

 COPE WEBINAR SERIES FOR HEALTH PROFESSIONALS

February 6, 2019

Preventing Metabolic Adaptation During Weight Loss


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Nursing Education Continuing Education Programming Research


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 OBJECTIVES

- Identify methods of assessment necessary to design a nutrition plan for fat loss.
- Create a macronutrient prescription to fuel activity and preserve lean body mass while in calorie deficit
- Design a sample resistance training workout designed for simultaneous fat loss and muscle growth.

 CE DETAILS



- Villanova University College of Nursing is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center Commission on Accreditation
- Villanova University College of Nursing Continuing Education/COPE is a Continuing Professional Education (CPE) Accredited Provider with the Commission on Dietetic Registration


 CE CREDITS

- This webinar awards 1 contact hour for nurses and 1 CPEU for dietitians
- Suggested CDR Learning Need Codes: 2070, 2110, 3030, 5370
- Level 2
- CDR Performance Indicators: 4.1.2, 4.2.6, 4.2.7, 6.2.3

 **PREVENTING METABOLIC ADAPTATION DURING WEIGHT LOSS**



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 **DISCLOSURE**

Neither the planners or presenter have any conflicts of interest to disclose.

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Preventing Metabolic Adaptation During Weight Loss

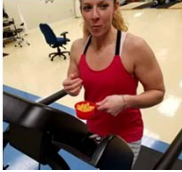


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The Conventional Approach to Weight Loss



Cardio



Calorie Restriction

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Guidelines for Exercise

ACSM

Weight loss -- 150-250 minutes/week of moderate-intensity physical activity provides only modest weight loss. Greater amounts (ie. >250) provide clinically significant weight loss.

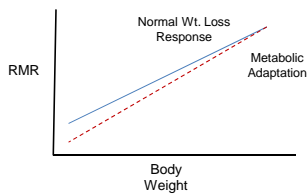
CDC

To lose weight and keep it off: You will need a high amount of physical activity unless you also adjust your diet and reduce the amount of calories you're eating and drinking. Getting to and staying at a healthy weight requires both regular physical activity and a healthy eating plan.

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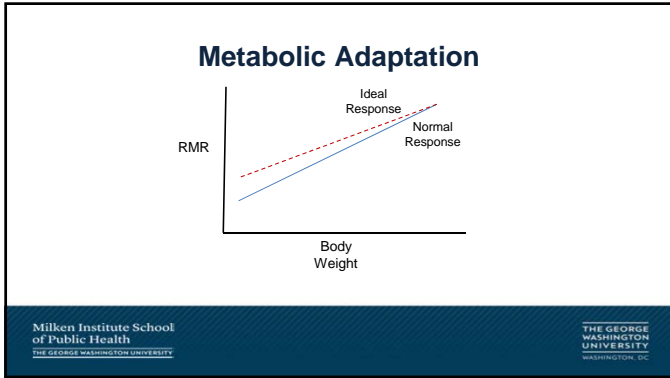
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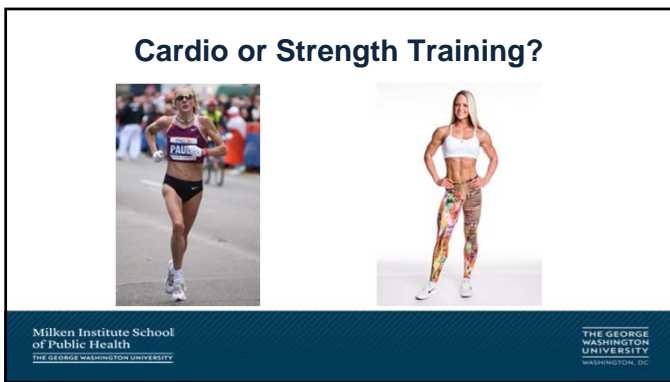
Metabolic Adaptation

