Nutrition: in the Personal Training Setting

Chapter 7
Role of the Personal Trainer Regarding Nutrition

- Impt: Ability to recognize more complicated nutrition issues and how to refer.
- Referral to professional when client has disease state that is effected by nutrition.
- Referral to nutrition professional when complexity of nutrition issues is beyond the competence of the trainer.
- Locate nutrition professional through ADAs website: www.eatright.org
Dietary Assessment

• Dietary Intake Data
  – Some info about the clients current diet is imperative.
  – Methods for dietary intake:
    • Dietary recall – clients report what have eaten in past 24 hours.
    • Dietary history – clients answer questions about eating habits, likes, dislikes, eating schedule, medical history, etc.
    • Dietary records – typically a 3 day log where everything that is consumed is recorded.
  • Never make assumptions about the clients eating habits.
Dietary Assessment Con’t

• Evaluating the Diet
  – Now that data is gathered, several methods can be used to evaluate:
    • Food Guide Pyramid
    • Computerized Diet Analysis
      – Only as good as the information that is logged
      – Certain shortcomings w/ computer programs
      – Is time consuming & requires expertise.

• Other sites to check out:
  www.cyberdiet.com, vitabot,
  www.usda.gov/cnpp
Energy

• Commonly measured in kilocalories (kcal).
  – Is a measure of the heat required to raise the
    temp of 1kg of water 1 degree Celsius (or 2.2 lbs water 1.8 degrees Fahrenheit)
Energy

- Factors Influencing Energy Requirements
  - Resting Metabolic Rate (RMR)
    - 60-75% of daily energy expenditure
    - Measure of calories required for maintaining normal body functions (respiration, cardiac function, etc.)
  - Physical Activity
    - 2\textsuperscript{nd} largest component & most varied ~30%
    - Amount necessary depends on F.I.T. and environmental conditions
Energy

- Thermic Effect of Food
  - 7 – 10% daily energy expenditure
  - Increased energy expenditure above RMR measured for several hours following a meal
  - Energy needed to digest and assimilate foods
Energy

• Estimating Energy Requirements
  – Difficult to obtain accurate estimate of clients expenditure
  – Methods:
    • Measure Caloric Intake
    • Use mathematical equations for a ROUGH ESTIMATE
Nutrients – Protein

What is a Protein?

• Proteins are the basic building blocks of the human body.
• They are made up of amino acids, and help build muscles, blood, skin, hair, nails and internal organs.
• Next to water, protein is the most plentiful substance in the body, and most of it (around 60% to 70%) is located in the skeletal muscles.
Nutrients – Protein

• What do proteins do?
• Supplies valuable enzymes that regulate bodily functions.
• Provide for the transport of nutrients, oxygen and waste throughout the body.
• Key to muscle building and development—provide the structure and contracting capability of muscles.
• Provide collagen to connective tissues of the body and to the tissues of the skin, hair and nails.
• Hormones ie., insulin.
Nutrients – Protein

• General Requirements
  – Must consider protein for energy intake & source
  – More protein used for energy when in caloric deficit
  – Recommended Dietary Allowance (RDA) – for healthy, sedentary adults: 0.8 g/kg
  – Requirements for clients who are dieting for weight loss are higher than standard requirements

• Increased Requirements for Intense Training
  – Intense physical training increases protein requirements
  – Aerobic endurance athletes can reach 1.4 g/kg
  – Resistance training can reach 1.8 g/kg
  – General recommendation: 1.5 – 2.0 g/kg
Nutrients – Protein

• What happens if I eat too many proteins?
• May put your other bodily systems under stress.
• Eating more protein and increasing total caloric intake while maintaining the same exercise level will build an equal amount of additional fat and muscle mass.
• Ketogenic diets can thrust your kidneys into overdrive in order to flush these ketones from your body. As your kidneys rid your body of these toxic ketones, you can lose a significant amount of water, which puts you at risk of dehydration, particularly if you exercise heavily.
Protein

- What happens if I eat too little protein?
- An insufficient supply of protein in the diet limits the amount of protein your body can use for daily cell function and building muscle.
Proteins

• **How do proteins aid in weight loss?**

• High-protein foods slow the movement of food from the stomach to the intestine. Slower stomach emptying means you feel full for longer and get hungrier later.

