

Nutritional Counseling for the ATC and MD

Jen Ketterly MS, RD

University of North Carolina *at* Chapel Hill

College Athletic Trainer's Society- Spring Symposium

May 13, 2005

Objective

Recognize athletes with nutritional concerns and learn to advise appropriately.

Nutrition for Performance

Exercise and Training:

- increases rate of energy used
- increases rate of water lost due to heat production from higher levels of energy metabolism

Performance nutrition = distinct advantage over competitors

Energy Requirements

Macronutrient Needs

Micronutrient Needs

Weight

Nutritional Supplements and Ergogenic Aids

“Never eat more than you can lift.”

-Miss Piggy

Energy Requirements

Maximizing performance nutrition has little meaning in the face of energy deficits!

Energy Requirements

Data suggest that *most* athletes:

- do NOT consume adequate intake to meet demands of physical output
- tend to take in energy at the end of the day **AFTER** activity- backloading

Survey Says!

90% self reported they are not eating properly

45% reported days of not having enough energy to exercise

84% do not eat an hour before training

76% wait 1 hour or longer to eat post exercise

10% eat 6x per day

Benerdot 2002

Athletes don't eat enough and don't drink enough!

Consequences of Inadequate Energy Balance

Fatigue

Menstrual Dysfunction

Lower Metabolic Rate

Increased Risk of Injury

Higher % Body Fat

Loss of muscle mass

Poor Bone Health

Lower Nutrient Intake

Limited or Slow recovery from injury

Overall POOR PERFORMANCE

Inter-day Energy Balance

Never get hungry, never, never get hungry!

Those with wide deviations in energy balance during the day have highest body fat – regardless of whether the energy deviations are surpluses or deficits

Typical athlete eating pattern: infrequent meals with a heavy emphasis of large end of day meals

RESULT: Often overall weight stability but higher than optimal body fat

WHY???

Inter-day Energy Balance

Blood Glucose flux: ~every 3hrs

Delayed eating:

- drops blood glucose

- amino acid recruitment (from muscle)

- conversion to glucose by liver

RESULT= blood sugar stabilization at the cost of muscle mass!

Energy Needs

EXAMPLE:

Estimated Calories Burned/min

	140#	180#
Basketball	9.4	12.1
Football	8.4	10.8
Soccer	8.7	11.1
Volleyball	9.3	12.0

140# soccer player can burn 783 kcal in a 1.5hr practice/game

1 Day Food Record

9:00am 2 chicken biscuits (Chik FilA)

2:00pm Gatorade Bar
14 oz Gatorade

← Practice

7:00pm 2 pieces Fried Chicken
Pork Chop
Green Beans
French Fries
Carton whole milk

Energy Requirements

Practice Points:

- Meet energy requirements as day progresses: keep pace with hourly expenditures
- Maintain weight throughout season: not ok to drop weight when “in season”
- Weight loss is an indicator of inadequate energy balance

Macronutrient Needs

Carbohydrate

Protein

Fat

Alcohol

Why is Carbohydrate so important?

Adequate CARBOHYDRATE intake:

- Maintains blood sugar levels
- Keeps serum fatty acids minimized
- Spares Protein utilization as energy
- Adequate Liver and Muscle GLYCOGEN stores
- Greater % of maximum workload maintained
- Endurance and Intensity is improved
- Optimizes recovery
- Helps prevent mental fatigue



Even if muscle has adequate substrate at any given moment and an athlete is mentally fatigued, the body will decrease work capacity as if fatigued!

Carbohydrate

15% college athletes consume adequate Carbohydrate (CHO) intake

Hinton 2004

What % know what a carbohydrates is ???

Practice Points:

- Be sure athletes know what you mean when you say Carbohydrate
- Encourage nutrient dense carbohydrates to get vitamins needed for energy metabolism
- 2/3 plate at meal time should be carbohydrate from fruit, vegetables, grains and starches

Protein

Females: tend not to get enough

Males: tend to eat high fat protein foods

Vegetarians:

- Can tend to have diets based on refined flours, sugars, overprocessed and fried foods if not well-advised
- Needs can be met with a variety of vegetables, beans, grains, nuts, seeds, and fruit
- Complementary Protein theory unnecessary –amino acids are stored in the body and drawn upon when needed
- May be a protein deficiency when there is a calorie deficiency

Protein

Practice Points:

- Don't assume athletes know what foods contain protein
- Don't assume vegetarian athletes eat healthfully
 - consider ED in presence of other risk factors
- 1/3 plate at meal time should be lean, low fat protein foods

