful exercise (30 min.) = 300

Total calories to maintain = 2,400
To lose weight without intense hunger

1. Subtract 10 to 20% from total energy needs
2. Divide calories evenly throughout the day
3. Chip away at gradual fat loss

Example: If a person maintains weight on 2,400 calories—
Deduct 250-500 cals = 1,800 – 2,100 cals/day
Divide: Breakfast 500 calories
       Lunch 500-600
       Lunch #2 300-400
       Dinner 500-600

What if you have a “slow metabolism”?

The problem is unlikely the metabolism….

- Lean people tend to fidget & be animated
  NEAT: Non-Exercise Activity Thermogenesis (daily activity—working, playing, dancing; not your purposeful exercise)
- NEAT can vary by 2,000 calories per day
- People with obesity sit 2.5 h more/d than lean peers
- Sitting can save them 350 calories per day

Your body is your best calorie counter

- Counting calories should be needless
  (Your body can regulate your proper calorie intake)
- Listen to your body to learn about hunger and fullness

<table>
<thead>
<tr>
<th>Starved</th>
<th>Content</th>
<th>Stuffed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3 = Cold, tired, bored, moody, unable to focus, easily irritated…

Maintain energy by eating on a timeline

1. One food bucket every 4 hours
2. Use food labels to educate yourself about calories.
   (Count calories as 0, 50 or 100.)
3. Include at least 3 if not 4 different kinds of foods per meal
   1. Grains to fuel the muscles and brain
   2. Protein to build and repair muscles
   3. Fruit / veggie for vitamins and minerals
   4. Dairy/calcium-rich food for bones, blood pressure

How to fill your food bucket

What is available to eat…?

<table>
<thead>
<tr>
<th>Meal</th>
<th>Cals</th>
<th>Grain</th>
<th>Protein</th>
<th>Fr/Veg</th>
<th>Calcium</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>600</td>
<td>-700</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td>500</td>
<td>-600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#3</td>
<td>400</td>
<td>-500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#4</td>
<td>500</td>
<td>-600</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How to fill your food bucket

What is available to eat…?

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<th>Meal</th>
<th>Cals</th>
<th>Grain</th>
<th>Protein</th>
<th>Fr/Veg</th>
<th>Calcium</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>500</td>
<td>Oatmeal 150</td>
<td>Peanut Butter 150</td>
<td>Raisins 100</td>
<td>Latte 100</td>
</tr>
<tr>
<td>#2</td>
<td>500</td>
<td>Bread, 2sl 200</td>
<td>Turkey, 3 oz 150</td>
<td>Carrots 50</td>
<td>Cheese 100</td>
</tr>
<tr>
<td>#3</td>
<td>400</td>
<td>Granola 200</td>
<td>Almonds 100</td>
<td>Banana 50</td>
<td>Gr Yogurt 150</td>
</tr>
<tr>
<td>#4</td>
<td>500</td>
<td>Rice 200</td>
<td>Chicken 250</td>
<td>Broccoli 50</td>
<td>Milk 100</td>
</tr>
</tbody>
</table>
Adjust fueling to time of exercise:
You are either fueling-up or re-fueling

<table>
<thead>
<tr>
<th>Exercise time</th>
<th>Suggestions to fuel-up and then re-fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>Smoothie // bagel + yogurt</td>
</tr>
<tr>
<td>Noon</td>
<td>Half sandwich // rest of lunch</td>
</tr>
<tr>
<td>Afternoon</td>
<td>Energy bar + latte // choc milk</td>
</tr>
<tr>
<td>Before dinner</td>
<td>Bagel w PB // smaller dinner</td>
</tr>
</tbody>
</table>

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Case study

**Collegiate rower / Binge Eater**

Follow-up one week after teaching him how to eat —
"I have been letting myself eat a satisfying breakfast with eggs, cottage cheese, oatmeal and fruit … I feel content, not stuffed.
"I have a PB&J and glass of milk for my second lunch…
"I feel calmer, less anxious, and less worried about losing control of food. …
"And I’ve even lost weight. Amazing!"

