Current Management of Obesity

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UCSF, Controversies in Women’s Health
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Division of General Internal Medicine

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO, SCHOOL OF MEDICINE

I have nothing to disclose
Prevalence of Obesity (BMI ≥ 30 kg/m²)

Ogden, NCHS, 2015

Trends in Obesity 1999-2014
Roadmap

1. Definitions and Outcomes
2. Clinical management
   a. The Clinic Visit
   b. Diet
   c. Exercise
   d. Mobile technology, Apps, wearables
   e. Medications
   f. Bariatric Surgery

Question #1

The same BMI categories should be used for determining overweight and obesity in all populations?

A. True
B. False
Question #1

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A. True
B. False

Defining Obesity

- “An increase in fat accumulation, to the extent that health may be adversely affected”
- BMI (kg/m²)

| 1995: BMI < 18.5 | Underweight |
| 18.5 – 24.9    | Healthy Weight |
| 25 - 29.9      | Overweight |
| ≥ 30           | Obese |

WHO, 1995
Intl Obesity Task Force, 1997
Body Shape and Size

All 6 people
Are 5'9"
172 lbs
BMI 25.4 kg/m²

Ectopic Fat Depots

SYSTEMIC
- Intra-muscular Fat
- Fatty Liver
- Visceral Adipose Tissue

LOCAL
- Perivascular Fat
- Pericardial Fat
- Myocardial Steatosis
- Renal Sinus Fat

Metabolic Risk Factors
Vascular Disease
### Overweight & Obesity Definitions

<table>
<thead>
<tr>
<th></th>
<th>WHO-general</th>
<th>WHO-Asian</th>
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</thead>
<tbody>
<tr>
<td><strong>Underweight</strong></td>
<td>&lt;18.5</td>
<td>&lt;18.5</td>
</tr>
<tr>
<td><strong>Normal weight</strong></td>
<td>18.5 - 24.9</td>
<td>18.5 - 22.9</td>
</tr>
<tr>
<td><strong>Overweight</strong></td>
<td>25.0 - 29.9</td>
<td>23.0 - 27.5</td>
</tr>
<tr>
<td><strong>Obese</strong></td>
<td>≥30.0</td>
<td>≥27.5</td>
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</tbody>
</table>

Lancet, WHO expert panel, 2004

### CHD and Stroke Outcomes

**Coronary heart disease (59 studies, 150,296 participants, 5,460 cases)**
- Adjusted for age, sex, and smoking status
- Adjusted for age, sex, smoking status, and baseline values of intermediate risk factors

**Ischaemic stroke (21 studies, 89,433 participants, 2,812 cases)**

![BMI vs. CHD and Stroke Outcomes](chart1)

ERFC, Lancet, 2011
### Metabolically Healthy Obesity?

**CVD Mortality**

14 studies; 299,000 participants

**RR 1.47 > 15 years f/u**

Fan, Intl J Cardiology, 2013

![Graph showing pooled relative risk (95% CI) for CVD mortality across normal weight, overweight, and obesity categories.](image)

### Policies and Recommendations

- **HEDIS**: adults 18-74 years, receive BMI assessment annually at PCP visits
- **USPSTF**: screen all adults for obesity
  - If BMI ≥ 30 kg/m², offer or refer for counseling and behavioral interventions to promote weight loss
- **ACA**: provides coverage, without cost sharing, for obesity screening and counseling on healthy eating and weight loss
Guidelines

AACE, ACC/AHA/TOS, Endocrine Society:

1. Obesity is a chronic disease and needs long-term management.
2. Goal is to improve health.
3. Cornerstone is comprehensive lifestyle change.
4. Initial goal is weight loss of 5-10%
5. Consider use of weight loss medication or possible bariatric surgery as addition to lifestyle therapy to promote greater weight loss and maintain weight loss.

The Clinic Visit

- Measure BMI: the fifth vital sign.
- Document obesity as a problem.
- Talk to patient about their weight, “your BMI is above a healthy range”.
- Ask about eating habits, physical activity.
- What are their goals regarding weight?
- What changes are they willing to start making?
- Willing to work with a team including the PCP?
Question #2

45 y.o. African American woman, no other comorbidities, BMI = 33 kg/m²
She wants to start making dietary changes to lose weight.
What type of diet would you recommend?
A. Low-fat diet
B. Low-carbohydrate diet
C. Weight Watcher’s diet
D. Any diet that she wants to try
Question #2

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Low Fat vs. Other Diets in weight loss trials

Favors low carb
-1.2 kg mean difference
Low Fat vs. Other Diets in weight loss trials

Favors low carb
-1.2 kg mean difference

No difference

Favors low fat
-5.4 kg mean difference

Tobias, Lancet Diab & Endo, 2015
Low-fat vs. Low Carb MA

Favors Low Carb
-2.0 kg

Which Named Diet is Better?

