Senior Exercise Park: A Novel Exercise Initiative for Older Adults

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Background

- Falls continue to be a major public health concern\(^1\)
- 30-35% of older people living in the community and aged over 65 years falls at least once a year\(^2\)
- Quality of life and functional decline\(^2\)

Exercise and Falls Prevention Interventions

- Slow down functional losses\(^1\)
- Improve quality of life and maintain functional independence\(^1\)
- Participation in falls prevention interventions are rather low\(^2\)
- Not perceived as beneficial or sufficiently appealing to them?

Senior Exercise Parks
Aims of this study

Investigate the **feasibility** and **effectiveness** of an exercise intervention using an outdoor exercise park in **improving balance, physical function and quality of life**.
Study Design

- Parallel randomised controlled trial with pre and post intervention design
- Outcome assessments at baseline and at 18 weeks after participation commencement
- Number of falls over a 12-month period
- Participants: One hundred twenty community-dwelling people between 60 and 90 years old
Recruitment and Randomization

Recruitment of participants

Baseline Assessment

Block Randomization

Control Group (CG)

Exercise Park Intervention Group (EPIG)

18 weeks follow-up

Falls Calendar for 12 months

Participants in the Control:
- continued usual daily activities
- social activities once every two weeks

Community health promotion events, advertisement in local newspapers, magazines, online social networking media
Exercise Park Intervention

- Study protocol

Primary Outcome Measure

- Balance Outcome Measure for Elder Rehabilitation (BOOMER)¹:
  - Step Test
  - Functional Reach
  - Static Balance
  - Timed-up-and-go

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Secondary Outcomes Measures

- **Strength and Physical Function:**
  - Balance tests
  - Lower limb strength
  - Hand grip strength
  - Gait speed and sit-to-stand

- **Questionnaires:**
  - The Short Falls Efficacy Scale International (Short FES-I)\(^1\)
  - The Short Form (12) Health Survey (SF-12v2\(^{TM}\))\(^2\)

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Secondary Outcomes Measures

- Feasibility:
  - Total adherence: Number of participants recruited and retained (exercise group)
  - Total attendance
  - Seasonal attendance
  - Safety: Falls? Injuries?
  - Adverse effects: Muscle soreness?

Statistical analysis

- Repeated measures ANCOVA univariate analysis: BOOMER battery test
- Repeated measures ANCOVA: for all secondary measures
- Difference between groups and groups over time (baseline vs 18-week assessment)
Results

Enrollment

Assessed for eligibility (n=176)

Excluded (n=110)
- Not meeting inclusion criteria (n=31)
- Declined to participate (n=60)
- Didn’t believe exercise suit them (16)
- Other reasons (3)

Randomized (n=66)

Allocated to intervention (n=35)

Allocated to Control (n=31)

Follow-Up

Discontinued intervention (n=4)
- Relying on Public Transport (n=1)
- No time to commit (n=1)
- Living too far from site

Discontinued control (n=10)
- Death (n=1)
- Didn’t accept randomization (n=7)
- Lost interest (n=1)

Analysis

Analysed (n=27)
- Excluded from analysis (n=4) due to attendance to sessions < 50%

Analysed (n=21)
- Excluded from analysis (n=0)
## Results

### Participants’ characteristics

<table>
<thead>
<tr>
<th></th>
<th>Control Group (n=21)</th>
<th>Exercise Intervention Group (n=27)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (Years)</strong></td>
<td>70.2±8.2</td>
<td>75.1±7.9</td>
</tr>
<tr>
<td><strong>Gender (Females, %)</strong></td>
<td>77</td>
<td>64</td>
</tr>
<tr>
<td><strong>BMI (kg/m^2)</strong></td>
<td>28.1±5.0</td>
<td>28.9±5.3</td>
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<tr>
<td><strong>Previous Falls History (≥1 fall, %)</strong></td>
<td>61.9</td>
<td>62.9</td>
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<tr>
<td><strong>Follow-up Falls Over 12 months (%)</strong></td>
<td>47.6</td>
<td>40.7</td>
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</table>
Results - Physical and Functional Measures

- **Single Leg Stance (sec)**
  - p<0.01 (95% CI -8.35 to -0.54)

- **Knee Strength (N.m)**
  - p<0.01 (95% CI -29.1 to -5.8)

- **Two Minute Walk (m)**
  - p<0.01 (95% CI -19.1 to -0.85)

- **Sit to Stand (reps)**
  - p<0.01 (95% CI -2.26 to -0.143)

Results - Feasibility

- No injuries or adverse effects reported

Total Adherence and Attendance

- Total Adherence: 87.0%
- Total Attendance: 79.6%
Results - Feasibility

- Only 9.6% of sessions had to be cancelled due to rain.
Discussion

- No improvement on the BOOMER test: potential ceiling effect

- No improvement in quality of life and fear of falling: Participants more independent and physically capable\(^2,3\)

<table>
<thead>
<tr>
<th>Measure</th>
<th>CG (n=21) Pre/Post</th>
<th>EPIG (n=27) Pre/Post</th>
<th>P value Group by Time Interaction (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOOMER (Out of 16)</td>
<td>13.5±1.7/13.9±1.4</td>
<td>13.6±1.4/13.7±1.3</td>
<td>0.6 (-.354 to .830)</td>
</tr>
</tbody>
</table>

2. Tucker et al. (2010). Quality of Life Research, 19(7), 1069-1076.
Discussion

- Improvement in key measures of function, balance and strength
- Maintenance of independence, mobility and vitality in old age
- ADLs - Positive effect on confidence and self-efficacy
- Social interaction - a playful and relaxed atmosphere – Adherence and attendance

Key messages

- The senior exercise park – feasible, effective and safe in improving balance, muscle strength and physical function among older adults
- Reduction of falls risk
- Relatively high adherence/attendance rates
- Social Interaction
Where to next?

- Future trial with a larger sample size to investigate if the senior exercise parks are effective in reducing falls among older adults.
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