Overview of Weight Loss Interventions for Obese Adults

Thomas A. Wadden, Ph.D.

Department of Psychiatry
University of Pennsylvania
Perelman School of Medicine
Overview

• Benefits of Modest Weight Loss
• Lifestyle Modification
  - Diabetes Prevention Program
  - Look AHEAD
• Disseminating Lifestyle Modification
• Pharmacotherapy and Surgery
• Conclusions
Assessing Obesity: What Is BMI?

• BMI
  - Calculated as weight (kg)/height (m²)
  - Evaluates weight relative to height
  - Replaced % ideal body weight as the primary criterion for assessing obesity
  - Correlates significantly with body fat, morbidity, and mortality

<table>
<thead>
<tr>
<th>Category</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt; 18.5</td>
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<tr>
<td>Normal*</td>
<td>18.5–24.9</td>
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<tr>
<td>Overweight</td>
<td>25.0–29.9</td>
</tr>
<tr>
<td>Obesity</td>
<td>≥ 30</td>
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<tr>
<td>Class I</td>
<td>30.0–34.9</td>
</tr>
<tr>
<td>II</td>
<td>35.0–39.9</td>
</tr>
<tr>
<td>III</td>
<td>≥ 40</td>
</tr>
</tbody>
</table>

Obesity Mortality Risk

Body Mass Index (kg/m²)

Mortality Ratio

Men
Women

Moderate
Very Low
Low
Moderate
High
Very High

2.5
2.0
1.5
1.0
0

20
25
30
35
40

Image courtesy of Dr. George Bray
New Goals of Weight Management: A 10% Loss of Initial Weight

“The initial goal of weight loss therapy for overweight/obese patients is a reduction in body weight of about 10%…”

“Moderate weight loss of this magnitude can significantly decrease the severity of obesity-associated risk factors.”

BMI = 32 kg/m²

NIH/NHLBI. Obes Res. 1998;6:51S
Benefits of a 5-10% Weight Loss: Overweight Patients with Type 2 Diabetes

Wing RR et al. Diabetes Care. 2011;34:1481-1486
## A Guide to Selecting Treatment: NIH Guidelines*

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<tr>
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<tr>
<td>Diet, physical activity, behavior therapy</td>
<td>Yes with comorbidities</td>
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<tr>
<td>Pharmaco-therapy</td>
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<tr>
<td>Weight loss surgery</td>
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</table>

*Yes alone indicates that the treatment is indicated regardless of the presence or absence of comorbidities. The solid arrow signifies the point at which therapy is initiated.
Lifestyle Modification for Obesity

- Consists of a set of principles and techniques to modify eating and activity habits.
- New habits can be learned in same manner as a sport or musical instrument.
- Treatment examines antecedents, behaviors and consequences (ABCs) associated with eating and activity.

Brownell: Learn Program for Weight Control, 1998
Lifestyle Modification for Weight Control

- Reduce energy intake by 500-1000 kcal/day (by reducing portion size, fat, and sugar); ↑ fruits and vegetables
- Exercise ≥ 150 min/week.
- Record food intake, physical activity, and weight; receive feedback.
- Set realistic goals for weight loss and behavior change.

Dietary Plan

- Consume meals and snacks at regular intervals
- Women: 1200-1500 kcal/d
  Men: 1500-1800 kcal/d
- Protein: 12%-15%; Fat ≤ 30%
- Variation in macronutrient content does not affect weight loss with isocaloric diets.

USPSTF Recommendations for Behavioral Counseling

• “The U.S. Preventive Services Task Force (USPSTF) recommends that clinicians screen all adult patients for obesity and offer intensive counseling and behavioral interventions to promote sustained weight loss for obese adults.”
  – Moderate intensity = monthly contact
  – High intensity = more frequent contact
  – Low intensity = less frequent contact.
• This is a grade B recommendation.
Diabetes Prevention Program

• Can a 7% reduction in initial weight, combined with increased physical activity, reduce the risk of developing type 2 diabetes in at-risk individuals?