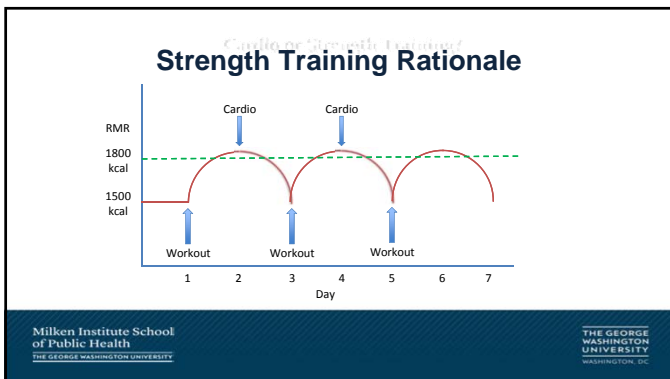


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Lean Body Mass & Obesity

- Obesity is characterized by:
 - High muscle mass; low muscle quality
 - Decreased muscle function
- In overweight people, 20%-30% of weight lost during a weight loss intervention comes from fat free mass.

Is this loss in FFM obligatory?

Changes in Fat and Fat Free Mass



Metabolism Based Eating

Measure Body Composition

| Trend: Total (Enhanced Analysis) | | | | | | | | | | |
|----------------------------------|-------------|-------------|-------------|-----------------|-------------|---------------|-------------|----------|---------------|--------------|
| Measured Date | Age (Years) | Height (cm) | Weight (kg) | Total Mass (kg) | Region (kg) | Tissue 1 (kg) | Lean 1 (kg) | BMC (kg) | Fat Free (kg) | Fat Free (%) |
| 02/05/2016 | 43.9 | 16.8 | 2 | 123.9 | 16.0 | 118.4 | 19.8 | 96.8 | 5 | 104.0 |
| 01/19/2016 | 43.8 | 17.0 | 3 | 122.0 | 17.0 | 105.5 | 20.7 | 95.8 | 5 | 101.3 |

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Measure RMR

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| | Measured | Estimated with Mifflin St. Jeor | Estimated with Cunningham |
|-------------------------|-------------|---------------------------------|---------------------------|
| RMR | 2370 | 1689 | 2030 |
| Leisure and TEF 300-400 | 300 | 300 | 300 |
| TEE 300-600/hr | 400 | 400 | 400 |
| TOTAL | 3070 | 2389 | 2730 |

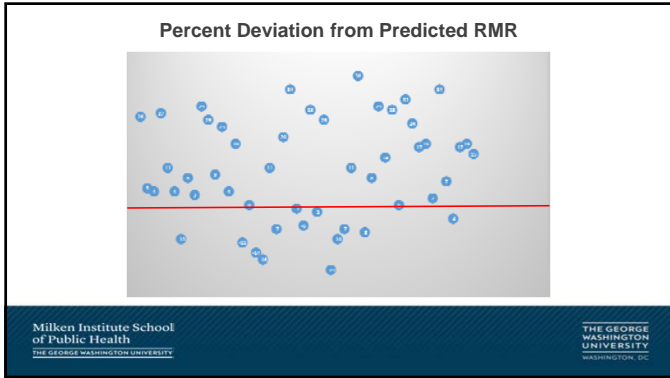
| | Measured | Mifflin | Cunningham |
|-----------------|-------------|-------------|-------------|
| RMR | 2370 | 1809 | 2030 |
| Activity factor | 1.6 | 1.6 | 1.6 |
| Total | 3792 | 2894 | 3248 |

41 kcal/kg = 3363

Daily calorie requirement ranges from 2389 - 3792

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Why measuring RMR is critical Client: Kia

What if we PREDICTED

- Predicted RMR: 2,742
- Add activity factor of 1.5
- Subtract 1,000
- Target calorie intake = 3,113

What we ACTUALLY did

- Actual RMR = 2,168
- Calorie Rx = 2,100

Client's calorie intake = 2,122

Recommended intake (from prediction) = 3,113/day

Difference from recommended = -991

Actual Fat Loss = 28 lbs.