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Case study
**Collegiate rower / Binge eater**

Follow-up four weeks later —
"I keep waiting for a binge to come, and it hasn’t! I have a jar of peanut butter in my room that has lasted 1.5 weeks (instead of 1.5 days). I have a box of granola that I haven’t devoured in one sitting…
"I have lost about 7 pounds—without trying!
"I feel so much better about myself … and I’ve been rowing really well!"

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Myth: Carbohydrates are fattening

- Truth: Excess calories are fattening, particularly excess calories from fatty, greasy foods.
- Carbs are important for muscle fuel.

Exception: High insulin secretors (pre-diabetes, PCOS, high BMI)
Athletes tend to be low insulin secretors

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Confusing message:

**Carbohydrates: Aren’t they bad?**

“I stay away from bread. It has too many carbs…”

“I’m on the Paleo Diet; I don’t eat wheat or other grain foods.”

“I don’t eat pasta dinners any more. I have a big salad instead.”

“No more orange juice … too much sugar!!”

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A problem:

**What kind of carbs are you talking about…?**

Are you concerned about—

- Refined white flour in bread and pasta?
- Natural sugars in fruit juice or bananas?
- High Fructose Corn Syrup in soft drinks?
- Refined sugar and candy?
- Fruits, vegetables & grains in any form?
Isn’t sugar evil...???

—Problem is not sugar; it’s how your body handles sugar.
—Athletes’ bodies differ from unfit, overfat bodies.
—10% of calories can appropriately come from sugar.

What nutrients come with the carbs?

Carbohydrates refuel depleted muscle

Paleo dieter

“But I feel so much better when I don’t eat carbs...”

Question: What were you eating before?

Answer: The S.A.D. Diet (Standard American Diet)

What’s so good about a no-carb diet...?

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 binging on bagels and crackers and pasta... I’ve lost 8 pounds and I feel great...”

Are Paleo and Keto ways for some people to manage disordered eating?
**Carbs are actually performance enhancing**

Current Recommendations

(A AND, ACSM, DC Position Statement Nutrition and Athlete Performance, 2016)

<table>
<thead>
<tr>
<th>Amount of exercise</th>
<th>g carb/lb body wt</th>
<th>g carb for 150 lb athlete</th>
<th>Calories from carb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate exercise (~1 hour/day)</td>
<td>2.25 to 3.5</td>
<td>335-525</td>
<td>1,350-2,100</td>
</tr>
<tr>
<td>Endurance exercise (1-3 h/day)</td>
<td>2.5 to 4.5</td>
<td>375-675</td>
<td>1,500-2,700</td>
</tr>
<tr>
<td>Extreme exercise (&gt;4-5 h/day)</td>
<td>3.5 to 5.5</td>
<td>525-825</td>
<td>2,600-3,300</td>
</tr>
</tbody>
</table>

About 100-200 grams (400 – 800 calories) of carbs/meal

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**Example of a “Low Carb” Diet**

<table>
<thead>
<tr>
<th>Sample menu</th>
<th>Carb</th>
<th>g Carb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast Spinach-cheese omelet</td>
<td>400</td>
<td>1</td>
</tr>
<tr>
<td>Turkey bacon</td>
<td>200</td>
<td>--</td>
</tr>
<tr>
<td>Lunch Grilled chicken on a salad</td>
<td>300</td>
<td>5</td>
</tr>
<tr>
<td>Oil + Vinegar Dressing</td>
<td>300</td>
<td>--</td>
</tr>
<tr>
<td>Snack Almonds</td>
<td>200</td>
<td>8</td>
</tr>
<tr>
<td>Dinner Salmon (6 oz cooked)</td>
<td>350</td>
<td>--</td>
</tr>
<tr>
<td>Pile of broccoli (5 cups cooked)</td>
<td>150</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>2,100</td>
<td>60 g</td>
</tr>
</tbody>
</table>

