Physical Activity and Obesity – State of the Science

Physical Activity: Implications for Weight Loss Maintenance and Related Health Outcomes

John M. Jakicic, PhD
University of Pittsburgh
Department of Health and Physical Activity
Physical Activity and Weight Management Research Center
Should the Focus be on Physical Activity or Obesity?

Physical Activity

Body Weight and Adiposity

Health-Related Outcomes
Should the Focus be on Physical Activity or Obesity?

Physical Activity is a behavior

Body Weight and Adiposity

Body Weight and Health are Outcomes

Physical Activity

Health-Related Outcomes
Should the Focus of Physical Activity on Health disregard the potential impact on body weight and adiposity?
4-Year Change in HbA1c by 4-Year Percent Change in Fitness Adjusted for Age, Gender, Weight Change and Diabetes Medication Use

[Graph showing change in HbA1c by percent change in fitness for DSE and ILI Combined, DSE, and ILI, with significance levels P<0.0001, P<0.0001, and P=0.1814 respectively.]

Self-Report and Physical Function

Disability Limitation

Function

Hergenroeder AL et al, 2009
Mean ± SEM unadjusted Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) physical function summary scores across the 18-month intervention period. * = P < 0.05, diet plus exercise group versus healthy lifestyle group.

Messier SP et al. 2004
Pathway for physical activity to influence Health (including Body Weight)
What is the Long-Term Impact of Physical Activity in the Management of Body Weight?
Dose of Exercise and Long-Term Weight Loss

Jakicic, et al. JAMA. 1999

110 min/wk
175 min/wk
280 min/wk
Physical activity (0, 6, and 24 months) for categories of 24-month weight loss (N = 170).

*1500 kcal/wk or 275 min/wk above baseline

P-Values
Group Effect = 0.09
Time Effect = <0.001
Group X Time Effect = <0.001

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

OBJECTIVELY MEASURED PHYSICAL ACTIVITY
Subjects Grouped based on Weight Loss Achieved and Maintained

<table>
<thead>
<tr>
<th>Group</th>
<th>&gt;10% Weight Loss at 6 Months</th>
<th>&gt;10% Weight Loss at 18 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Loss</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>(n=107, 41%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late-Loss</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>(n=19, 7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Maintain</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>(n=45, 17%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintain</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>(n=87, 34%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
% Change in Body Weight by Group

P-Values
Weight Change Group: <0.0001
Time: <0.0001
Weight Change Group X Time: <0.0001

Jakicic et al. Obesity. 2014
Change in Moderate-to-Vigorous Intensity Physical Activity (bouts >10 minute in duration) by Weight Loss Pattern

P-Values
Weight Change Group: <0.0001
Time: <0.0001
Weight Change Group X Time: <0.0001

Jakicic et al. Obesity. 2014
Change in Moderate-to-Vigorous Intensity Physical Activity (bouts 1 to <10 minute in duration) by Weight Loss Pattern

**P-Values**
- Weight Change Group: 0.0037
- Time: 0.4512
- Weight Change Group X Time: 0.0393

Jakicic et al. *Obesity*. 2014
Change in Moderate-to-Vigorous Intensity Physical Activity (bouts >10 minute in duration) by Weight Loss Pattern

P-Values
Weight Change Group: <0.0001
Time: <0.0001
Weight Change Group X Time: <0.0001

Jakicic et al. *Obesity*. 2014
Change in Light Intensity Physical Activity by Weight Loss Pattern

P-Values
Weight Change Group: 0.0002
Time: 0.0326
Weight Change Group X Time: 0.0075

Jakicic et al. *Obesity*. 2014
Weight Variability in Response to Physical Activity
Mid-West Exercise Study
Responders and Non-responders (Women)

Donnelly et al.
Difference in Individual Energy Intake Following Rest and Exercise

Adapted from Unick et al. *Appetite*
Difference in Individual Energy Intake Following Rest and Exercise

Consume more following Rest compared to Exercise

Consume more following Exercise compared to Rest

May induce weight loss

May induce weight gain

Adapted from Unick et al. *Appetite*
Potential Mechanisms through which Physical Activity Energy Expenditure Influences and Energy Intake and Body Weight
Potential Mechanisms through which Physical Activity Energy Expenditure Influences and Energy Intake and Body Weight

Physical Activity

Metabolic Parameters

Hunger & Satiety

Energy Intake

Energy Expenditure

Body Weight

Health
Are the “Dynamics” of Energy Balance Influenced by:

Total Daily Physical Activity and Energy Expenditure

OR

The Pattern of Total Daily Physical Activity and Energy Expenditure?
Energy Expenditure Pattern
Energy Expenditure Pattern
Energy Expenditure Pattern
WARNING
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