Change in Fat if fed predicted intake = 29 lb fat gain

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| Parameter | Rest | Pred. | % Pred. |
|----------------|-------|-------|---------|
| Time (mm:ss) | 10:00 | | |
| RMR (Kcal/day) | 2214 | 2507 | 85.0% |
| R (-) | 0.78 | 0.85 | 92.3% |
| VO2 (ml/min) | 324 | 476 | 67.9% |
| VCO2 (ml/min) | 254 | 405 | 62.7% |

Kia

RMR initial: 2168

RMR after 6 months: 2214

Fat down 28 lbs

LBM up ~9 lbs

| Parameter | Rest | Pred. | % Pred. |
|----------------|-------|-------|---------|
| Time (mm:ss) | 10:00 | | |
| RMR (Kcal/day) | 2214 | 2507 | 85.0% |
| R (-) | 0.78 | 0.85 | 92.3% |
| VO2 (ml/min) | 324 | 476 | 67.9% |
| VCO2 (ml/min) | 254 | 405 | 62.7% |

Total Intake (Kcal)

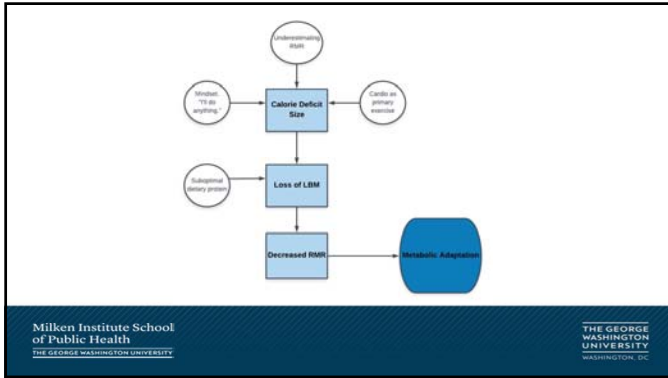
Fat (lbs)

LBM (lbs)

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8



Nutrition Planning

CALORIES

- General rule:
 - Males:** at the RMR or up to 10% above
 - Females:** at the RMR or 10-15% below
 - No lower than 20% below the RMR.

MACROS

- Fat 20% of calories
 - Allows for the creation of a large deficit while providing adequate carbohydrate and protein
- Protein based on FFM
- Carbs fill in the rest of the calories

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Calorie Prescriptions Based on RMR

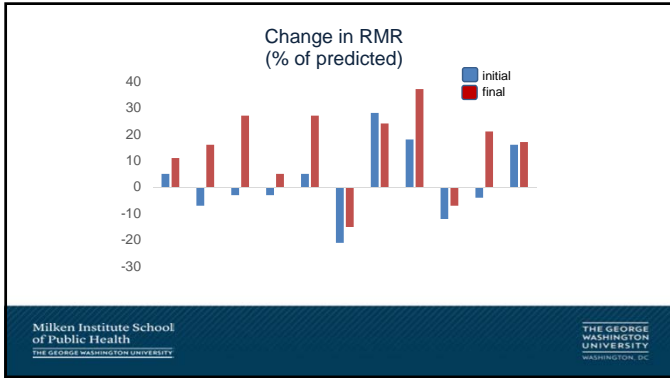
10 clients: 6 males, 4 females

- Initial relative RMR range:
 - 21% to +18%
 - 6 were below predicted

- Repeat relative RMR range:
 - 15% to +37%
 - 2 were below predicted

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Fat

20% of calories

- 1 avocado = 23 g
- 2 Tbsp PB = 14 g
- 1 oz almonds = 14 g
- 1 Tbsp olive oil = 13 g
- 2 Tbsp chia seeds = 9 g
- 2 Tbsp flaxseeds = 6 g
- 2 Tbsp hummus = 5 g
- 1 whole egg = 5 g

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RDA for Protein is Inadequate!

