

## Nutritional Assessments of Athlete's

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## About the Speaker

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  - Co-Founder, The ISSN. [www.theissn.org](http://www.theissn.org)
  - Media Network – American College of Sports Medicine, National Strength & Conditioning Association, The ISSN: [www.acsm.org](http://www.acsm.org); [www.nsca-lift.org](http://www.nsca-lift.org); [www.theissn.org](http://www.theissn.org)
  - Adjunct Professor, Florida Atlantic & International University (Sports Nutrition, Advanced Metabolism)
  - Columnist/Reviewer – Many Science & Industry periodicals (i.e., *JAMA*, *NUTR*, *JADA*, *JISSN*, *AJCN*, etc. NW, etc.)

## Disclosures of Interest

- Member of the following Scientific Advisory Boards:
  - Javalution,
  - Scivation/PrimaForce.
- No financial remuneration is currently received for participation on these SAB's.
- Writer, *Muscular Development*, *Fitness Rx for Women*
- Paid consultant: None to declare.
- MRA, my employer conducts fee for service clinical trials (pharma, nutra, medical device, etc.)

## Overview

- Athlete's nutritional needs are based on energy system demands of their sport, age, gender, lifestyle, health status, training routine and frequency, goals, and conditioning amongst other factors.
- The nutritional assessment of the athlete is more complex than the typical client assessment. Understanding and integrating use of technology for more precise metabolic calculations coupled with the basic principles of the nutritional assessment appears to allow for better nutritional support during training and competition.
- Utilization of 1) biochemical, 2) metabolic, 3) physiologic assessments coupled with analysis of macro & micro training cycles employed by high-level athletes will be explored.
- The typical methods of data collection and how to individualize the findings and strategic plan for each athlete will be discussed.
- In addition, real world practical examples of the advanced nutrition-metabolic assessment and sports nutrition intervention also will be covered. The importance of networking (physicians, strength coaches, athletic trainers, team or personal coach, etc.) as a part of nutritionally supporting the athlete will not be lost in this session.

## Basics

- Want to get baseline on health status and familial history.
- Want to be as accurately representative as possible on food intake profile.
- Want to explore *external forces* affecting food choices and intake.
- Want to get exercise schedule (type, duration, times per day/week, etc.).

## Items of Interest

- Body composition
- Diet composition
- Goal(s)
- Resting Metabolic Rate (plus EPOC)
- Psychosocial influences
- Understanding the sport and its relative metabolic and physiologic influences

## General

- Basic procedures in nutrition care plans for assessment:
  - Anthropometrics (Ht, Wt, BMI, body fat %)
  - Dietary (Kcal, % macro, fiber, micronut, etc.)
  - Biochemical (blood and or urine tests)
  - Clinical Studies (RMR, RQ, etc.)
  - Medical/Surgical history
  - Use of medications, supplements, etc.

## Training Programs

- Physiological demands:
  - Type of sport
  - Training routine - type of training & frequency
  - Energy system(s) used
  - Musculoskeletal stresses
  - Thermoregulatory stresses
  - Weight changes

## Competitive Events

- Physiologic demands
  - Type of Sport
  - Duration
  - Intensity
  - Energy system(s) used
  - Musculoskeletal stresses
  - Thermoregulatory stresses

## Nutritional Needs

- Essential during Training and Competitive Seasons to assess and follow as part of your athlete's development.
  - Calories
  - CHO/PRO/FAT
  - Fluids
  - Vitamins
  - Minerals
  - Fiber

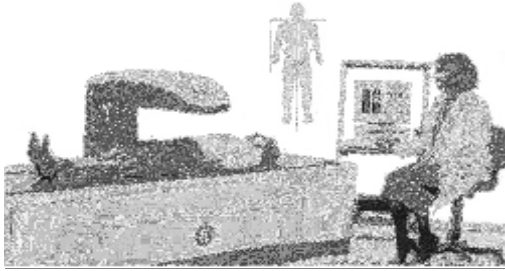
## Methods of Data Collection

- Anthropometrics.
- Food Diary.
- Calculated or calorimetry for Energy Expenditure
- Body composition (DXA, BodPod, BIA, etc.) - see "Essentials of Sports & Nutrition Supplements" - Tables 10.4, 10.5 in text - page 210.
- Waist measurement.
- Exercise and post exercise EE assessment.