• 3234 patients; BMI = 34.0 kg/m²; Impaired glucose tolerance (95-125 mg/dl)

• Randomly assigned to 4-year trial
  – Placebo
  – Metformin (850 BID)
  – Lifestyle intervention

**COMPREHENSIVE LIFESTYLE MODIFICATION PROGRAM**

**Weight Loss Induction:**
- 16 **individual** visits over 6 months

**Diet:** Low-fat diet, conventional foods (1200-1800 kcal/d)

**Activity:** ≥ 150 minutes/week of moderate intensity exercise

**Weight Maintenance:** Individual visits at least every 2 months.
- Three group classes/year for 4-6 weeks (campaigns)
- Toolbox

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**DPP: Treatment Interventions and Weight Loss**

Change in Weight (kg)

<table>
<thead>
<tr>
<th>Year</th>
<th>Placebo</th>
<th>Metformin</th>
<th>Lifestyle</th>
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<tbody>
<tr>
<td>0</td>
<td>-8</td>
<td>-6</td>
<td>-4</td>
</tr>
<tr>
<td>0.5</td>
<td>-8</td>
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<td>-4</td>
</tr>
<tr>
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</tr>
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<td>-6</td>
<td>-4</td>
</tr>
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<td>3</td>
<td>-8</td>
<td>-6</td>
<td>-4</td>
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<tr>
<td>3.5</td>
<td>-8</td>
<td>-6</td>
<td>-4</td>
</tr>
<tr>
<td>4</td>
<td>-8</td>
<td>-6</td>
<td>-4</td>
</tr>
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Cumulative Incidence of Diabetes (%) vs Year

Placebo
Metformin
Lifestyle

0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
Look AHEAD Study

Diabetes Prevention Program:
7% weight loss, with increased activity, reduced risk of developing type 2 diabetes by 58% compared w/ placebo

Look AHEAD Study:
Will a loss ≥7% of initial weight, with increased activity, reduce risk of cardiovascular morbidity and mortality in overweight and obese persons with type 2 diabetes?
Look AHEAD Study Design

- 5145 overweight subjects with type 2 diabetes
- 2 arms
  - Usual care (Diabetes Support and Education)
  - Usual care + Intensive Lifestyle Intervention
- Study duration: up to 13.5 years (with 4 years of intensive intervention to achieve 7% loss).
- Primary outcome: Cardiovascular death (fatal MI and stroke), nonfatal MI, and stroke; hospitalization for angina

Treatment Factors Affecting Weight Loss in Behavioral Interventions

Induction of Weight Loss

- Portion-controlled meals
- Group treatment
- Longer duration
- Weight loss medication

Maintenance of Weight Loss

- Continued patient support
- High physical activity

Wadden et al. Gastroenterology. 2007;132:2226-38
Portion-Controlled Meals

- Provide fixed-portion and calorie amounts
- Reduce choices and contact with problem foods
- Are convenient to use
- Satisfy appetite (monotony and sensory specific satiety)
- Facilitate dietary adherence

Meta-Analysis of Meal Replacements (PMR) vs. Reduced Calorie Diets (RCD)
Mean Weight Losses for Completers

Maintenance of Weight Loss Is Improved With Long-Term Behavioral Treatment

Key Behaviors for Long-Term Weight Control

1. Monitor weight regularly
2. Exercise regularly
3. Eat low-calorie, low-fat diet
4. Record food intake periodically

High Levels of Physical Activity are Needed for Weight Loss Maintenance

Concomitant Behavior Therapy

- Weekly
- Biweekly
- Monthly

Change in Weight (kg)

Time (months)

< 150 min/wk
≥150 min/wk
≥ 200 min/wk

*P<0.05

Jakicic et al. JAMA. 1999;282:1554
Look AHEAD Lifestyle Intervention: Years 1-4

• Year 1
  - 2-3 group sessions/month
  - 1 individual session/month
  - Personal weight loss goal = 10%

