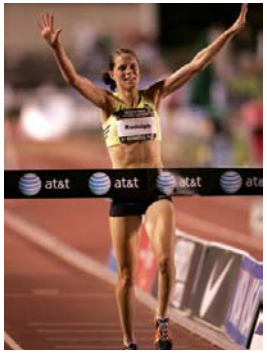


Sport Nutrition Update

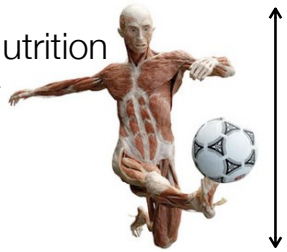
Kristi Spence MS, RD, CSSD, CD

Topics...

- Food & Performance?
- Food & Function
  - Hydration
- Pre-Game
- During
- Recovery
- Eating on the Go
- Supplements?
- Special Cases

Sport Nutrition vs. General Nutrition

- Additional Energy Expenditure
  - Increased Energy Requirements
- Sport Specific Needs & Environment
  - Team Sports...Power Sports...Aesthetic Sports
  - Endurance Sports; Winter Sports
- Food Function & Sport
- A Training Tool



REE

Energy Expenditure

Food & Functionality

Energy=

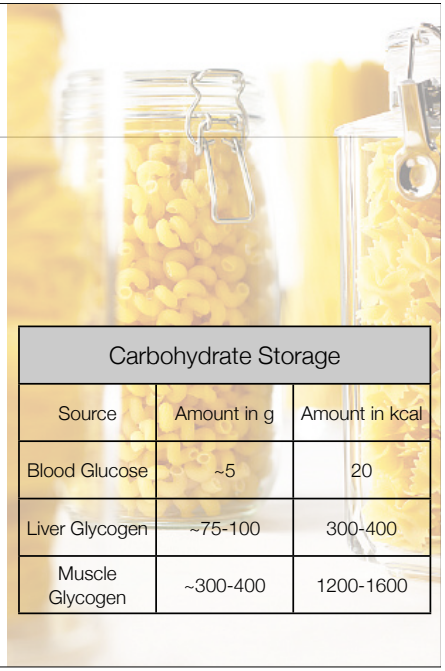
Carbohydrates
Protein
Fat

(Vitamins & Minerals)

The In & The Out
Food Choices impact
Performance!

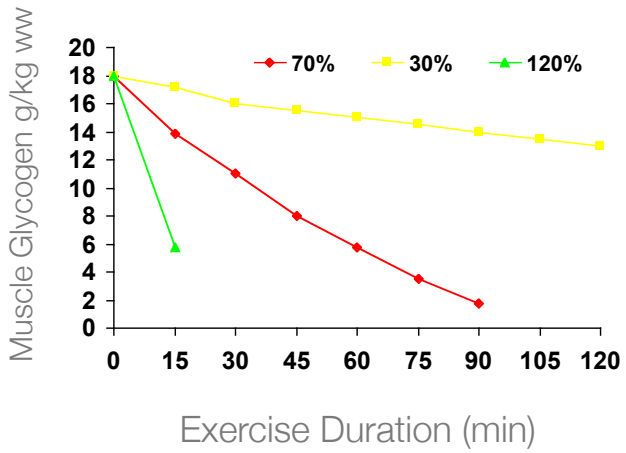
Carbohydrate

- Source (Grains...Fruits/Veggies...Dairy) 4kcal/g
- Metabolism
  - Glycogen Storage (Liver...Muscle)
- High Intensity Activity
- Protein Sparing (limits gluconeogenesis)
- Greater Activity ↑Carbohydrate Needs
- Recovery

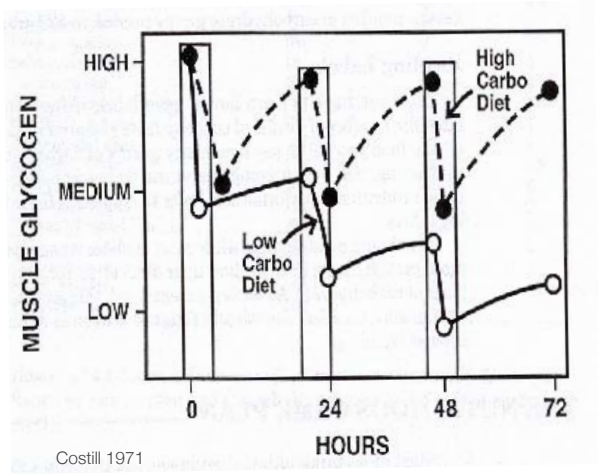


Carbohydrate Storage		
Source	Amount in g	Amount in kcal
Blood Glucose	~5	20
Liver Glycogen	~75-100	300-400
Muscle Glycogen	~300-400	1200-1600