• Proteins gentle, steady effect on blood sugar avoids the quick, steep rise in blood sugar and just as quick hunger-bell-ringing fall that occurs after eating a rapidly digested carbohydrate, like white bread or baked potato.

• The body uses more energy to digest protein than it does to digest fat or carbohydrate.
Proteins

• What are the types of proteins to eat?
• Animal proteins – include meat, poultry, fish, dairy products and eggs and are of high biological value. These foods contain all the essential amino acids your body requires.
• Vegetable, Grain, Legume, Seed or Nut proteins – these are considered incomplete proteins, since each individual food does not contain all of the essential amino acids. To get all of the essential amino acids, simply choose foods from two or more sources.
Carbohydrate

• **Carbohydrate Basics**
  
  – Carbohydrates offer an immediate source of energy for your body. They provide the fuel for your muscles and organs, such as your brain. The two types of carbohydrates are:

• **Simple carbohydrates**: These are found in fruits and fruit juice, and are easily digested by the body. They also are often found in processed foods and anything with added refined sugar, such as soft drinks and some candy.

• **Complex carbohydrates**: These are found in nearly all plant-based foods and usually take longer for the body to digest. They are most commonly found in whole-wheat bread, whole-grain pasta, brown rice, and starchy vegetables.
**Carbohydrate**

- **The role of carbohydrates**
  Carbohydrates provide all the cells of the body with the energy they need for everyday tasks and physical activity.

- **Amount of carbohydrate to consume**
  If the foods you eat contain too many carbohydrates, the following occurs:
  - Carbohydrates are stored in the liver and muscle cells, and are used when the body needs an extra burst of energy
  - Anything leftover that is not stored in liver and muscle cells is turned into fat
Carbohydrate

- If you take in an insufficient supply of carbohydrates, the following can occur:
  - Fatigue
  - Muscle cramps
  - Poor mental function
  - Fatigue easily results from deprivation of carbohydrates, which is seen in persons who fast, possibly interfering with activities of daily living.
  - Carbohydrates are your body’s first choice for fuel. If given a choice of several types of foods simultaneously, your body will use the energy from carbohydrates first.
Carbohydrate

- A low-carbohydrate diet might seem healthy, but if taken to the extreme, it is very dangerous to a person’s overall well-being.
- It is important to remember that “low-carb” does not mean “no-carb.”
- Make sure you eat moderate amounts of carbohydrates to keep your body fueled properly—50%-55% of calories should come from carbohydrates.
Carbohydrate

- The following are some serving and portion sizes for foods containing carbohydrates:
  - One medium piece of fruit, about 4-5 ounces (oz)
  - 1 cup (C) berries or melon
  - ½ C canned fruit
  - ¾ C juice (fruit or 100% vegetable)
  - ¼ C dried fruit or 50 raisins
  - 1 C raw, leafy vegetables
  - ½ C other vegetables, cooked or chopped
  - One slice whole-grain bread
  - ½ C brown rice or pasta
  - One small tortilla (less than 6” diameter)
  - 1 oz pretzels
Carbohydrate

- Carbohydrate is needed for the complete breakdown of fatty acids.
  - Ketosis – high levels of ketones in blood stream as result of incomplete breakdown of fatty acids.
- Carbohydrate replaces muscle & liver glycogen used during high-intensity activity so a high carbohydrate diet often recommended (60-70% of total intake).
- Not all clients should be on a high carbohydrate diet
- Aerobic endurance athletes training for 90 min or more can replenish glycogen levels w/ 8-10 g/kg.
- Majority of physically active individuals (less than 60 min aerobics activity) 5-6 g/kg is reasonable.
Carbohydrate