Goal for 150 lb athlete: About 100-200 g (400 – 800 cal) carbs/meal

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**Hard exercise + low carb diet = needless fatigue**

![Chart: Nancy Clark’s Sports Nutrition Guidebook, 5th Edition](Chart.png)

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**Depletion of Muscle Glycogen Stores**

Football team trends Aug - Nov

![Image courtesy of MuscleSound](Image.png)

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**“But I eat lots of fruits & veggies for carbs...”**

- One large bagel (60 g carb - 300 cal) =
  - 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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**Lack of carbs 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.
To summarize

• Diets don’t work. Depriving yourself of food leads to food binges and weight gain. You want to learn how to eat appropriately!
• Excess calories (not carbs) are fattening.
• Quality carbs are excellent for fueling muscles and enhancing athletic performance & health

What is the right balance of carbs and protein for active people?

<table>
<thead>
<tr>
<th>How much protein does your body require?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Current RDA</td>
</tr>
<tr>
<td>150 lb. person</td>
</tr>
<tr>
<td>Gram Pro / LB body wt</td>
</tr>
<tr>
<td>60</td>
</tr>
<tr>
<td>0.4</td>
</tr>
<tr>
<td>0.8</td>
</tr>
<tr>
<td>Athletic adult</td>
</tr>
<tr>
<td>75 - 110</td>
</tr>
<tr>
<td>0.5 - 0.75</td>
</tr>
<tr>
<td>1.2 - 1.5</td>
</tr>
<tr>
<td>Growing teen athlete</td>
</tr>
<tr>
<td>105 - 150</td>
</tr>
<tr>
<td>0.7 - 1.0</td>
</tr>
<tr>
<td>1.5 - 2.0</td>
</tr>
<tr>
<td>Adult building muscle mass</td>
</tr>
<tr>
<td>105 - 150</td>
</tr>
<tr>
<td>0.7 - 1.0</td>
</tr>
<tr>
<td>1.5 - 2.0</td>
</tr>
<tr>
<td>Adult restricting calories</td>
</tr>
<tr>
<td>120 - 150</td>
</tr>
<tr>
<td>0.8 - 1.0</td>
</tr>
<tr>
<td>1.7 - 2.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Most athletes eat a “high protein” diet without protein supplements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example of a “high protein” baseline menu</td>
</tr>
<tr>
<td>Protein-rich food</td>
</tr>
<tr>
<td>Breakfast</td>
</tr>
<tr>
<td>Snack</td>
</tr>
<tr>
<td>Lunch</td>
</tr>
<tr>
<td>Snack</td>
</tr>
<tr>
<td>Dinner</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

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

Protein Pacing optimizes muscle-building

Distribute protein evenly throughout the day

• Plan for about 20 g protein per food bucket
• 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
Protein bar
Chicken thigh

Choose protein + carbs in combination

<table>
<thead>
<tr>
<th>Protein: builds and repairs muscles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbs: fuel muscles</td>
</tr>
<tr>
<td>Goal: 3 x more carbs than protein</td>
</tr>
</tbody>
</table>

Eggs + oatmeal or bagel
Protein shake (made with banana + OJ)
Sandwich (not just a salad)
Spaghetti + meatballs
Chocolate milk
To summarize: Protein

- Include a protein-rich food in each meal and snack
- Combine protein with carbs
- Don’t bother buying protein powders
- Spend that money on more quality carbs, like bananas, berries and broccoli

Should I eat before I exercise...