• Years 2-4
  - Monthly onsite individual session
  - Monthly phone call or e-mail contact
  - Periodic refresher groups or campaigns offered 2-3 times per year for 6-8 weeks
Intervention Recommendations

• Dietary Intake
  1200-1500 kcal/day < 250 lb
  1500-1800 kcal/day ≥ 250 lb
  < 30% calories from fat
  Meal replacements (2 meals and 1 snack/d in Months 1-4; reduced use thereafter)
  Menu plans provided

• Physical Activity
  175 min/wk (achieved gradually)
  10,000 steps

Percentage Reduction in Initial Weight Over 4 Years in ILI and DSE Groups

Retention:
ILI = 94.2%
DSE = 93.3%

HbA1c (mg/dl) Change from Baseline

Repeated Measures Adjusting for Clinic and Baseline Level
P-value for average effect across all visits: p<0.0001

SBP Change from Baseline

Conclusions at Year 4

• Positive effects of Lifestyle Intervention across all 4 years on indices of glycemic control.
  
  Greater ↓ in HbA1c

  Greater ↓ in use of diabetes medication & insulin

• Greater ↓ in triglycerides and SBP.

• Greater ↑ in HDL cholesterol and fitness.

• Further follow-up is needed to determine if the present improvements in weight and CVD risk factors are sufficient to reduce cardiovascular morbidity and mortality.

High Intensity, On-Site Interventions

• DPP and Look AHEAD are high intensity, on-site interventions, with high costs.

• Low intensity interventions are less effective.

• USPSTF findings:
  “Interventions with more (counseling) sessions showed more weight loss”
  - 12 to 26 intervention sessions in first year produced mean loss of 4 to 7 kg (6%)
  - < 12 sessions produced loss of 1.5 to 4 kg (2.8%)

Increasing the Availability of High Intensity Interventions

- Medicare (CMS) proposal to cover high intensity counseling in primary care practice
- Month 1: weekly sessions
  Months 2-6: twice monthly sessions
- Months 7-12: monthly sessions, provided 3 kg lost in first 6 months
- Interventionists: primary care providers (physicians, nurse practitioners, phys. assistants)
- Dietitians and related professionals currently not included in proposal
Primary Care Practitioners’ (PCP) Options for Managing Obesity and Its Complications

Assess and Treat Cardiovascular Risk Factors

- Advise Weight Loss, Prevent Weight Gain
- Not Motivated
- Assess Motivation for Weight Loss

Motivated

PCP Provides Weight Management

Lifestyle Counseling; Prescription Medication

PCP and Other Health Professionals Offer Collaborative Care

Medical Assistant, Dietitian, Call-Center, Web-based programs

Referral to Community Program

YMCA, Self-Help

Commercial Program: Call center or web-based

Referral to Obesity Treatment Specialist

Medically Supervised Program; Dietitian

Bariatric Surgery

PCP Continues to Treat CVD Risk Factors and Monitor Weight

Tsai & Wadden. J Gen Intern Med. 2009;24:1073-9
Translating the DPP into the Community with the YMCA

- YMCA wellness instructors trained to deliver DPP
- 16 weekly classroom-style sessions
- Monthly meetings thereafter through 52 weeks
- 92 participants, mean BMI=31.6 kg/m², casual capillary blood glucose of 110-199 mg/dL
Weight at 1 Year

Cost of 1 Year of Treatment

% Reduction in Weight

YMCA

Academia

$300

$1407

$0 $200 $400 $600 $800 $1000 $1200 $1400 $1600

0 28 52

weeks
Commercial Weight Loss Programs: Weight Watchers’ Trial in Primary Care

- 772 patients recruited from primary care practices in 3 countries
- Randomly assigned to local Weight Watchers program or Usual Care
- Intervention provided at no charge for 1 year
- Mean losses of 4.1 vs. 1.8 kg, respectively