CHO Storage: Intensity & Duration



CHO Storage: Repetitive Training



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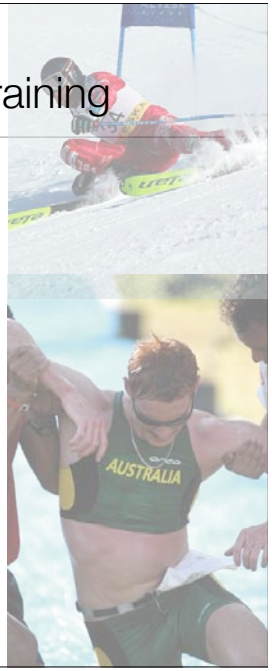


Carbohydrate Recommendations...

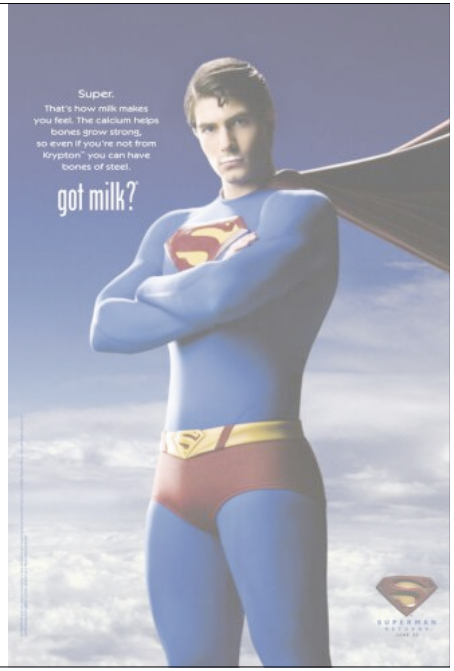
- Minimum Amounts
  - 5-7g/kg (2.3 - 3.2g/lb.)
- Considerations
  - Size, Gender, Sport, Diet
  - Typical Intake
  - Phase of Training
    - (heavy training, 7+ g/kg)
- Carbohydrate Loading?? (8-10g/kg)
- During Training (30-60g/hr)

Tina is a 16 year-old Soccer Player
She is 5'6" & weighs 135 lb. (61.4kg)
Carbohydrate Goal: 305-365g/d

Food	Carb Content (g)
1.5 cups Cereal (like cheerios) 1 cup skim milk Banana; 8 fl oz. OJ	100
Apple	20
Turkey Sandwich (2 slices bread, tomato) Whole Grain Crackers	77
Yogurt	25
Stir-Fry with brown Rice	75
1/2 c ice cream with 1/2 c yogurt & berries	35
Total	332

Protein

- Source (Animal + Vegetable sources)
- Caloric Density: 4kcal/g
- Metabolism (no storage)
- Building & Structure
- Muscle Tissue & Repair
- Immune Function
- Enzymes, Hormones, Antibodies
- Transportation & Fluid Balance
- Vitamins & Minerals



Protein Recommendations

- RDA: 0.8g/kg
- Endurance Athletes: 1.2-1.6g/kg
- Strength Athletes: 1.6-1.7g/kg
- Adolescent Athletes: 1.5 - 2.0
- Upper Limits:
  - Keep recommendations < 2.0 - 2.5 g/kg
  - Concerns about bone??

148lb soccer player (67.3kg) @1.4g/d = 95g	
Protein-Rich Food	**Protein (g)**
1.5c skim milk	12g
3/4 c oats	7g
string cheese	8g
1/4 c almonds	8g
1 c plain yogurt	10g
2 slices deli turkey	7g
2T peanut butter	7g
1 chicken breast	25g
sport bar	10g
TOTAL	94g

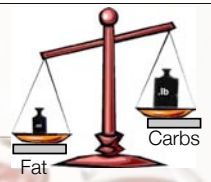
Consuming Enough?

