OBESITY

- 35% of adults in US are obese
- 17% of children were obese (which decrease their participation in physical activity and affects them psychologically)
- Only 21% meet the recommended level of physical activity
- Children with BMI 95th percentile report double pain (44% vs 19%)
- Obese patients have a negative psychological outlook which perpetuates sedentary behavior
OBESITY FACTS WORLD WIDE

• In 2014, more than 1.9 billion adults aged 18 years and older were overweight. Of these over 600 million adults were obese.
• Overall, about 13% of the world’s adult population (11% of men and 15% of women) were obese in 2014.
• In 2014, 39% of adults aged 18 years and over (38% of men and 40% of women) were overweight.
• The worldwide prevalence of obesity more than doubled between 1980 and 2014

BMI SCALE

• Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m²).
BMI SCALE

<table>
<thead>
<tr>
<th>BMI</th>
<th>Weight Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 18.5</td>
<td>Underweight</td>
</tr>
<tr>
<td>18.5 – 24.9</td>
<td>Normal or Healthy Weight</td>
</tr>
<tr>
<td>25.0 – 29.9</td>
<td>Overweight</td>
</tr>
<tr>
<td>30.0 and Above</td>
<td>Obese</td>
</tr>
</tbody>
</table>

ADULTS

- overweight BMI greater than or equal to 25
- obesity BMI greater than or equal to 30.
CHILDREN

• **Children under 5 years of age**
  - obesity is weight-for-height greater than
  - 3 standard deviations above the WHO Child Growth Standards median.

• **Children aged between 5–19 years**
  - obesity is greater than 2 standard deviations above the WHO Growth Reference median.
<table>
<thead>
<tr>
<th>States With Lowest Obesity Rates</th>
<th>% Obese</th>
<th>States With Highest Obesity Rates</th>
<th>% Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawaii</td>
<td>19.0</td>
<td>Mississippi</td>
<td>35.2</td>
</tr>
<tr>
<td>Colorado</td>
<td>20.3</td>
<td>West Virginia</td>
<td>34.3</td>
</tr>
<tr>
<td>Montana</td>
<td>23.5</td>
<td>Louisiana</td>
<td>33.2</td>
</tr>
<tr>
<td>California</td>
<td>25.9</td>
<td>Arkansas</td>
<td>33.0</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>24.0</td>
<td>Oklahoma</td>
<td>32.6</td>
</tr>
<tr>
<td>Idaho</td>
<td>24.2</td>
<td>Alabama</td>
<td>32.1</td>
</tr>
<tr>
<td>South Dakota</td>
<td>24.6</td>
<td>Kentucky</td>
<td>31.5</td>
</tr>
<tr>
<td>New York</td>
<td>24.7</td>
<td>Indiana</td>
<td>31.4</td>
</tr>
<tr>
<td>Minnesota</td>
<td>24.8</td>
<td>Iowa</td>
<td>31.1</td>
</tr>
<tr>
<td>Connecticut</td>
<td>24.9</td>
<td>Missouri</td>
<td>30.9</td>
</tr>
</tbody>
</table>

January-December 2014
Gallup-Healthways Well-Being Index

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**Obesity in Oklahoma**

Obesity is defined as an excessively high amount of body fat or adipose tissue in relation to lean body mass.

**Obesity rate by gender**
- Men: 33.9%
- Women: 35.8%

**Obesity rate by age**
- 18-24: 31.4%
- 25-34: 33.4%
- 35-44: 34.4%
- 45-54: 35.4%
- 55-64: 36.4%
- 65+: 37.4%

**Obesity rate by race**
- White: 32.6%
- Black: 38.2%
- Other: 35.4%

**Obesity-related health issues**

- **Diabetes**
  - Current adult diabetes rate: 12% (7th)
  - Rate among adults aged 20 and older: 3.3%
  - Percentage of adults with diabetes who are aware of their diabetes: 71.2%
  - Percentage of adults with diabetes who are using medication to control their diabetes: 86.2%
  - Percentage of adults with diabetes who are under professional care: 80.5%

- **Hypertension**
  - Prevalent hypertension rate: 30.5%
  - Prevalent hypertension rate among adults aged 20 and older: 28.4%
  - Percentage of adults with hypertension who are aware of their hypertension: 70.1%
  - Percentage of adults with hypertension who are taking prescribed medication for their hypertension: 55.0%

**Additional Health Data**

- **Chronic Disease Mortality**
  - Number of chronic disease deaths: 29,659
  - Number of deaths from heart disease: 7,251,461
  - Number of deaths from cancer: 60,784