- 1.0-1.4 g/lb FFM during calorie restriction
 - Protein should not be >40% of calories.
 - Focus on lean proteins
 - Challenges: vegetarians and vegans
 - Supplements usually necessary
- Even distribution among meals for a positive nitrogen balance
- 10-20 grams after RT

Weij, P. JM & Wolfe, R.R. (2015). Exploration of the protein requirement during weight loss in obese older adults. *Clinical Nutrition*.

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Carbohydrate

Fill in the rest of the calories
Supports energy requirements and metabolic needs

Not the devil

- "I don't eat bananas because they have too much sugar."
- "Carrots have too much sugar."
- "I only eat sweet potatoes and quinoa but avoid bread and pasta because they are too carb dense."
- "I try to limit my carb intake throughout the day." – said by a client who overeats on carb based snacks or sweets in the afternoon/evening.

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Monitoring

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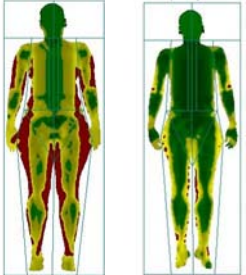
Importance of Food Tracking

- Food tracking is necessary for long-term compliance and success
- Self-report of intake not accurate
 - Bias gets progressively larger
 - Mathematical model calculations show a significant reduction in self-reported calorie deficits over 12 months
 - @month 3, EI -804 kcals/day
 - @month 6, EI -279 kcals/day
 - @month 12, EI -65 kcals/day

Quo, J., Robinson, J.L., Gardner, C., & Hall, K.D. (2018). Objective versus self-reported energy intake changes during low-carbohydrate and low-fat diets. Retrieved from <https://www.karger.com/Article/Abstract/501829/2018/09/4131>.

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Mary's 15 month results:

July 2017: 189 lbs @ 38% fat, RMR 1558 (-6%)

October 2018: 157 @ 17.1% fat, RMR 1771 (+21%)

AVG calorie intake:
1st 8 months: 1556
after that: 1957

Total fat loss: 45 lbs
Total muscle gain: 13 lbs.
Total minutes of cardio: 0

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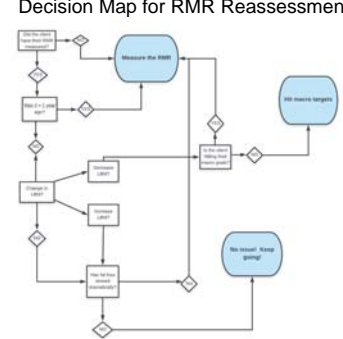
Re-Assessment of the Calorie Goal

| | |
|---|--|
| <p>s/s of increased RMR</p> <ul style="list-style-type: none"> • Hungry • Poor sleep • Fatigue esp. during workouts • Slowed fat loss • LBM loss • Cognitive changes | <p>s/s of decreased RMR</p> <ul style="list-style-type: none"> • Satiety • Difficulty finishing meals and hitting nutrient goals • Fat gain or slowed fat loss |
|---|--|

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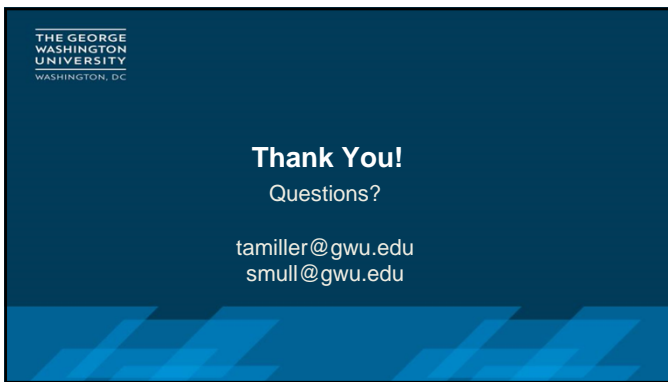
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Decision Map for RMR Reassessment



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Behavior Change to Prevent Chronic Disease:
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QUESTIONS & ANSWERS



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