- Food Avoidances/intolerances/ allergies
- Vegetarians
  - Vegan
- Voluntary Dietary Restriction
- Hormone Imbalances
- Bone Health

Timing

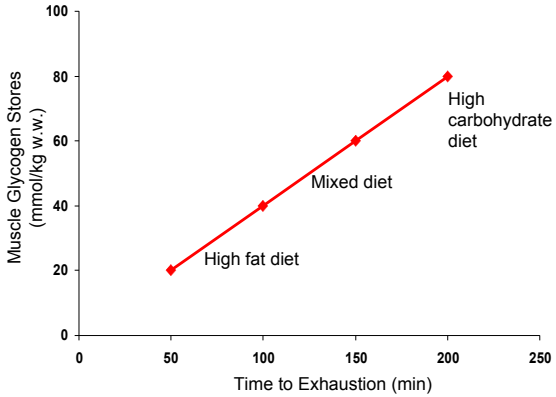
- Before Training
- During Training?
- After Training
- Type
- Amount

Fat



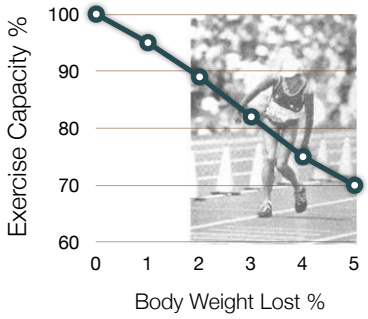
- Sources (Animal products (i.e., dairy, meat); nuts & seeds; oil)
- Greater energy density 9kcal/g
- Substantial Energy Source (lower intensity exercise)
  - Carbohydrate Sparing
- Cell Signaling & Structure
- Regulates Inflammation
  - Essential: Omega-6; Omega-3 Fatty Acids

Substrate Composition



An Athletes Diet is a Low Fat Diet

Hydration: The role of fluid



2% Weight lost from body water can↓ performance and impair thermoregulation

- The Role of Fluids:
  - Temperature (sweating cools the body)
  - Blood pressure regulation
  - Structure & lubricant
  - Nutrient concentration (electrolyte balance)
  - Nutrient Transport
  - Recovery (Dehydration delays recovery)

Hydration: How much?

- Establish good habits: Drink a 16 oz glass of water with each meal
- Carry a water bottle
- Pay attention to thirst!
- Drink more when adapting to a new environment
  - Remember that dehydration occurs in cold weather too!
  - Start hydration well before (at least 4 hrs) intense training/competition
  - Monitor your urine color & frequency
- Know YOUR sweat rate

Consider...

- Age
- Environment
- Altitude
- Fitness Level
- Taste
- Cramping
- NSAID use

Pre-Training:
Aim to drink 5-7mL/kg
So...135 lb. person
300-430 mL fluid
~10-16 fl oz.
4+ hrs before

Calculating Sweat Rate...

- Step #1: Weigh yourself (minimal clothing, no shoes) before training/competition
- Step #2: Keep track of all fluid consumed during training
- Step #3: Weigh yourself after training (same clothing)
- Step #4: Find the difference and convert to ounces (1 lb. = 16 oz or 2 cups of fluid)
- Step #5: Add the ounces you consumed during training
- Step #6: Determine hourly sweat rate: divide total ounces lost by hrs of training.

Example:

Tim practices for 2 hours and drinks 20 oz (2.5cups)

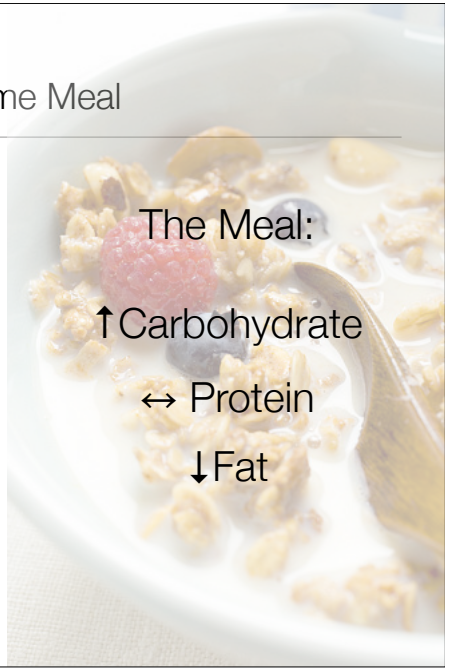
Weight #1	175
Training Fluid	20 oz
Weight #2	172
Weight Difference	-3 lbs
Difference in oz	48 oz
Total Volume lost 48 + 20	68 oz
Sweat Rate 68 oz / 2 hrs.	**34 oz/hr ~4c/hr**

Translating the Science into Practice
When & What Should Athletes Eat?