– Fiber

• The DRI for fiber is 38 and 25 g/day for young men and women, respectively.
• This level of fiber may be excessive for some aerobic endurance athletes.
FAT

• **The role of fat**-helps the body in many different ways:
  • Fat deposits surround and protect organs, such as the kidneys, heart, and liver
  • Fat balances hormones
  • A layer of fat beneath the skin, known as subcutaneous fat, insulates the body from environmental temperature changes, thereby preserving body heat
  • Dietary fat acts as a long-lasting fuel source for low-intensity exercise
  • Dietary fat provides fat-soluble vitamins and vitamins A, D, E, and K
FAT

- The types of dietary fat are:
- Saturated fat (animal flesh, butter, margarine, processed/hydrogenated oils, tropical oils, and fried foods)
- Polyunsaturated fat (vegetable oils—sunflower, safflower, corn, and flaxseed oils)
- Monounsaturated fats (vegetable oils—olive, peanut, canola, and many nut oils)
- Omega-3 fatty acids (highly polyunsaturated—from seafood such as tuna, mackerel, and salmon, as well as nuts, soy, canola, and flaxseed oils)
- Omega-6 fatty acids (highly polyunsaturated—vegetable oils such as soybean, corn, and safflower oils)
FAT

- Amount of fat to consume
  If you eat too much fat, the following occurs:
- Fat is stored in fat cells and adipose tissue
- Fat provides the body with the building blocks for cholesterol - LDL’s go up
Fat and Disease

- High levels of cholesterol or unfavorable ratios of lipoproteins are associated with increased risk of heart disease.
- High levels of HDLs protect against heart disease.
- HDLs can be increased by exercise and weight loss
Eating too little fat can cause an essential-fatty-acid deficiency, which may lead to:

- Skin integrity problems
- Hair loss
- Poor wound healing
- Fatigue
- Poor mental function
• **Fat intake**
According to the World Health Organization (WHO), we should restrict our dietary fat intake to 30% of our calories. However, fat quantity is not the only issue. Type of fat is also important. Certain types of fats, such as omega 3s from whole foods (found in nuts, seeds, and oily fish), now are viewed as essential to a healthy diet.

• If you want to lose weight, a reasonable daily fat target is 30% of calories, of which no more than 10% are from saturated fat. If you have high cholesterol, you should reduce your cholesterol by avoiding high-cholesterol foods.
Fat

- Very Low Fat Diets not recommended for healthy individuals.
- Recommendation for general public by most health organizations is that fat contributes 30% or less of total calories consumed (20% from mono- or polyunsaturated & 10% or from saturated fats)
- American Heart & Subcommittee on Nutrition of the United Nations recommend that fat provide at least 15% of total calories in diets of adults & at least 20% of total calories in women of reproductive age.
Exercisers or athletes in training may require a more substantial meal or snack to optimize performance.

The best pre-workout meal for athletes is one that is full of nutritious and wholesome foods.

Most importantly, one that is tried and true for them.
Factors that may contribute to how well a pre-workout meal is tolerated include:

- Age
- Gender
- Gastric motility and emptying time
- Allergies and intolerances
- Type of training
- Overall diet
- Dietary intake during exercise
- Genetic factors
Sports Nutrition

- Choose high-carbohydrate, low-fat foods—whole-grain, high-fiber foods, consumed 1 hour prior to exercise, are ideal; some examples include:
  - Breads
  - Cereals
  - Muffins
  - Yogurt
  - Oatmeal
  - Beans
  - Pasta
Sports Nutrition

- Avoid high-fat protein sources, such as fried meats, cheese, and hamburgers, because they take longer to empty from the stomach and may contribute to a sluggish or nauseated feeling.
- Take time to digest your pre-workout meal—the blood used to digest foods in the stomach is required in the muscles for exercise; so, food will remain in the digestive tract longer if improper time for digestion is allowed.
- Eat familiar foods prior to competitions and intense practices.
Recovering from exercise is an important part of the athlete’s routine.

Post-workout foods and drinks can affect recovery by affecting fatigue, repletion of glycogen stores, and preparation for future bouts of exercise.