48 RCTs of named diets evaluated
Low carb: -7.3 kg at 12 mo vs. no diet
Low-fat: -7.3 kg at 12 mo vs. no diet
Weight loss differences between individual diets were minimal
Supports recommending any diet that a patient can adhere to for weight loss.

Johnston, Jama, 2014
My Dietary Tips

- Track what you eat (self-monitor)
- Be conscious of portion sizes (plate method)
- Beware of liquid calories (choose water)
- Eat breakfast
- More fiber (whole grains, fresh fruit/veggies)
- Eat protein at each meal (legume, beans, nuts, fish, poultry…)
- Small snacks between meals (nuts, fruit)
- Take time to eat your meals (mindfulness)
45 y.o. African American woman, no other comorbidities, BMI = 33 kg/m²
She doesn’t have time to add exercise to her day. She asks whether diet or exercise is more effective for weight loss?

A. Diet is more effective
B. Exercise is more effective
C. Both diet + exercise are most effective
Diet vs. Exercise for Weight Loss

Meta-analysis of 21 trials

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Weight loss, kg</th>
<th>Fat Mass, kg</th>
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</thead>
<tbody>
<tr>
<td>Diet vs. Exercise</td>
<td>-2.9 (-4.2 to -1.7)</td>
<td>-2.2 (-3.7 to -0.7)</td>
</tr>
<tr>
<td>D+E vs. Diet alone</td>
<td>-1.4 (-2.0 to -0.8)</td>
<td>-1.6 (-2.8 to -0.5)</td>
</tr>
<tr>
<td>D+E vs. Exercise</td>
<td>-4.1 (-5.6 to -2.6)</td>
<td>-3.6 (-6.1 to -1.0)</td>
</tr>
</tbody>
</table>

Schwingshackl, Sys Rev, 2014

- Moderate quality evidence that D+E is effective for long-term obesity management
- Moderate superiority of Diet over Exercise for weight loss outcomes
Modest Benefit of Isolated Aerobic Activity in Trials of Weight Loss

<table>
<thead>
<tr>
<th>Study</th>
<th>WMD (95% CI)</th>
<th>Weight %</th>
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</thead>
<tbody>
<tr>
<td>12 Month Programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irwin (2002)</td>
<td>-1.40 (-1.61, -1.19)</td>
<td>49.9</td>
</tr>
<tr>
<td>Andersen (1995)</td>
<td>-2.01 (-2.21, -1.79)</td>
<td>50.1</td>
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<tr>
<td>12 Month Subgroup</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-1.70 (-2.29, -1.11)</td>
<td></td>
</tr>
<tr>
<td>6 Month Program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nakaji (2007)</td>
<td>-1.61 (-1.64, -1.58)</td>
<td>77.7</td>
</tr>
<tr>
<td>Alves (2009)</td>
<td>-1.71 (-2.45, -0.95)</td>
<td>17.6</td>
</tr>
<tr>
<td>Blumenthal (2006)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-2.51 (-4.11, -0.90)</td>
<td>4.7</td>
</tr>
<tr>
<td>6 Month Subgroup</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-1.60 (-1.61, -1.56)</td>
<td></td>
</tr>
</tbody>
</table>


Exercise is Key after Weight Loss

- Weight loss leads to decreases in EE (activity-related, nonexercise activity thermogenesis, and PA index)
- RCT of 140 post-menopausal women who had lost 25 lbs with diet (800 kcal/day)
- Group 1: aerobic trained 3/week, 40 min/day
- Group 2: resistance trained 3/week
- Group 3: no exercise

Exercise is Key after Weight Loss

- Weight loss leads to decreases in EE (activity-related, nonexercise activity thermogenesis, and PA index)
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- Group 1: aerobic trained 3/week, 40 min/day
- Group 2: resistance trained 3/week
- Group 3: no exercise
- All measures of EE decline after wt loss, but either form of exercise ↑ TEE and NEAT


My Exercise Tips

- Set exercise goals:
  - Be specific: walk 30 minutes per day
  - Attainable (doable): start with 3 days/week
  - Forgiving: Ok if I miss a day
- Find a fitness buddy
- Mix up your routine—walk, bike, swim, dance, step
- Add strength training
- Monitor your steps
- Reward yourself (but not with food)
Existing (free) Apps