## Determining Energy Expenditure

- Direct calorimetry (not realistic).
- Indirect calorimetry (portable units - measure  $O_2$  uptake,  $CO_2$  output, motion, heat flux, galvanic skin response, skin and near-body temperature).
- Examples: [MedGem](#), [ReeVue](#), [SenseWear](#), [Fitmate](#), etc.
- Predictive formulas: [Harris-Benedict Calculation](#), [Mifflin St-Joer](#)
- Cunningham formula ( $RMR = 500 + 22 (LBM)$ )
- Factor in Activity plus TEF...

Body Comp Testing - DXA



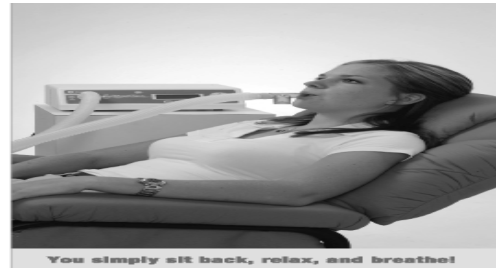
Body Comp - Bod Pod



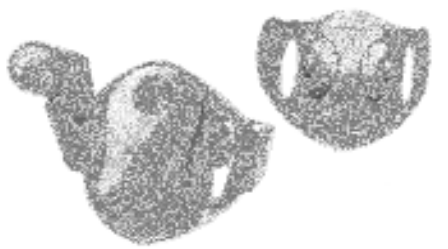
MedGem



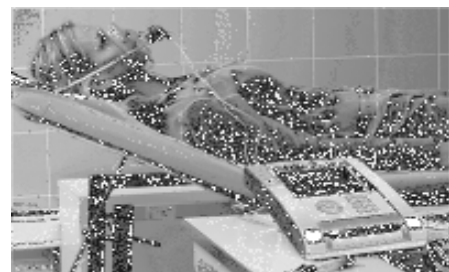
ReeVue



SenseWear



Fitmate / Fitmate Pro



## Where to find

- **MedGem** - only the WatchWT MedGem is a clinically-validated and FDA 510K-cleared, class II, medical device for measurement of patient resting metabolic rate (RMR). [www.mimhs.com](http://www.mimhs.com)
- **Reevue** - not FDA cleared:  
<http://www.korr.com/products/reevue.htm>
- **SenseWear** - <http://www.sensewear.com/>
- **Fitmate** - not FDA cleared. [www.fitmate.net](http://www.fitmate.net)

## Assessment Equation 1

- **Step 1- Calculating the BMR**
  - For Men:  $BMR = 66 + (13.7 \times \text{weight in kg}) + (5 \times \text{height in cm}) - (6.8 \times \text{age in years})$
  - For Women:  $BMR = 655 + (9.6 \times \text{weight in kg}) + (1.8 \times \text{height in cm}) - (4.7 \times \text{age in years})$
- **Step 2: Apply Harris Benedict "principle"**

If you are sedentary Little to no exercise	Daily calories needed= BMR x 1.2
If you exercise lightly 1-3 days per week	Daily calories needed= BMR x 1.375
If you exercise moderately 3-5 days per week	Daily calories needed= BMR x 1.55
If you exercise heavily 6-7 days per week	Daily calories needed= BMR x 1.725
If you exercise very heavily 2x per day, extra heavy workouts	Daily calories needed= BMR x 1.9

## Assessment Equation 2

- The Mifflin-St Jeor equations are:
  - Male:
    - $BMR = 10 (Wt \text{ kg}) + 6.25(Ht \text{ cm}) - 5(\text{age}) + 5$
  - Female:
    - $BMR = 10 (Wt \text{ kg}) + 6.25(Ht \text{ cm}) - 5(\text{age}) - 161$
- Activity Factor as applied to Harris Benedict also applied to Mifflin St-Jeor for TEE.

## Food Intake Assessment

- **Food Diary** (3d vs. 7d)
- **Food activity record**
- **General nutrition questionnaire** (See ISSN text!)
- **Direct observation**

## Sample Basic Nutrition Questionnaire

### HOW DOES YOUR DIET RATE?

- Please use the following scale to rate how satisfied you feel now about your dietary habits. Choose any number from this list (1 to 5) and indicate your choice on the questions below.
- 1 = Not at all ----- 5 = Strongly Agree
- I eat at least three to five (3 to 5) servings of vegetables per day (a serving equals 1/2 cup cooked or 1 cup raw).
  - 1 2 3 4 5
- I eat at least three servings (3) of fruit per day (a serving equals 1/2 cup fresh fruit or juice or 1/4 cup of dried fruit).
  - 1 2 3 4 5
- I drink or get the equivalent of 3 cups (8 ounces) of milk per day (equivalent calcium 300 mg/cup through fortified fruit juice or dark green leafy vegetables).
  - 1 2 3 4 5