Fats

- High fat meals prior to practice or competition can cause GI distress, especially in emotional athletes or in presence of other gut dysfunction
 - If a meal is high in fat, it is likely lower in carbohydrate and other nutrient dense foods important for adequate nutrition
- Vegetarian diets have considerably lower omega-3 and higher omega-6 fats
 - Maximize essential fatty acid status and minimize trans fatty acids by using:
nuts, olives, avocados, olive and canola oils, and considering a DHA supplement (avoid safflower, sunflower and grapeseed oils)

Alcohol

- 5 or more alcoholic beverages in one night can affect brain and body activity for up to 3 days

*Two consecutive nights of 5 + drinks can affect the athlete for up to 5 days

EX: 5 beers Friday and Saturday night will affect Thursday's performance

- Hangovers reduce performance by 11%

- Alcohol increases urine losses

within 4 hours of drinking alcohol fluid losses can reach 3% of body weight

* 2% loss of body weight from fluid losses can impair endurance performance by 22%

Alcohol

- Alcohol affects sleep patterns and decreases sleep quality resulting in fatigue
- Alcohol depresses the CNS resulting in decreased reaction time and interfering with balance and coordination
- Alcohol over stimulates cells in the lining of the stomach: these cells produce acid and can possibly contribute to heartburn and electrolyte imbalances due to the poor absorptive surface

Alcohol

Affects performance by:

Increasing fatigue

Interfering with cognitive function

Impairing ability to recover from injury and workouts

Dehydrating the body

May lead to nutrient deficiencies

Practice Points:

- Athletes need to make an informed choice about alcohol consumption!
- 1 alcoholic beverage should be replaced with at least 1 cup fluid
- Always ask about consumption patterns: it can be a factor in delayed healing, recovery, or increased incidence of overuse injury

Micronutrient Needs

Iron

Calcium

Vitamin B12

Vitamin D

Micronutrient Needs

Iron

RDA: Men = 8mg/d Women = 18mg/d

UL: 45mg/d

Vegan Needs: those who exclude all animal products may need almost twice as much dietary iron due to the lower intestinal absorption

Runners, Swimmers, Cyclists: may need 30% more iron due to GI blood losses and greater turnover of red blood cells

Signs/Symptoms of Iron Deficiency

Feeling tired and weak

Decreased immune function

Decreased concentration

Pale complexion

Pica: eating nonnutritive substances, i.e. dirt, clay

Micronutrient Needs

Athletes at risk:

Female Athletes

Distance Runners

Vegetarian Athletes

Absorption Factors:

Small Intestine Dysfunction: Most iron absorbed in the small intestine: therefore any GI disorder resulting in inflammation of the small intestine may result in diarrhea, poor absorption and iron depletion

Dietary Absorption Inhibitors: tannins (tea), calcium (dairy foods), polyphenols (wine), Phytates (legumes, some grains), zinc supplements (zinc lozenges), coffee

Dietary Absorption Enhancers: Heme iron food sources (from animal products), vitamin C (citrus, etc)

Micronutrient Needs

Iron Supplements:

- The amount absorbed decreases with increasing doses: take daily supplements in 2 or 3 doses
- Therapeutic doses may cause GI side effects: nausea, vomiting, constipation, diarrhea, dark colored stools, abdominal distress
- Start with ½ recommended dose and gradually increase
- Taking with food may also limit side effects, but iron is best absorbed on an empty stomach
- Do not take with calcium supplement
- Need adequate folate and vitamin B12 status to help reverse iron deficiency anemia: assess nutrient intake and consider MVI

Micronutrient Needs

Calcium

RDA: 19-50y/o 1000mg/d

1 c milk = ~300mg

½ c fortified soy milk = 150mg

Bone density peaks ~early 20's: college age years are critical

AN: 98% osteopenia at time of diagnosis (Grinspoon 2000)

Assume bone loss: 1500mg/d calcium + 800IU vitamin D

Supplements: absorption is dose dependant, therefore take separately if more than 1 tablet.