- 7-minute work-out
- My Fitness Pal: calorie counter and diet tracker
- Lose It!
- Noom Coach
- Fooducate
- Amwell
- Calorie counter PRO MyNetDiary ($ 1p/ free Android)
- Diet Assistance
- Endomondo
Physical Activity trackers

<table>
<thead>
<tr>
<th>Device</th>
<th>No. of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galaxy S4 Moves App</td>
<td>28</td>
</tr>
<tr>
<td>iPhone 5s Moves App</td>
<td>28</td>
</tr>
<tr>
<td>iPhone 5s Health Mate App</td>
<td>27</td>
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<tr>
<td>iPhone 5s Fitbit App</td>
<td>27</td>
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<tr>
<td>Nike Fuelband</td>
<td>28</td>
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<tr>
<td>Jawbone UP24</td>
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<tr>
<td>Fitbit Flex</td>
<td>28</td>
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<tr>
<td>Fitbit One</td>
<td>26</td>
</tr>
<tr>
<td>Fitbit Zip</td>
<td>27</td>
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<tr>
<td>Digi-Walker SW-200</td>
<td>28</td>
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</tbody>
</table>

Case, Jama, 2015

Mobile Technologies

- Mobile health interventions:
  - Short message service (SMS) – majority of trials
  - Multimedia message service (MMS)

- Meta-analysis of randomized trials of mobile phone interventions with weight change outcomes
  - 14 trials, total of 1,337 participants (trial n=30-250)

Liu, Am J Epidemiology, 2015
### Meta-analysis of mHealth

- Net Change in Weight: **-1.4 kg (-2.1 to -0.8)**

#### Apps + Program

- **Omada health Prevent: diabetes prevention**
  - App + health coach + tools
  - 16 week program ($120/month or $480 total cost)
  - Single arm longitudinal study (pre- and post-study)
    - 220 people, 187 started and 155 completed

<table>
<thead>
<tr>
<th></th>
<th>Starters (4+ sessions)</th>
<th>Completers (9+ sessions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight loss %</td>
<td>P</td>
</tr>
<tr>
<td><strong>16 week</strong></td>
<td>5.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>1 year</strong></td>
<td>4.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>2 years</strong></td>
<td>4.2</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

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Liu, Am J Epidemiology, 2015

Sepah, J Med Internet Res, 2015
### Currently Available Meds

<table>
<thead>
<tr>
<th>Drug</th>
<th>Mechanism of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phentermine</td>
<td>Noradrenergic sympathomimetic (IV)</td>
</tr>
<tr>
<td>Orlistat</td>
<td>Triacylglycerol lipase inhibitor</td>
</tr>
<tr>
<td>Lorcaserin</td>
<td>Selective serotonin 2c rec agonist (IV)</td>
</tr>
<tr>
<td>Phentermine/topiramate</td>
<td>NA sympathomimetic/GABA receptor (IV)</td>
</tr>
<tr>
<td>Naltrexone/bupropion SR</td>
<td>NA and dopamine reuptake inhibitor/ opioid receptor antagonist</td>
</tr>
<tr>
<td>Liraglutide</td>
<td>GLP-1 receptor agonist</td>
</tr>
</tbody>
</table>
**Currently Available Meds**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Weight loss in trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phentermine</td>
<td>No long-term data; 8% short-term efficacy</td>
</tr>
<tr>
<td>Orlistat</td>
<td>-5.8 kg vs. -3.0 kg Po (4 years);</td>
</tr>
<tr>
<td>Lorcaserin</td>
<td>-4.5% to -5.8% vs. -1.5% to -2.5% Po (1 yr)</td>
</tr>
<tr>
<td>Phentermine/topiramate</td>
<td>-10.9% vs. 1.6% Po (56 wks)</td>
</tr>
<tr>
<td>Naltrexone/bupropion SR</td>
<td>-5.0% to -9.3% vs. 1.2% to 5.1% Po (56 wks)</td>
</tr>
<tr>
<td>Liraglutide</td>
<td>-6.2 to -8.0% vs. -0.2 to -2.6% Po (56 wks)</td>
</tr>
</tbody>
</table>