## Questionnaire con't.

- I limit my saturated fat (lard, butter, bacon, creams, etc.) intake. – Especially Bacon
  - 1 2 3 4 5
- I limit my total daily fat intake to less than 50 grams (1 tsp of oil = 5 grams, 1 tbsn of PB = 15 grams, etc.)
  - 1 2 3 4 5
- I eat in between six and ten servings of protein-based foods per day (1 ounce of meat, 1 egg or 3 egg whites, 1/4 cup tuna, 1-ounce cheese or 4-ounce tofu equals 1 serving).
  - 1 2 3 4 5
- I drink at least eight cups (8 ounce per cup) of non-caffeinated fluid daily (water, juice, seltzer, etc.)?
  - 1 2 3 4 5
- *Office use only:* Score = \_\_\_\_\_ Score out of 35 \_\_\_\_\_ %

## Biochemical Testing

- Request recent blood work from MD (if possible).
- Obtain testing of:
  - CBC with differential
  - comprehensive metabolic panel
  - Lipids
  - iron/ferritin (female athletes)
  - ionized calcium (female athletes)
  - food allergies (where indicated)

## The Fitness Assessment

- Anthropometrics (Ht, Wt, BMI, waist circumference)
- Body composition
- Vitals (resting and recovery BP, HR)
  
- Aerobic capacity ( $VO_2$  peak/max)
- Strength
- Flexibility

## Psychosocial

- External influences on food intake
- Biological influences
- Social influences
- Self motivated, authentic (read Deci)
- See “Essentials of Sports & Nutrition Supplements” - Table 10.8, page 224.

## Develop

- Nutrition Care Plan
- Lifestyle approach
- Meal plans that are sustainable, reproducible & realistic for athlete's lifestyle.
- Plan that is cohesive with the rest of the support team for the athlete's benefit.

## Sample Athlete

- Goal: to enhance training for personal best race times at the 2009 World Games (2x Olympian - swimming).
- Start/Baseline: (Feb 2009)
- Assessment: 25yoF, 172cm, 62.2kg, BMI 20.7, DXA BF% 15.7, RMR~1732(12.3 kcal/lb), Food intake 2122 (57/19/31), Output ~3442 kcals.
- Diet & nutrient timing changes made.
- June 2009: Wt 65.4kg, BF% 15.8 (gained 5lb LBM, 1.2lb FM, RMR 1820(12.7kcal/lb), Food intake 2668 kcals (54/22/22).
- On training pace for late July, early August games. Did a PR, now training for 2012 Olympics.

## Practical Considerations

- Develop a 'partnership' with the athlete
- Obtain commitment
- Get athlete involved in what you do for them
- Educate the athlete (and their caregivers)
- Be supportive
- Monitor progress
- Reinforce the behavior-health relationship
- Look at barriers; behavior modification

## Suggested Basic Library

- Essentials of Sports Nutrition and Supplements by Jose Antonio, Douglas Kalman, Jeffrey R. Stout, and Mike Greenwood. Humana Press. Hardcover 2008
- Sports and Exercise Nutrition by William D McArdle, Frank I Katch, and Victor L Katch (Hardcover - May 1, 2008).
- Exercise Physiology: Energy, Nutrition, and Human Performance by William D McArdle, Frank I Katch, and Victor L Katch (Hardcover - April 1, 2006).
- Sports Nutrition: Energy Metabolism & Exercise. Editors: I. Wolinsky and J. Driskell. CRC Press. Hardcover 2008.

## Suggested Basic Library con't

- Nutritional Assessment of Athletes. Editors: I. Wolinsky and J. Driskell. CRC Press. Hardcover 2002.
- Exercise Metabolism by Mark, Ph.D. Hargreaves and Lawrence, Ph.D. Spriet (Human Kinetics; Hardcover - Dec 31, 2005).
- The Ergogenics Edge. Mel Williams. Paperback. Human Kinetics, 1998.
- Sports Psychology for Coaches. By: Damon Burton and Thomas D. Raedeke PhD. Human Kinetics, Paperback 2008).
- Sports Supplements by Jose Antonio and Jeffrey R. Stout. Lippincott William & Wilkens. Hardcover - Sep 1, 2001.

## Questions



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