How can dietitians, coaches, parents, and teachers help?

Before: The Pre-Game Meal

- The night before
  - It doesn't have to be pasta...
- The morning of...
  - Timing: 2-4 hrs prior
  - CHO: 1-4g/kg
  - Nothing New!
  - Familiar; Easily Digested
  - Nervous? Try liquids...



During: Benefits of Carbohydrate

- Benefits of Carbohydrate Intake DURING prolonged exercise
  - ↓ Hypoglycemia
  - Fuel for active muscles (↓ risk glycogen depletion)
  - Protein sparing
- 40-60g/hr
  - Rate of uptake: 1g/min
  - Type of carbohydrate may make a difference

During: What and How Much?

Whole & Solid Foods

Sport Nutrition Foods

What? It's a matter of personal preference & tolerance	
Food	Carb Content
1 med banana	25g
1 slice Bread w/ PB	15-20g
1 Fig Newton Bar (2 Cookies	14g
1 oz Pretzels	20g
1 Med white roll with 1 T jam	50g
1 Clif Bar / 1 Luna Bar	40-45g / 23-28g
3 Clif Bloks / 6 Luna Moons	25g
1 Sport Gel (i.e., Gu, PowerGel, ClifShot)	25g
Gatorade (8 oz) 500-1000mL/hr (18-34 oz)	14g 30-60g

During: Gut Management

- GI Symptoms include: abdominal cramps, acid reflux, heartburn, side-aches, diarrhea, vomiting, loose stool, bloody stool
- Why does this happen?
  - delayed gastric emptying
  - nervousness
  - hyperthermia
  - dehydration
  - increased intensity
- Nutritional Management?
- Yes...

Gut Management Tips:

- Get fit and acclimatized
- Stay hydrated
- Practice drinking during training
- Avoid "Over-Nutrition" both before and during competition
- Keep your pre-race meal moderate in protein and low in fat
- Eat a high-energy, high carbohydrate diet regularly
- Avoid high-fiber foods before exercise
- If prone to GI problems, limit NSAIDS, alcohol, caffeine, antibiotics, & supplements
- Visit the Port-A-Potty BEFORE you start!

Recovery: The 3,4 Rule

- 3 eating episodes over 4 hours
- Of primary concern when exercise bouts are within 8 hours - TOURNAMENTS
  - Immediately after training/competition (30min)
  - Carbohydrate rich meal within 2 hours
  - Carbohydrate rich snack within 4 hours
- Remember to re-hydrate: Goal...Replenish 150%
- Body is primed to replenish glycogen stores within 4-6 hours
- Waiting too long will S L O W the recovery process

Busy? Eating on the Run

- Think ahead
- Simplify your meals
- Make travel packs
- Take meals with you
- Know your needs
- Stop at a grocery store
- Combine Carbohydrate & Protein
- Make nutrition a priority!

Travel? Eating on the Road

- Travel Packs
- Stop at a grocery store
- Make better fast food choices
  - Grilled Chicken sandwiches; baked potatoes
  - Add / bring fruit & veggies
  - Limit fried, high fat choices

DRY GOODS

Pretzels
Crackers
Fruit & nut butter
dried fruit & nuts
Veggies & hummus
Granola Bars
Sport Foods
Drink mixes
Soup
Dried milk powder
Oatmeal
UHT Milk

REFRIGERATION?

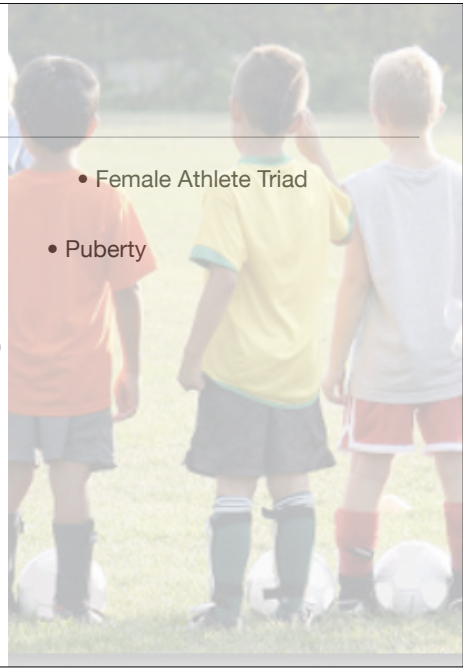
Cut fruit & veggies
Yogurt
String cheese
Pasta salad
Milk
Juice
Smoothies
Hummus

Supplements?