For the recreational exerciser, one who exercises 3-4 days/week, overall good nutrition is most important for maintenance of glycogen stores, so muscles will have enough time to rest and recover between workouts.
Sports Nutrition

- For the more vigorous exerciser, one who exercises multiple times/day, performs competitively, or is in training for a sport, refueling muscle glycogen stores and assisting the body in recovery is of utmost importance.
- Repletion of nutrients lost through dietary intake is an essential component in maximizing the body’s performance.
Repletion of muscle glycogen stores

- To best promote repletion of muscle glycogen stores, consume carbohydrate-rich foods within 15 minutes after the workout has ended.

- Athletes should aim for 1 gram (g) of carbohydrate for every 2 pounds (lb) of body weight/hour, taken at 30-minute intervals over 4-5 hours.
Sports Nutrition

• Example: A 150-lb person should have 75 g of carbohydrate or 300 carbohydrate calories (4 calories of carbohydrates/g). The individual should consume the first 300 calories beginning 15-30 minutes after exercising during the first hour, and 150 calories each half hour for the next 3-4 hours to maximize glycogen repletion.
Sports Nutrition

• These carbohydrate calories can come from foods or fluids. The following are some 300-calorie ideas:
  – 8 fl oz of orange juice and two slices of bread
  – 12-16 fl oz of juice or a sports drink and a fruited low-fat yogurt
  – Cereal with milk and a banana
Sports Nutrition

- Protein repletion after a serious workout is less of a key player in the recovery diet, but a little protein can enhance glycogen replacement initially after exercise.
- The American diet is ubiquitous in protein, added protein is not essential in the post-workout routine.
Sports Nutrition

• Repletion of sodium, potassium and electrolytes (sometimes lost through sweating) is easy to do through foods. Supplementation generally is not recommended.
• The following are common recovery foods, which are high in essential electrolytes:
  – Potatoes
  – Yogurt
  – Orange juice
  – Bananas
  – Soup
  – Cereals
  – Cheese
  – Breads
Vitamins & Minerals

- **Dietary Reference Intakes (DRIs)** – are recommendations of the Food & Nutrition Board of the Academy of Sciences for intake of vitamins and minerals, to be used in planning & assessing diets for healthy people.

- **Split up into:**
  - Recommended dietary allowance
  - Adequate intake
  - Estimated average requirement
  - Tolerable upper intake level

- **Full text reports may be found at:** [www.nap.edu](http://www.nap.edu)
V/M

- Vitamins and minerals are team players; they work together with nutrients in food.
- In contrast, habitual consumption of foods high in antioxidant value (fruits, vegetables, whole grains) is associated with significant health benefits.
- Hundreds of antioxidants, some of which act synergistically, are available in foods.
- Supplementing here and there with one or several vitamins or minerals is unlikely to help and may waste an athlete's precious time and resources.
- Keep the focus where it belongs *making healthful food choices that benefit exercise training and performance*
• **Fat-soluble vitamins**
  Fat-soluble vitamins are found mainly in fatty foods such as animal fats (including butter and lard), vegetable oils, dairy foods, liver and oily fish.

Your body needs these vitamins every day to work properly. However, you don't need to eat foods containing them every day.

This is because, if your body doesn't need these vitamins immediately, it stores them in your liver and fatty tissues for future use. This means the stores can build up so they are there when you need them. But, if you have much more than you need, fat-soluble vitamins can be harmful.
• Water-soluble vitamins are not stored in the body, so you need to have them more frequently.

If you have more than you need, your body gets rid of the extra vitamins when you urinate. Because the body doesn't store water-soluble vitamins, generally these vitamins aren't harmful.

Water-soluble vitamins are found in fruit, vegetables and grains. But unlike fat-soluble vitamins, they can be destroyed by heat or by being exposed to the air. They can also be lost in the water used for cooking.
Minerals are essential nutrients that your body needs in small amounts to work properly. We need them in the form they are found in food.

