Will Exercise Prescription via Metabolic Equivalents Improve Six-Minute Walk Distance of Patients Undergoing Cardiac Rehabilitation?

Presented by Qamaruzaman Bin Syed Gani
Benefits of Cardiac Rehabilitation
Exercise Prescription

Frequency

Intensity

Time

Type
## Intensity

<table>
<thead>
<tr>
<th>Intensity</th>
<th>%HRR</th>
<th>%HR(_{\text{max}})</th>
<th>RPE ((6 – 20) scale)</th>
<th>METs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
<td>30 – 39</td>
<td>57 – 63</td>
<td>9 – 11</td>
<td>2.0 – 2.9</td>
</tr>
<tr>
<td>Moderate</td>
<td>40 – 59</td>
<td>64 – 75</td>
<td>12 – 13</td>
<td>3.0 – 5.9</td>
</tr>
<tr>
<td>Vigorous</td>
<td>60 – 89</td>
<td>76 – 95</td>
<td>14 – 17</td>
<td>6.0 – 8.7</td>
</tr>
</tbody>
</table>

Participants/Methods

“This treadmill is so high-tech, you burn 100 calories just selecting your workout program!”
Participants
Participants

- Percutaneous Coronary Intervention
- Coronary Artery Bypass Graft
- Valve Surgery
## Methods

<table>
<thead>
<tr>
<th>Intervention Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed individual aerobic exercise via Metabolic Equivalents (METs)</td>
<td>Prescribed individual aerobic exercise via maximum Heart Rate (HRmax)</td>
</tr>
</tbody>
</table>

Primary outcome measure was the Six-Minute Walk Test (6MWT) conducted on the first and twelfth session.
Methods

Your Health and Well-Being

This questionnaire asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Thank you for completing this survey.

For each of the following questions, please mark an □ in the box that best describes your answer.

1. In general, would you say your health is:

   - Excellent
   - Very good
   - Good
   - Fair
   - Poor

2. Compared to one year ago, how would you rate your health in general:

   - Much better now than one year ago
   - Somewhat better now than one year ago
   - About the same as one year ago
   - Somewhat worse now than one year ago
   - Much worse now than one year ago

SF36v2 Health Survey

Physical Function

Role Physical

Bodily Pain

Mental Health

Role Emotional

Social Function

Vitality

General Health
Methods
Results
## Results

<table>
<thead>
<tr>
<th></th>
<th>Intervention Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td>57 ± 10</td>
<td>58 ± 10</td>
</tr>
<tr>
<td><strong>BMI (kg·m⁻²)</strong></td>
<td>26.0 ± 4.7</td>
<td>22.8 ± 3.7</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td></td>
<td>16</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
Results

• Significant improvement ($p = 0.0005$) in pre and post-6MWT within intervention and control group.

• Exercise prescription via METs led to similar 6MWT distance improvements when compared with exercise prescription via HRmax ($p = 0.86$).
### Results

<table>
<thead>
<tr>
<th>SF36v2</th>
<th>Pre CR Scores</th>
<th>Post CR Scores</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Function</td>
<td>45.45 ± 6.66</td>
<td>52.60 ± 2.95</td>
<td>0.001</td>
</tr>
<tr>
<td>Role-Physical</td>
<td>44.04 ± 10.08</td>
<td>47.58 ± 7.74</td>
<td>0.11</td>
</tr>
<tr>
<td>Bodily Pain</td>
<td>50.39 ± 7.49</td>
<td>52.77 ± 8.20</td>
<td>0.09</td>
</tr>
<tr>
<td>General Health</td>
<td>50.41 ± 8.58</td>
<td>55.66 ± 7.85</td>
<td>0.001</td>
</tr>
<tr>
<td>Vitality</td>
<td>50.25 ± 8.02</td>
<td>56.66 ± 7.68</td>
<td>0.01</td>
</tr>
<tr>
<td>Social Functioning</td>
<td>44.94 ± 7.35</td>
<td>50.48 ± 7.88</td>
<td>0.004</td>
</tr>
<tr>
<td>Role-Emotional</td>
<td>45.36 ± 11.37</td>
<td>46.46 ± 9.75</td>
<td>0.92</td>
</tr>
<tr>
<td>Mental Health</td>
<td>51.28 ± 7.81</td>
<td>53.07 ± 9.68</td>
<td>0.43</td>
</tr>
</tbody>
</table>
Results

- CR resulted in improvements in physical component score ($p = 0.001$) but not mental health score ($p = 0.32$).
Discussion
Discussion

• Improvement in 6MWT distance was similar when exercise was prescribed via HRmax or METs.

• Moderate inverse correlation between initial 6MWT distance and distance improved post Cardiac Rehabilitation

• Lower physical function = greater improvement in 6MWT distance

• Ceiling effect’ may occur in participants with higher pre-6MWT distance
Discussion

• Currently using Heart Rate Walking Speed Index (HRWSI) to explain improvement

  Improvement of HRWSI: 1.60 to 1.40

• Compare METs value to estimated energy requirements for tasks of daily living or sports.

  Improved METs from 4 to 6.5

  4 to 9 METs
Discussion

- Cardiac Rehabilitation improves Physical but not Mental Health-Related Quality of Life.
- Modest correlation between relative distance improved in 6MWT and relative improvement in Physical Component Score
- Availability of normative scores in Singapore
- Early identification and justification of psychosocial assistance
Summary

Metabolic Equivalents

Maximum Heart Rate
References

References

- British Association for Cardiovascular Prevention and Rehabilitation. (2014) Physical Activity and Exercise in the Management of Cardiovascular Disease. London, United Kingdom: British Cardiovascular Society
Questions
Thank you for your attention