- Risks
  - Health
  - Drug Test
  - Performance
  - Financial Burden
- Benefits
  - Performance
  - Health
- Consider
  - Quality/ Research/ Effectiveness
  - Caffeine
  - MVI
  - Vit. C/E
  - Ca, Vit D

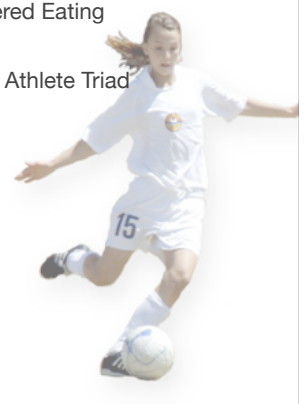
Young Athletes:

- Increased nutrient needs:
  - Growth, development, daily activity
    - Calcium, Iron (M vs. F), Vit. D
- School & peer pressures
- Sport pressures
  - Aesthetic sport athletes
  - Disordered Eating
- Female Athlete Triad
- Puberty

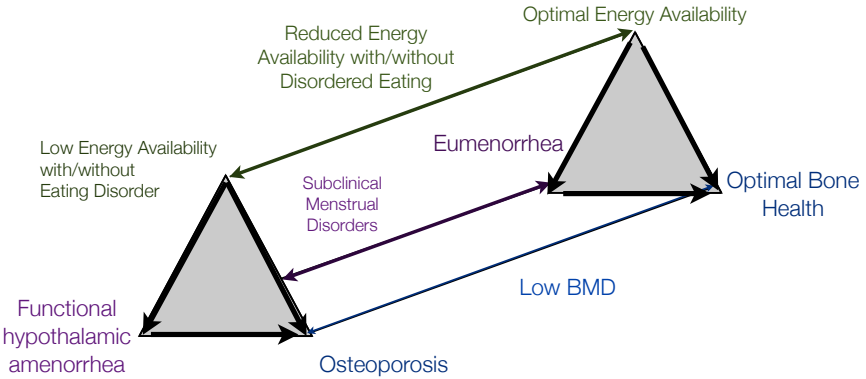


Older Athletes:

- Time...jobs, training
- Cooking Skills
- Cooking Environment
- Frequent Travel
- Financial Situation
- Sport pressures
- Aesthetic sport athletes
- Disordered Eating
- Female Athlete Triad



Female Athlete Triad



Energy Availability

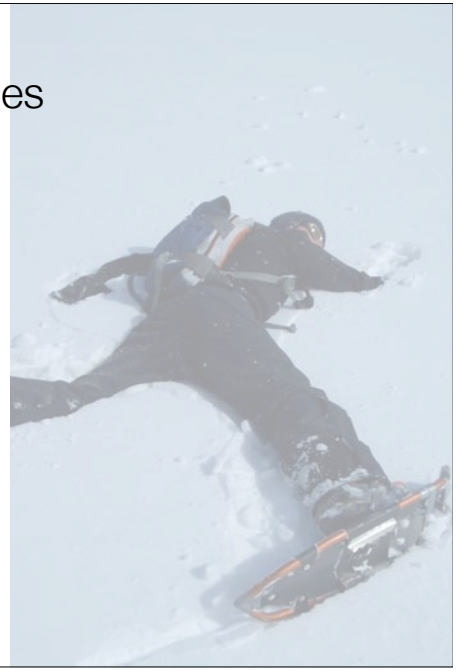
Can an athlete experience low EA, but be in Energy Balance?

EA forms the cornerstone of bone metabolism

Description	Kcal
Energy Needs	2800Kcal
Energy Intake	2300Kcal
EEE	900Kcal
EA = 2300 - 900 = 1400	
RMR	1800Kcal
	-400Kcal

Know your Athletes

- Abnormal Fatigue
- Muscle Cramping
- Irregular Cycles
- Difficulty Concentrating
- What Should you Do?
- Diet
- Physician, Lab Assessment



Thank You!

Questions??

Follow-Up:
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