Micronutrient Needs

Vegetarian Red Flag Nutrients

Vitamin B12

Not found in plant products naturally

Vegans need B12 from a supplement and/or fortified foods

If using a supplement as primary B12 source, needs are likely higher than RDA because of the absorptive capacity; daily supplement goal from MVI should be 10ug

Vitamin D

2 main dietary sources are fish and fortified milk (best source = sun)

Vitamin D2 (ergocalciferol) is derived from plants and nonanimal sources (D3: cholecalciferol is from animal sources)

UL: 2000IU- causes hypercalcemia

Weight

GOAL:

Weight maintenance during season- *even at peak training intensity*

Weight loss or gain in the off season

Weight

FEMALE

Wt Loss:

- Significant weight loss can be a red flag for an ED
- Can provide an opportunity to investigate menstrual cycle status
- Amenorrhea is rooted in energy balance: regardless of whether it is a reduced energy availability via dietary restriction or an increased energy expenditure not matched by corresponding energy intake.
- Can be an indication of GI dysfunction- inquire about BM's

Wt Gain:

- ? BN in the presence of other risk factors
- Alcohol consumption
- BOTH

Weight

MALES

Wt Loss:

- Can indicate dehydration
- Not consistently meeting energy needs
- Can provide an opportunity to discuss meal patterns and recovery nutrition principles
- Can be an indication of GI dysfunction- inquire about BM's

Wt Gain:

Alcohol consumption?

Weight

Alcohol can significantly affect body weight & body composition

- The body treats alcohol like fat, converting alcohol sugars into fatty acids
- Alcohol deaminates amino acids and stores them as fat
- Alcohol calories are usually consumed in addition to normal food intake
 - these extra calories can add up quickly resulting in weight gain

Weight

Practice Points:

- Be aware of weight changes
- Weigh when needed and always educate athlete on why you are weighing him/her
- Assume weight is a sensitive issue with everyone even though external behaviors may communicate something different
- Address nutrition and food behaviors when athletes are injured to prevent unwanted weight gain and maximize recovery and healing
- Make sure athletes are aware of alcohol's affects on body weight and body composition

Nutritional Supplements and Ergogenic Aids

If you supplement a crappy diet... then you have a crappy supplemented diet!

Nutritional Supplements and Ergogenic Aids

- Check to be sure MVI, bars, fortified nutrition shakes, etc do not exceed the established Tolerable Upper Intake Level (UL) of vitamins and minerals.
- Be aware of lactose-intolerant individuals taking supplements that may contain lactose and contributing to GI distress, *i.e.* vitamins, bars, shakes, etc.
- Pharmacologic doses of magnesium in supplements can cause diarrhea and abdominal cramping and can become toxic.

Adult UL for supplemental Magnesium = 350mg/day

Signs/Symptoms of excess Magnesium: changes in mental status, nausea, diarrhea, appetite loss, muscle weakness, difficulty breathing, low blood pressure, irregular heartbeat

- Be aware of the use of magnesium for headaches or magnesium containing laxatives or antacids!

Nutritional Supplements and Ergogenic Aids

Positive GI Affects:

Chammomile Tea: known for its antispasmodic properties

Flaxseed: can help with constipation

Candied Ginger Root: can help settle the stomach and decrease nausea

Raspberry Tea: the natural tannins can help with diarrhea

Nutritional Supplements and Ergogenic Aids

Negative GI Affects:

Sports Drink: Overconsumption of electrolyte containing beverages or supplements can cause bloating, gas, and fullness and lead to GI discomfort and an underconsumption of calories and nutrients

Echinacea: can cause nausea

Bee Pollen: can upset the stomach, in many multivitamins

Ginseng: can cause extreme nausea, in many multivitamins

Fish Oil: can cause heartburn

Nutritional Supplements and Ergogenic Aids

Evaluating Ergogenic Supplements

1. Evaluate the scientific validity of an ergogenic claim.

-Does the claim made by the manufacturer match the science of nutrition and exercise as you know it?

2. Evaluate the quality of the supportive evidence for using the ergogenic aid.

-What is the quality of the science? What is the reputation of the author and the journal in which the research was published? Was the research sponsored by the manufacturer?

3. Evaluate the safety and legality of the ergogenic aid.

-Is the product safe? Will the product compromise the health of a person? Is the product banned by any athletic organizations?

Nutritional Supplements and Ergogenic Aids

Practice Points:

- Always inquire, in a specific manner, about nutritional supplement or ergogenic product use
- Buy MVI and other nutritional supplements from a well known pharmacy that have a USP stamp
 - work to get appropriate MVI and nutritional supplements on the formulary at the campus pharmacy
- Evaluate an ergogenic aid thoroughly
 - consider subscribing to consumerlabs.com
 - consider asking campus pharmacy to stock nutrition shakes for use as recovery nutrition product, i.e. Boost

Questions for the panel ?????