**YES! As long as you are exercising at a pace you can maintain for more than 30 minutes**

---

**Fueling 5 minutes pre-exercise has benefits**

STUDY: Athletes with low glycogen stores biked hard for 45 minutes, then sprinted for 15 minutes

<table>
<thead>
<tr>
<th>Trial</th>
<th>Improvements during final sprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Baseline: No fuel, only water</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>#2</td>
<td>Sugar (180 cals glucose) + water</td>
</tr>
<tr>
<td>#3</td>
<td>Energy bar (270 cals) + water</td>
</tr>
<tr>
<td>#4</td>
<td>Breakfast 4 h before + Energy bar + water</td>
</tr>
</tbody>
</table>

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**Benefits of fueling before morning workouts**

*After an overnight fast, 8 athletes biked for 50 minutes Then did 10-minute sprint to exhaustion*

Work generated in the last 10 minutes:

+ 6% better with adequate water vs minimal water
+ 6% better with carbs vs no carbs (and minimal water)
+12% better with carbs + water (sports drink)

---

**Fueling before and during exercise improves endurance performance!**

10 men completed treadmill runs (70% VO2 max) to exhaustion

- Trial #1. No calories pre-ex + water during Run-time: 102 min
- Trial #2. Carb meal 3 h pre-ex + water during Run-time: 112 min
- Trial #3. Carb meal pre-ex + sports drink during Run-time: 125 min
What if pre-exercise food causes intestinal distress?

You can train the gut. Practice fueling during before & during training sessions. Choose low FODMAP foods three days pre-event.

What’s best to eat after exercise to enhance recovery?

You can train the gut. Practice fueling during before & during training sessions. Choose low FODMAP foods three days pre-event.

Choose the right balance of carbs, protein

For Rapid Recovery...

Consume mostly carbohydrates with a little protein

- As soon as tolerable 0 - 30 minutes post-exercise
- At next meal 1 - 3 hours post-exercise
- Snacks Every two hours for 6 hours

Recovery Fluids

Ratio of 3-4 g Carbs to 1 g protein

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Gm Carb/8 oz</th>
<th>Gm Pro/8 oz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beer</td>
<td>8</td>
<td>--</td>
</tr>
<tr>
<td>Gatorade</td>
<td>14</td>
<td>--</td>
</tr>
<tr>
<td>Coke</td>
<td>26</td>
<td>--</td>
</tr>
<tr>
<td>Chocolate milk</td>
<td>29</td>
<td>8</td>
</tr>
<tr>
<td>Rockin’ Refuel</td>
<td>32</td>
<td>13</td>
</tr>
<tr>
<td>Endurox R4</td>
<td>35</td>
<td>8</td>
</tr>
</tbody>
</table>

Chocolate milk to replace sodium

11 dehydrated subjects drank ~2 quarts (150% of sweat losses)

<table>
<thead>
<tr>
<th>Beverage</th>
<th>Sodium Intake (mg)</th>
<th>Cumulative urine loss 5 h post-ex (mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk, 2% fat</td>
<td>~1,000</td>
<td>610</td>
</tr>
<tr>
<td>PowerAde</td>
<td>~440</td>
<td>1,200</td>
</tr>
<tr>
<td>Water</td>
<td>—</td>
<td>1,180</td>
</tr>
</tbody>
</table>

Milk: • emptied slower • limited influx of fluid into the system
• well tolerated • provided protein for recovery

Shirreffs Jr J Nutr, July 2007
**Recovery foods**

*Be responsible and plan ahead!*

<table>
<thead>
<tr>
<th>Carb (g)</th>
<th>Pro (g)</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yogurt, flavored, 6 oz</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td>Cheerios w/ milk</td>
<td>32</td>
<td>11</td>
</tr>
<tr>
<td>Pasta + meat sauce</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

**Food for thought**

“Too many athletes show up for training, but they don’t show up for meals. They might as well not show up for training.”

Successful Boston College Hockey Coach

**So what is a hungry athlete to do?**

Meet with a registered dietitian (RD) who specializes in sports nutrition (CSSD)

wwwSCANdpg.org

**Dietary improvements happen when the benefits are bigger than the costs**

**Benefits of frontloading and fueling well**
- Less hungry; have better energy all day
- Concentrate better; more productive
- Better mood; less irritable
- Weight management becomes easier

**Costs**
- Planning food takes time and energy
- Fewer pig-outs on yummy “junk food”

**Questions? Comments?**

Don’t be just a good athlete when you can be a better one!

www.NancyClarkRD.com @nclarkrd