
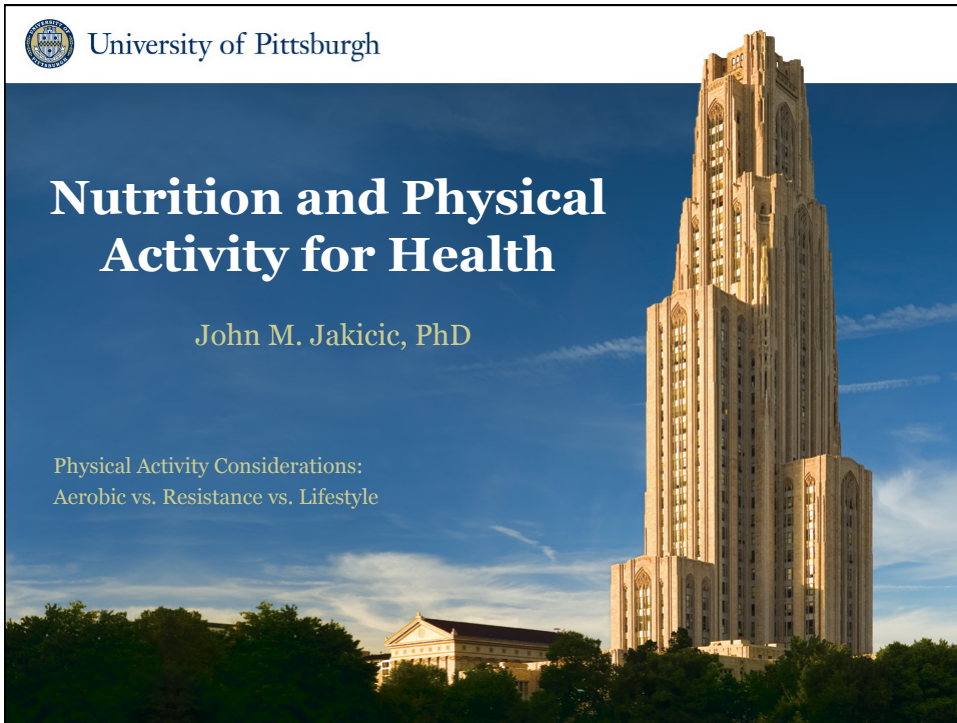


University of Pittsburgh

Nutrition and Physical Activity for Health

John M. Jakicic, PhD

Physical Activity Considerations:
Aerobic vs. Resistance vs. Lifestyle



University of Pittsburgh

What is the effect of aerobic exercise on body weight?



Evidence from Randomized Studies

- Systematic review of the scientific evidence
 - Studies that reported a significant effect of physical activity on body weight
 - reported physical activity ranging from 180-270 min/wk
 - Weight change was a reduction of 0.5-3.0 kg
 - Corresponds to approximately 3% weight loss
 - Considered to be “weight maintenance” using the criteria of Stevens et al. (2006)
 - Studies reporting no effect included <150 min/wk of physical activity



- Magnitude of weight loss consistent with prior reviews
 - NHLBI Expert Review Panel (1998)
 - Physical Activity alone results in 2.4 kg reduction in body weight.
 - Review conducted by Wing (1999)
 - Physical Activity alone results in approximately 1-2 kg reduction in body weight.



University of Pittsburgh

Effect of Resistance Exercise

- **Systematic review of studies**
 - Modest change in body weight of <1 kg observed in these studies
 - Confirmed in a review by Donnelly et al. (2003)
- **Potential reasons for this modest effect**
 - Weight (fat) loss might be accompanied by a concurrent increase in fat-free mass
 - May need to use body composition rather than body weight to determine the effect
 - Dose of resistance exercise may not be sufficient
 - Studies are typically short in duration (<6 months)
 - Typically involve 2-3 days of resistance exercise



University of Pittsburgh

Endurance plus Resistance Exercise

- Studies were reviewed that used combined endurance (aerobic) plus resistance exercise
- **Studies reported no effect on body weight**
 - Studies were 8-10 weeks in duration
 - May have not provided a sufficient dose of physical activity to impact body weight



University of Pittsburgh

Lifestyle Physical Activity

- Confusion regarding the definitions of lifestyle physical activity
 - No clear definitions have been proposed
- Lifestyle Forms of Physical Activity versus Lifestyle Approaches to Physical Activity



University of Pittsburgh

Lifestyle Forms of Physical Activity

- Any non-structured form of physical activity that is not intended to constitute a structured period of exercise.
- Example:
 - Walking done for the purpose of commuting to work would be considered lifestyle physical activity
 - Walking performed in a structured period of exercise would not be considered lifestyle physical activity



University of Pittsburgh

Lifestyle Approaches to Increasing Physical Activity

- Refers to interventions that incorporate behavioral theories and constructs to assist and facilitate increasing physical activity within one's lifestyle.
- This intervention approach can be used to improve participation in all forms of physical activity that include structured exercise, leisure-time physical activity, occupational physical activity, household physical activity, and physical activity used for commuting.



University of Pittsburgh

Nonexercise Activity Thermogenesis (N.E.A.T.)

- All energy expenditure that is not from sleeping, eating, or planned exercise programs.
 - Levine and colleagues
- Definition does not use the term “lifestyle”
 - May reduce confusion



Is Lifestyle Physical Activity Useful for Weight Management?