Minerals can be found in varying amounts in a variety of foods such as meat, cereals (including cereal products such as bread), fish, milk and dairy foods, vegetables, fruit (especially dried fruit) and nuts.

Minerals are necessary for three main reasons:

- building strong bones and teeth
- controlling body fluids inside and outside cells
- turning the food we eat into energy
**Food Groups to Encourage**

- Consume a sufficient amount of fruits and vegetables while staying within energy needs. Two cups of fruit and 2 ½ cups of vegetables per day are recommended with higher or lower amounts depending on the calorie level.

- Choose a variety of fruits and vegetables each day. In particular, select from all five vegetable subgroups (dark green, orange, legumes, starchy vegetables, and other vegetables) several times a week.

- Consume 3 or more ounce-equivalents of whole-grain products per day, the rest of the recommended grains coming from enriched or whole-grain products; at least half the grains should come from the whole grains.

- Consume 3 cups per day of fat-free or low-fat milk or equivalent milk products.
A basic premise of the Dietary Guidelines is that nutrient needs should be met primarily through consuming foods.

Foods provide an array of nutrients and other compounds that work together to promote health and prevent chronic disease.

Increase intakes of fruits and vegetables, and place more emphasis on whole grains, fat-free and low-fat milk products.
### TABLE 10.1

Recommended Nutrient Intakes at 12 Different Calorie Levels

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<th>1,600</th>
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<td>Fruits*</td>
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<td>Oils*</td>
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<td>7 tsp</td>
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<td>10 tsp</td>
<td>11 tsp</td>
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$tsp =$ teaspoon. See inside back cover for metric conversions.

1. **Grain group.** Includes all foods made from wheat, rice, oats, cornmeal, or barley, such as bread, pasta, oatmeal, breakfast cereals, tortillas, and grits. In general, 1 slice of bread, 1 cup of ready-to-eat cereal, or 1/2 cup of cooked rice, pasta, or cooked cereal can be considered as 1 ounce equivalent from the grains group. At least half of all grains consumed should be whole grains.

2. **Vegetable group.** Includes all fresh, frozen, canned, and dried vegetables and vegetable juices. In general, 1 cup of raw or cooked vegetables or vegetable juice, or 2 cups of raw leafy greens, can be considered as 1 cup from the vegetable group.

3. **Fruit group.** Includes all fresh, frozen, canned, and dried fruits and fruit juices. In general, 1 cup of fruit or 100% fruit juice, or 1/2 cup of dried fruit, can be considered as 1 cup from the fruit group.

4. **Milk group.** Includes all fluid milk products and foods made from milk that retain their calcium content, such as yogurt and cheese. Foods made from milk that have little to no calcium, such as cream cheese, cream, and butter, are not part of the group. Most milk group choices should be fat free or low fat. In general, 1 cup of milk or yogurt, 1 1/2 ounces of natural cheese, or 2 ounces of processed cheese can be considered as 1 cup from the milk group.

5. **Meat and beans group.** In general, 1 ounce of lean meat, poultry, or fish; 1 egg; 1 tablespoon peanut butter; 1/4 cup cooked dry beans; or 1/2 ounce of nuts or seeds can be considered as 1 ounce equivalent from the meat and beans group.

6. **Oils.** Include fats from many different plants, and from fish, that are liquid at room temperature, such as canola, corn, olive, soybean, and sunflower oil. Some foods are naturally high in oils, like nuts, olives, some fish, and avocados. Foods that are mainly oil include mayonnaise, certain salad dressings, and soft margarine.

