SARCOPENIC OBESITY: A CASE STUDY OF NEW TRENDS FOR MANAGEMENT

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CSCS CPT
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To learn about the new emerging concept of Sarcopenic Obesity (SO) and its relevance to increasing epidemic of diabetes.
**PREVALENCE OF DIABETES AND OBESITY**

**Diabetes**
- Prevalence worldwide 2.8% in 2000
- Prevalence worldwide 4.4% in 2030

(Wild, Sicree, Roglic, King & Green, 2004, p-1047)

**Obesity**
- Prevalence in people over 60 years old would increase from 23.6% in 1990 to 32% in 2000 to 37.4% in 2010.

(Mathus-Vliegen, 2012, p-533)
GLOBAL BURDEN OF DIABETES

(Wild et al., 2004, Figure 2, p-1050)
Figure 1. Number of US Adults Aged 18 or Older with Diagnosed Diabetes, 1980-2012

(From Diabetes report card-2014, CDC, 2014, p-1)
RELATIONSHIP BETWEEN SARCOPENIA, OBESITY AND DIABETES

Aging population

Reduced physical activity

Reduced muscle mass

Increased obesity levels

Diabetic epidemic

(Marcell, 2008) (Gomez-Cabello et al., 2011)
CURRENT STATISTICS AND EVIDENCE

- Prevalence of sarcopenia was 12% in males and 11.9% in females.
- Among those who had sarcopenia, obesity was observed in 68.3% males and 65.0%.

  (Ryu, Jo, Lee, Chung, Kim & Baek, 2013, p-251)

- There is an increased risk of developing sarcopenia if one already has type-II diabetes.

  (Kim et al., 2010)
With increasing and alarming rates of urbanization and population getting older, the prevalence of diabetes will continue to rise.

The human and economic costs of diabetic epidemic will be enormous, as this will lead to increments in cardiovascular diseases as well.

(Wild et al., 2004)
The main problem is addressing both fat mass decrement and muscle mass increment simultaneously.

Traditional methods of reducing weight may have detrimental effects as they tend to reduce the muscle mass as well.

(Wood & O’Neil, 2014)
Dr. Unni Karnakara, retired international president MSF (Medicine san frontiers)

25 years ago, after passing out from medical school, explored northern part of India, from Delhi to Srinagar on bicycle

Covering over 1000 miles
In September 2013, he was set to retire from MSF, was stuck in a desk job for last 5 years, with too much travel and too little physical activity.

Decided to fulfill his dream of covering India on bicycle, generate some awareness and funds for MSF India programs.

Plans to cover 38000 miles on bicycle.
### Body Composition

<table>
<thead>
<tr>
<th></th>
<th>Under</th>
<th>Normal</th>
<th>Over</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td></td>
<td></td>
<td>115-145</td>
<td>145-165</td>
</tr>
<tr>
<td>SMM</td>
<td></td>
<td></td>
<td>110-130</td>
<td>130-150</td>
</tr>
<tr>
<td>Body Fat Mass</td>
<td>40-60</td>
<td>60-80</td>
<td>80-100</td>
<td>100-120</td>
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</tbody>
</table>

### TBW, Total Body Water

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>TBW</td>
<td>37.3 kg (33.7 - 41.2)</td>
</tr>
<tr>
<td>Protein</td>
<td>10.1 kg (9.0-11.0)</td>
</tr>
</tbody>
</table>

### Obesity Analysis

<table>
<thead>
<tr>
<th></th>
<th>Values</th>
<th>Normal Range</th>
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<tbody>
<tr>
<td>BMI</td>
<td>25.2</td>
<td>18.5 - 25.0</td>
</tr>
<tr>
<td>PBF</td>
<td>25.9</td>
<td>10.0 - 20.0</td>
</tr>
<tr>
<td>WHR</td>
<td>0.91</td>
<td>0.80 - 0.90</td>
</tr>
</tbody>
</table>

### Nutritional Evaluation

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>Deficient</th>
</tr>
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<tbody>
<tr>
<td>Protein</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mineral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fat</td>
<td></td>
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</tbody>
</table>

### Weight Management

<table>
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</tr>
<tr>
<td>WHR</td>
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</tbody>
</table>

### Impedance

<table>
<thead>
<tr>
<th></th>
<th>RA</th>
<th>LA</th>
<th>TR</th>
<th>RL</th>
<th>LL (O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20kHz</td>
<td>319.5</td>
<td>320.0</td>
<td>24.1</td>
<td>278.3</td>
<td>273.6</td>
</tr>
<tr>
<td>100kHz</td>
<td>284.9</td>
<td>293.6</td>
<td>19.1</td>
<td>247.1</td>
<td>241.2</td>
</tr>
</tbody>
</table>

### Muscle Fat Control

<table>
<thead>
<tr>
<th></th>
<th>Muscle Control</th>
<th>Fat Control</th>
<th>Fitness Score</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscle</td>
<td>0.0 kg</td>
<td>-8.8 kg</td>
<td></td>
<td>71</td>
</tr>
</tbody>
</table>

### Exercise Planner

Plan your weekly exercises from the followings and estimate your weight loss from those activities.

<table>
<thead>
<tr>
<th></th>
<th>Walking</th>
<th>Jogging</th>
<th>Bicycle</th>
<th>Swim</th>
<th>Mountain Climbing</th>
<th>Aerobic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>137</td>
<td>240</td>
<td>206</td>
<td>240</td>
<td>224</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>Tennis</td>
<td>Table tennis</td>
<td>Football</td>
<td>Oriental Fencing</td>
<td>Gate ball</td>
<td>Badminton</td>
</tr>
</tbody>
</table>

### How to do

1. Choose practicable and preferable activities from the left.
2. Energy expenditure for each is calculated when it is done for 30 min.
To manage SO, the approach has to be a combination of exercise and diet, which can increase the muscle mass and at the same time works to reduce the fat levels.

(Wood & O’Neil, 2014)

A regular protein intake in addition to exercise can help to increase muscle mass and achieve reduction of fat.

(Li & Heber, 2011)
The rate of muscle decline in older age is dependent upon the lifestyle followed and physical health done earlier in life.

(Stenholm et al., 2012)
<table>
<thead>
<tr>
<th>Parameter</th>
<th>At beginning 07/31/2013</th>
<th>At finish 02/01/2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body weight</td>
<td>69.1 kilograms (152 pounds)</td>
<td>67.8 kilograms (149 pounds)</td>
</tr>
<tr>
<td>Body fat mass</td>
<td>19.4 kilograms (43 pounds)</td>
<td>16.9 kilograms (37 pounds)</td>
</tr>
<tr>
<td>Skeletal muscle mass</td>
<td>27.7 kilograms (60 pounds)</td>
<td>28.3 kilograms (62.2 pounds)</td>
</tr>
<tr>
<td>Aerobic capacity</td>
<td>39.53 ml/kg/min</td>
<td>50.65 ml/kg.min</td>
</tr>
</tbody>
</table>
REFERENCES


THANK YOU

- Questions?