Observational Data

- Estimates of the size of the positive energy balance leading to obesity ranges from 10 to 100 kcal/d
- Observational studies support the hypothesis that higher levels of lifestyle physical activity prevent weight gain
 - Recent studies have used objective monitoring
 - Most studies cross-sectional in nature



University of Pittsburgh

Lifestyle Approaches (Interventions) Using Pedometers

- Recent review of 26 observational (N=18) and intervention (N=8) studies that examine the association between step counts on a pedometer and change in body weight (Bravata et al. 2007).
- Participants increased steps by an average of 2100 steps per day
 - Equal to approximately 1 mile of walking per day
- Mean decrease in BMI was 0.38 units
- Weight change appears to be modest with this form of intervention.



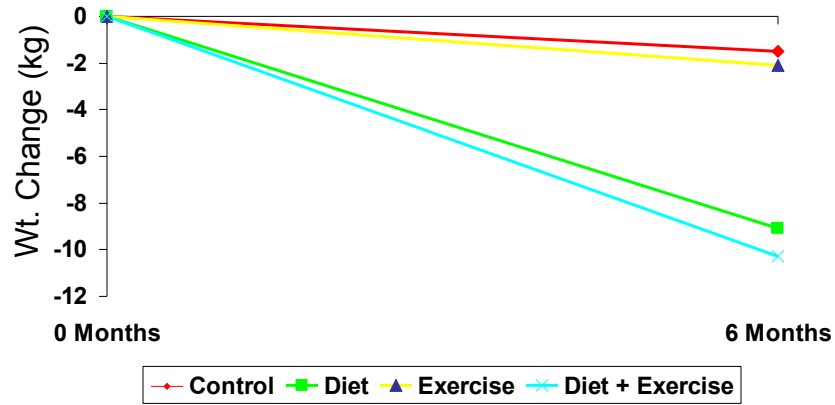
University of Pittsburgh

What is the Short-Term Impact of Physical Activity + Diet in the Management of Body Weight?



University of Pittsburgh

Short-Term Changes in Body Weight (Wing et al. 1998)



University of Pittsburgh

**What is the Long-Term Impact of
Physical Activity in the
Management of Body Weight?**



University of Pittsburgh

Long-Term Impact of Physical Activity in the Management of Body Weight

- Physical activity is typically a significant predictor of long-term weight loss maintenance in previously overweight and obese adults
- There is likely a dose-effect of physical activity on body weight
 - Greater effects on prevention of weight gain and weight loss with physical activity dose of 250-300 min/wk (~2000 kcal/wk)



University of Pittsburgh

ACSM Recommendation (2009)

- Adults should participate in at least 150 min/wk of moderate-intensity physical activity to:
 - Prevent significant weight gain
 - Overweight and obese individuals will realize modest weight loss with this dose of physical activity
 - Reduce chronic disease risk factors
- There is likely a dose-effect of physical activity on body weight
 - Greater effects on prevention of weight gain and weight loss with physical activity dose of 250-300 min/wk (~2000 kcal/wk)
- The addition of energy restriction to physical activity can further enhance weight loss



Conclusions

- Moderate-intensity physical activity of 150-250 min/wk (~1200-2000 kcal/wk):
 - Provide modest weight loss of <3%
 - This may be sufficient to modify chronic disease risk factors
 - Greater doses of physical activity result in greater weight loss
- Significantly greater weight loss can be achieved with reductions in dietary intake
 - Weight loss is additive with the addition of physical activity to moderate restriction in energy intake



References

- National Heart, Lung, and Blood Institute. (1998). Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. (Slide 4)
- Wing, R. R., & Jeffery, R. W. (1999). Benefits of recruiting participants with friends and increasing social support for weight loss and maintenance. *Journal of Consulting and Clinical Psychology*, 67(1), 132-138. doi: 10.1037//0022-006X.67.1.132 (Slide 4)
- Elmer, P. J., Obarzanek, E., Vollmer, W. M., Simons-Morton, D., Stevens, V. J., Young, D. R., ... Appel, L. J. (2006). Effects of comprehensive lifestyle modification on diet, weight, physical fitness, and blood pressure control: 18-Month results of a randomized trial. *Annals of Internal Medicine*, 144(7), 485-495. doi: 10.7326/0003-4819-144-7-200604040-00007 (Slide 3)
- Potteiger, J. A., Jacobsen, D. J., Donnelly, J. E., & Hill, J. O. (2003). Glucose and insulin responses following 16 months of exercise training in overweight adults: The midwest exercise trial. *Metabolism*, 52(9), 1175-1181. doi: 10.1016/S0026-0495(03)00146-X (Slide 5)
- Bravata, D. M., Smith-Spangler, C., Sundaram, V., Gienger, A. L., Lin, N., Lewis, R., ... Sirard, J. R. (2007). Using Pedometers to Increase Physical Activity and Improve Health: A Systematic Review. *JAMA: The Journal of the American Medical Association*, 298(19), 2296-2304. doi: 10.1001/jama.298.19.2296 (Slide 13)
- Williams, K. V., Mullen, M. L., Kelley, D. E., & Wing, R. R. (1998). The effect of short periods of caloric restriction on weight loss and glycemic control in type 2 diabetes. *Diabetes Care*, 21(1), 2-8. doi: 10.2337/diacare.21.1.2 (Slide 15)