**Obesity in the United States**

- Number of obese adults: 87,920,000
- Number of overweight adults: 81,900,000
- Number of normal weight adults: 63,000,000
- Number of underweight adults: 7,900,000

**Health Data by State**

- Oklahoma: Number of obese adults: 1,081,890
- Ohio: Number of obese adults: 1,090,727
OBESITY IS RELATED TO

• Avoidance of physical activity
• Disability
• Worsening of pain With
• repeated pain exposures

CATASTROPHIZING

• Pain catastrophizing is an exaggerated negative orientation to harmful stimuli
• Catastrophizing leads to maladaptive behaviors –
• Such as activity avoidance that perpetuate continued weight gain
• Physical inactivity
PROPOSED MECHANISM

- Excessive weight increases mechanical stress on joints and tissue of body
- Excessive weight induces physical limitations
- Induces physical pain
- The pain causes physical discomfort with exercise which causes activity decline
- Chronic pain induces physical impairment decline of fitness and health related quality of life
MECHANICAL LOADING THEORY

- Obesity causes mechanical loading
- Chronic musculoskeletal pain

MECHANICAL LOADING CONT.

- Leads to inflammation
  - Cytokines TNF, CRP
  - Psychological state
    - ANXIETY
    - DEPRESSION
    - FEAR OF MOVEMENT
    - PAIN CATASTOPHZING
**INFLAMMATION THEORY**

- Pro-inflammatory proteins such as
d- cytokines are released by
  - immune cells
  - adipocytes

**INFLAMMATION THEORY CONT.**

- C-reactive protein (CRP) and interleukins (ILs) are elevated in persons with chronic musculoskeletal pain
  - low back pain
  - knee pain
  - foot pain
  - joint pain
- more so in obese persons compared
to persons with normal weight
EXERCISE FOR LOW BACK PAIN

- Two recent analyses were performed that compared different resistance protocols for chronic LBP in obese persons.
- Obese adults aged 6–85 years with chronic LBP were randomized to
  - total body resistance (TOTRX; ten upper and lower body RXs and lumbar extension),
  - isolated lumbar extension exercise (LEXT; participants performed lumbar extension only), or
  - non-exercise control group (CON).
- All participants received the standard of care, pamphlets, and education materials on physical activity guidelines and weight loss benefits.
- Resting and pain with activity were measured during
  - walking,
  - stair climbing
  - chair rise

EXERCISE FOR CHRONIC LOW BACK PAIN

- TOTAL BODY RESISTANCE
  - TOTRX ten upper and lower body RXs and lumbar extension
- ISOLATED LUMBAR EXTENSION EXERCISE
  - LEXT Participants perform only lumbar extension only
- CON
  - Non exercise control group
EXERCISE FOR LOW BACK PAIN CONT.

• Greater reductions in resting average back pain levels and walking pain were achieved with
  • TOTRX 60.5%
  • LEXT 42.0%
  • CON 6.4%
• Pain with chair rise was decreased by 49.8% in TOTRX group compared to the other groups (3.7% and 0.3% reduction).
• In these studies, participants did not lose weight despite pain relief.
• Minimal evidence exists supporting the use of back extension exercises in the general population with LBP
• targeted back extension exercises can significantly reduce pain in the obese individual safely and effectively while minimizing pain medication

EXERCISE FOR LOW BACK PAIN IN OBESE CONT.

• significant reduction in perceived disability due to pain as shown by improved Roland Morris Disability and Oswestry Disability Index scores
• significantly lower pain catastrophizing
• faster gait speed
• When back strength increased more than 20% from baseline
  • pain levels improved more than if back strength did not increase more than 20% with either TOTRX or LEXT.
• From the functional perspective, lumbar strength gains are related to walking endurance improvements.
SOLUTIONS FOR INCREASING EXERCISE ADHERENCE IN OBESE INDIVIDUALS

• The American College of Sports Medicine, the American Dietetic Association, and the American Heart Association provide evidence-based recommendations for physical activity prescriptions for significant weight loss and maintenance.
• However, adherence to exercise is a challenge for obese persons, as shown by attrition rates ranging from 43.5% (children) and 50% (adults).

SOLUTIONS TO HELP IMPROVE ADHERENCE CONT.

• Modifications to the specific exercises may be necessary to offset the acute pain with mechanical loading. For example,
• RXs can be performed within the non-painful range of motion (reduce the overall motion of the knee extension or flexion exercise).
• walking or running can be painful for obese persons, but incline walking at slower speeds is less painful or not painful.
EXAMPLES TO IMPROVE ADHERENCE

• adherence to regular exercise is low
• several methods to increase adherence include
• modification of exercise including splitting up exercise duration into smaller bouts
• reducing joint range of motion,
• minimizing impact activity.