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Application

• Plate method
  – Fill half the plate with non starchy veggies
  – Fill ¼ with CHO (bread-starch-grain)
  – Fill remaining ¼ with lean protein or subs.
  – Add choice of dairy or fruit serving
Quiz

- Which has more vitamin C?
  - 1 cup (C) orange juice
  - 1 C strawberry halves

- Which has more potassium?
  - 1 medium-sized banana
  - 1 medium-sized white potato (baked)

- Which has more vitamin A?
  - ½ C carrot strips or slices
  - 1 C raw spinach

- Which has more iron?
  - 3 ounces (oz) cooked 90% lean ground beef
  - 1 C cooked black beans
Quiz

• Which has more calcium?
  – 3 oz canned salmon with bones (drained)
  – ½ C 2% milk

• Which has more vitamin B6 (pyridoxine)?
  – 4 oz chicken breast (broiler or fryer)
  – ½ C raw green peas
Nutrients – Water

- **Water: Why It Is Good for You**
  - Water is essential to good health. It helps your body to:
  - Regulate body temperature
  - Lubricate joints
  - Lessen the burden on the kidneys and liver by flushing out waste products
  - Carry nutrients and oxygen to the cells
  - Prevent constipation
  - Protect organs and tissue
  - Dissolve nutrients to make them accessible to the body
Water

- Thirst is triggered by about 1% dehydration
- Not possible to set a general recommendation because need dependent on multiple variables

* Fluid Replacement

The ultimate goal is to start exercise in a hydrated state, avoid dehydration during exercise, and rehydrate before the next training session.
Nutrients – Water

• Hydration Monitoring (Signs of Dehydration)
  – Dark yellow, strong smelling urine
  – Rapid resting HR
  – Decreased frequency of urination
  – Prolonged muscle soreness
  – Dizziness

• What to drink during exercise
  – Cool water if duration under 60 min
  – Sports Drinks may be more appropriate if over 60 min
Fluids

- Fluid Intake and Exercise
  - Before:
    - At least 1 pint (0.5 liter) of fluids 2 hours before activity for optimal hydration.
  - During:
    - Chugging large amounts of cool beverages (6-8oz @ 15min) may be preferred because it leaves the stomach faster and goes to the large intestine to be absorbed. Amounts consumed dependant on activity, duration, intensity of exercise, environmental temperature, and the athlete.
Fluids

– After: (rehydration)
  • For each pound of weight lost during activity, represents about 1 pint (0.5 liter) of fluid loss.
  • Consuming about 20% more than was lost is a good guideline due to urine production before rehydration
  • Weight should be regained before the next workout
Fluids

- Risks of Dehydration

  • Fluid loss equal to as little as 1% of total body weight can be associated with an elevation in core temperature during exercise.
  • Fluid loss of 3% to 5% of body weight results in cardio-vascular strain and impaired ability to dissipate heat.
  • At 7% loss, collapse is likely.
Fluids

– Total body water is determined largely by body composition; muscle tissue is approximately 75% water, whereas fat tissue is about 20% water.
  • The average fluid requirement for adults is estimated to be 2 to 2.7 quarts (1.9-2.6 L) per day.
  • Athletes sweating profusely for several hours per day may need to consume an extra 3 to 4 gallons (11-15 L) of fluid to replace losses.
Weight Gain

• **Caloric Intake**
  - 2,500 extra calories are required for each lb of muscle (350 – 700 kcal per day = 1 – 2 lb weekly gain per week).

• **Protein Requirements:**
  - 1.5 – 2.0 g/kg per day
  - May be higher for those who have plant based diets
Weight Loss

• An average of 1-2 lb of weight loss per week = a deficit of 500 – 1000 kcal.
  – Faster rates may lead to dehydration and decreased vitamin & mineral status
  – Substantial restriction will lead to decreased lean muscle mass loss.
  – The rate of loss of 1% total body weight per week is a common guideline

• Diets should be composed of foods with low energy density and should consist of a variety of foods.
Evaluating Weight Loss Diets

- Any method will lead to fat loss if and only if the person achieves a negative caloric balance.
- Exclusion of one or more of the food groups is an indicator that the diet may be nutrient deficient.
- One that is too restrictive for one to stay on in the long term.
Dietary Supplement Regulation

• Dietary supplements under same safety, purity & truth-in-labeling regulations as food
• However, they fall into the category of foods not drugs and are intended to supplement the diet.
• Independent monitoring of supplements: www.consumerlab.com