Commercial Weight Loss Programs: Two-Year Trial of Jenny Craig

- 446 women recruited in four cities
- Randomly assigned to:
  - Usual care
  - Center-based program
  - Telephone based program
- Participants in latter two groups were provided weekly counseling and prepared foods to replace 48% - 68% of energy intake during weight loss portion of trial
- Two-year mean losses of 2.0, 7.4, and 6.2 kg, respectively
- Economic analysis needed of all commercial programs

Rock et al. JAMA. 2010;304:1803-10
Electronically-Delivered Weight Loss Interventions

- Internet via computer, Smartphone, or tablet
- Cell phone/Text messaging
- Email
- Social networking sites
- Webcam/podcast
- Reach large numbers of people, potentially at lower costs

Strecher V. Annual Review of Clinical Psychology. 2007; 353-76
Comparison of In-Person and Internet-Delivered Programs

- Weight Loss: months 1-6
  - Weekly group sessions
    - In person or online (internet)
    - Hybrid (1 in-person, 3 internet/mo)
- Weight Maintenance: months 6-18
  - One session per month
    - Hybrid alternated
      (in-person/internet)

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Pharmacotherapy

Does adding weight loss medication improve the results of behavioral treatment?

YES

Does adding behavioral treatment improve the results of pharmacotherapy?

YES

Combining Behavioral and Pharmacologic Treatments: Sibutramine SNRI for Weight Loss

Sibutramine removed from the market 10/2010 because of ↑ CVD events


Attrition = 17%

Lifestyle modification: 30 group visits

Weight Loss (kg)

Weeks

0 3 6 10 18 26 40 52

Sibutramine alone
Lifestyle modification alone
Sibutramine + lifestyle modification

0    3    6    10            18           26                       40                    52

Sibutramine removed from the market 10/2010 because of ↑ CVD events
Drugs Approved for Long-Term Use


✗ Lorcaserin: serotonin agonist; 3-4 kg placebo-subtracted loss; concerns with valvular heart disease

✗ QNEXA: combination of phentermine and topiramate; 8 kg placebo-subtracted loss. Concerns with cleft lip and palate in infants.

✗ Contrave: combination of bupropion and naltrexone; 4 kg placebo-subtracted loss; concerns with ↑ CVD events.
Swedish Obese Subjects (SOS) Study

Mean % Weight Change in the Control and Surgery Groups, by Method of Bariatric Surgery

Unadjusted Cumulative Mortality

Major Issues in the Management of Obesity

- Who will receive weight management?
- Who will pay for treatment?
- Who will provide obesity treatment?
- How will treatment be delivered?
- How can we prevent the development of overweight and obesity?
Look AHEAD Steering Committee

Principal Investigators

George Blackburn, MD, PhD  
Harvard Center: Beth Israel Deaconess

Frederick Brancati, MD, MHS  
Johns Hopkins Medical Institutions

George Bray, MD  
Pennington Biomedical Research Center

John P. Foreyt, PhD  
Baylor College of Medicine

Steven M. Haffner, MD  
University of Texas, San Antonio

James O. Hill, PhD  
University of Colorado

Edward S. Horton, MD  
Harvard Center: Joslin Diabetes Center

John Jakicic, PhD  
University of Pittsburgh

Robert W. Jeffery, PhD  
University of Minnesota

Karen C. Johnson, MD, MPH  
University of Tennessee East

Steven Kahn, MB, ChB  
University of Washington/VA Puget Sound

Abbas E. Kitabchi, PhD, MD  
University of Tennessee Downtown

William C. Knowler, MD, DrPH  
Southwestern American Indian Center

Cora E. Lewis, MD, MSPH  
University of Alabama at Birmingham

David M. Nathan, MD  
Harvard Center: Massachusetts General Hospital

Anne Peters, MD  
University of Southern California

Xavier Pi-Sunyer, MD (Co-Chair)  
St. Luke’s Roosevelt Hospital Center

Thomas A. Wadden, PhD  
University of Pennsylvania

Rena R. Wing, PhD (Chair)  
The Miriam Hospital/Brown Medical School

Mark Espeland, PhD  
Coordinating Center, Wake Forest University

Mary Evans, PhD  
National Institutes of Health/NIDDK