**Currently Available Meds**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phentermine</td>
<td>&gt;10%: Dry mouth, insomnia, stimulant effects CVD risk?</td>
</tr>
<tr>
<td>Orlistat</td>
<td>&gt;10%: GI symptoms, fatty stools, urgency &lt;10%: fecal incontinence</td>
</tr>
<tr>
<td>Lorcaserin</td>
<td>&gt;10%: headache &lt;10%: Nausea, dizzy, fatigue, dry mouth, hypoglycemia FDA: Carcinogenicity, valvulopathy, CVD risk?</td>
</tr>
<tr>
<td>Phentermine/topiramate</td>
<td>&gt;10%: paresthesias, dry mouth, constipation &lt;10%: dizzy, insomnia, nausea, depression, glaucoma FDA: Neurocognitive, tachycardia, birth defects?</td>
</tr>
<tr>
<td>Naltrexone/bupropion SR</td>
<td>&gt;10%: nausea, headache, constipation &lt;10%: dizzy, insomnia, dry mouth FDA: CVD risk by ↑BP and ↑heart rate</td>
</tr>
<tr>
<td>Liraglutide</td>
<td>&gt;10%: N/V/D, constipation, hypoglycemia, URI &lt;10%: GI, infections, site effects, fatigue, cough FDA: CVD risk, medullary thyroid, breast cancer?</td>
</tr>
</tbody>
</table>
Emerging Therapies

- Pure CB1 receptor antagonists (different from rimonabant)
- Tesofensine: monoamine reuptake inhibitor
- Velneperit: Y5 receptor antagonist
- Beloranib: MetAP2 inhibitor
- Mirabegron: B3-adrenergic receptor agonist (OAB therapy)

Principles of Drug Therapy

- NIH: BMI > 30 kg/m² or 27 kg/m² with co-morbidity (but almost never in practice)
- Motivated to begin structured exercise and low calorie diet
- Begin medications at completion of one month successful diet and exercise
- Continue medications only if additional weight loss achieved in first 3 months with meds
Bariatric Surgery

- Laparoscopic Adjustable gastric band (Lap Band)
- Sleeve gastrectomy
- Roux-en-Y gastric bypass

- Refer if BMI $\geq 40$ or BMI 35-40 with a comorbidity, AND
- Must have tried and failed other medically managed weight-loss programs
**Bariatric Surgery**

- Refer if BMI \( \geq 40 \) or BMI 35-40 with a comorbidity, AND
- Must have tried and failed other medically managed weight-loss programs

**Contraindications to Surgery:**
- High risk surgical pt: severe CHD, coag., anesthesia risk
- Poor post-op adherence: untreated depression or psychosis; binge-eating, drug/alcohol abuse, post-op diet compliance

**Long-term weight loss results**

![Graph showing weight change over time for different procedures](image)

Sjostrom, Jama, 2012

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No. examined</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>15</th>
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<tbody>
<tr>
<td>Control</td>
<td>2037</td>
<td>1490</td>
<td>1242</td>
<td>1267</td>
<td>556</td>
<td>176</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Banding</td>
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<td>333</td>
<td>284</td>
<td>284</td>
<td>150</td>
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<td>VBG</td>
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<td>1086</td>
<td>987</td>
<td>1007</td>
<td>489</td>
<td>82</td>
<td></td>
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<tr>
<td>GBP</td>
<td>265</td>
<td>209</td>
<td>104</td>
<td>100</td>
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<td></td>
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</table>
Other Outcomes from SOS

Quality of Life after Bariatric Surgery

- Meta-analysis of 15 controlled trials
- 7 compared surgery vs. non-surgical interven.
- 6 compared different types of surgery
- Bariatric surgery: > QOL improvements than other obesity treatments
  - Few differences between the procedures
- QOL improved in first 2 years after surgery, more physical QOL than mental QOL

Hachem, Obes Surg, 2015
The Down-sides to Surgery

- Risk of death within 30 days post-op: 0.13%
  - PE most common cause (30-50% of deaths)
- Hospital readmission: 5.8% RYGB, 1.2% LAGB
  - Risk factors: prolonged LOS, open surgery, DVT/PE history, asthma and OSA
- Risk Factors for increased complications:
  - T2DM, BMI>55, cardiomyopathy
- Lifelong supplementation: MVI, Ca, Vit D, iron, B12, and more monitoring

Take-home points

1. Ask about weight, design a plan together, monitor.
2. Monitor your weight, track diet and exercise.
3. Diet + exercise is best lifestyle intervention.
4. Choose a diet that works for the patient.
5. Exercise is important after weight loss too.
6. PA trackers can be helpful. Apps=wearables
7. Medications can be helpful, but each has side effects.
8. Bariatric surgery may have best outcomes, but need a very motivated patient who will have close monitoring.
Thank You

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