An individualised group based exercise intervention is associated with improvements in functional performance, quality of life, and fatigue in adults with cancer

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Introduction

> Cancer and its treatment are frequently associated with impaired physical fitness which often persists into survivorship.

> Functional impairments such as cancer related fatigue, muscle atrophy, excessive weight gain or weight loss with associated deconditioning, reduced aerobic capacity, pain, nausea, neuropathy and reduced joint range of motion are commonly reported side effects of cancer therapy.

> Side effects not only impact on the physical wellbeing of the patient but often affect activities of daily living which can significantly impact on social and psychological wellbeing and affect quality of life 1,2.

> To our knowledge, no published studies have evaluated the effectiveness of a clinical non disease specific group based exercise program for cancer patients.

Methods

> We developed a multidisciplinary group exercise intervention for cancer patients who were either undergoing or had recently completed therapy for cancer. This program was supervised by exercise physiologists, with participants attending 2–3 sessions per week for 10 weeks at our hospital gymnasium.

> Patients underwent a baseline assessment which included past and present medical history, measurement of functional performance and self reported quality of life 3 and fatigue 4.

> Battery testing was determined by the Exercise Physiology during assessment. Tests included Fullarton’s Functional Assessment for Older Adults 5 and Australian functional fitness norms 6.

> Exercise goals were set using SMART principles 7.

> Individualised exercise programs were developed utilising information gathered from the baseline assessment and specific patient goals.

> Exercise programs comprised of cardiovascular, resistance, flexibility and core stability exercises.

> Exercise intensity was monitored using heart rate and Borg’s Rate of Perceived Exertion (RPE) scale. Aerobic intensity was set at 75% of predicted maximum heart rate, and a RPE of 13 (somewhat hard).

> Assessment of one repetition maximum (1RM) was assessed at baseline to enable prescription of the intensity for the resistance exercises (at an initial 60% 1RM). When a 1RM assessment was not appropriate, intensity was set using a 10-RM protocol.

> Patients were closely supervised throughout the 10 week intervention to ensure progression, monitor intensity and ensure safety.

> Further, patients were encouraged to perform physical activity outside of gym sessions.

> Paired t-tests were used to compare results prior to commencing and after completing the 10 week program.

Results

> 296 cancer patients were enrolled between 2008 and 2012.

> 153 were male and 143 female, with a range of cancer diagnoses. The median age was 57 years.

> 186 (63%) completed the program.

> The mean body mass pre-intervention was 75.8 (±17.7) kg and post intervention 74.5 (±17.1), while the mean BMI pre intervention was 26.2 (±4.6) and post-intervention 26.2 (±4.6).

> Highly significant improvements were observed in quality of life scores (mean (± SD) = 22.8 (±3.7) pre-intervention versus 22.8 (±3.7) post-intervention, p<0.0001),

> Piper fatigue scores decreased by 11% (5.0 (± 1.9) pre-intervention versus 22.8 (±3.7) post-intervention, p<0.0001),

> Significant improvements were seen in 11 of the 12 functional assessment measures (Table 1). Figure 1 and 2 demonstrate the mean percentage improvements for each functional measure.

Conclusions

> In conclusion, the improvement in functional assessment measures indicates that the program improves physical fitness, at least in the short-term, in a group at risk of persisting impaired fitness.

> Furthermore, the improvements in fatigue levels and quality of life suggest that the benefits of an exercise program extend beyond just physical fitness for cancer patients.

Table 1

<table>
<thead>
<tr>
<th>Outcome measure</th>
<th>n</th>
<th>Mean pre-intervention</th>
<th>Mean post-intervention</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum grip strength (kg)</td>
<td>25</td>
<td>R 0.26 (L 0.32)</td>
<td>R 0.27 (L 0.35)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>30 sec arm curls (number of repetitions)</td>
<td>148</td>
<td>L 16.60 (R 16.30)</td>
<td>L 20.81 (R 21.05)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Back scratch (measuring flexibility, cm)</td>
<td>101</td>
<td>R -2.67 (L -2.78)</td>
<td>R -0.88 (L -5.54)</td>
<td>&lt;0.0001</td>
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<tr>
<td>Maximum back and leg strength (kg)</td>
<td>51</td>
<td>113.65</td>
<td>124.54</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>30 sec chair stands (number of repetitions)</td>
<td>148</td>
<td>11.79</td>
<td>15.66</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Max push-ups (number of repetitions)</td>
<td>39</td>
<td>14.4</td>
<td>25.74</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Max sit-ups (number of repetitions)</td>
<td>45</td>
<td>21.85</td>
<td>26.80</td>
<td>&lt;0.0001</td>
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<tr>
<td>Self selected gait speed (m-1)</td>
<td>141</td>
<td>1.24</td>
<td>1.38</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Max gait speed (m-1)</td>
<td>140</td>
<td>1.69</td>
<td>1.88</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>6 Min. Walk Test (m)</td>
<td>142</td>
<td>495.41</td>
<td>669.66</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Figure 1

Mean percentage improvement Australian functional fitness norms

- Sit and reach (24%) 
- Back scratch right arm raised (87%) 
- Back scratch left arm raised (23%) 
- Max grip strength right arm (44%) 
- Max grip strength left arm (7%) 
- Max back and leg strength (59%) 
- Max push-ups (44%) 
- Max sit-ups (10%) 
- Pre chick walk (17%)

Figure 2

Mean percentage improvement Fullartons Functional Assessment

- 30 sec chair stands (25%) 
- 30 sec arm curls right arm (30%) 
- 30 sec arm curls left arm (20%) 
- Self selected gait speed (15%) 
- Max gait speed (100%) 
- Six Minute Walk Test (13%)

Acknowledgements

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References