Interstitial Lung Disease (ILD) and Exercise

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Overview

• The body’s typical response to aerobic exercise training

• Summary of previous research

• Current NIH study
National Institutes of Health (NIH)
Typical Response to Aerobic Exercise Training
Previous Research
Cardiorespiratory Function Before and After Aerobic Exercise Training in Patients With Interstitial Lung Disease

Randall E. Keyser, PhD; Joshua G. Woolstenhulme, DPT; Lisa M.K. Chin, PhD; Steven D. Nathan, MD; Nargues A. Weir, MD; Gerilynn Connors, RRT, BS; Bart Drinkard, MSPT; James Lamberti, MD; Leighton Chan, MD, MPH

• 10 weeks of vigorous walking
• 3 times a week, 30-45 minutes each session
• Treadmill speed and inclination adjusted continuously to maintain heart rate in training zone
• Exercise testing performed before and after exercise training

Table 1 • Baseline Characteristics of Study Patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>All Patients (n = 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD), y</td>
<td>57.0 (9.1)</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>9 (69)</td>
</tr>
<tr>
<td>Race/ethnicity, n (%)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>11 (85)</td>
</tr>
<tr>
<td>African American</td>
<td>2 (15)</td>
</tr>
<tr>
<td>BMI, mean (SD), kg/m²</td>
<td>28.6 (4.8)</td>
</tr>
<tr>
<td>Supplemental O₂ use, n (%)</td>
<td>5 (38)</td>
</tr>
<tr>
<td>Diagnosis, n (%)</td>
<td></td>
</tr>
<tr>
<td>Nonspecific interstitial pneumonitis</td>
<td>6 (46)</td>
</tr>
<tr>
<td>Idiopathic pulmonary fibrosis</td>
<td>3 (23)</td>
</tr>
<tr>
<td>Systemic sclerosis</td>
<td>2 (15)</td>
</tr>
<tr>
<td>Desquamative interstitial pneumonia</td>
<td>1 (8)</td>
</tr>
<tr>
<td>Sjögren syndrome</td>
<td>1 (8)</td>
</tr>
<tr>
<td>NYHA/WHO Functional Classification, n (%)</td>
<td></td>
</tr>
<tr>
<td>Class II</td>
<td>6 (46)</td>
</tr>
<tr>
<td>Class III</td>
<td>7 (54)</td>
</tr>
</tbody>
</table>

Abbreviations: BMI, body mass index; NYHA/WHO, New York Heart Association/World Health Organization.

(Keyser et al. J Cardiopulm Rehabil Prev. 2015)
Results

Figure 2. CPET duration, time to gas exchange threshold (GET-time), peak work rate (WR), and 6-minute walk test distance (6MWD) in (Keyser et al. J Cardiopulm Rehabil Prev. 2015)
## Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Before Exercise</th>
<th>After Exercise</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Oxygen Consumption</td>
<td>17.4 ± 5.5 (ml/kg/min)</td>
<td>18.2 ± 5.0 (ml/kg/min)</td>
<td>0.048</td>
</tr>
<tr>
<td>Cardiac Output</td>
<td>15.7 ± 3.8 (L/min)</td>
<td>14.5 ± 4.0 (L/min)</td>
<td>0.117</td>
</tr>
<tr>
<td>Arteriovenous oxygen difference</td>
<td>9.2 ± 2.2 (%)</td>
<td>10.7 ± 2.9 (%)</td>
<td>0.049</td>
</tr>
</tbody>
</table>

(Keyser et al. J Cardiopulm Rehabil Prev. 2015)
Figure 1. Muscle oxygenation capacity in the untrained and trained

P = 0.037

(Keyser et al. J Cardiopulm Rehabil Prev. 2015)
Questions

• Do we see similar results in a larger group of subjects?

• Is vigorous aerobic exercise really safe?

• Do these findings have clinical meaning?

• Can these findings be used to change guidelines for rehabilitative exercises recommended for patients with ILD?
Current NIH Study
Current NIH Study

• Prospective, randomized clinical trial
• Seeking to enroll 60 subjects
• 10 weeks of aerobic exercise training & education
  • “Control group” receives 10 weeks of education lectures followed by 10 weeks of exercise training
  • “Combined group” receives 10 weeks of exercise training and education lectures concurrently
• Exercise training takes place at NIH in Bethesda, MD or at the Inova Fairfax Hospital in Falls Church, VA
Current NIH Study: Who Qualifies?

- **If you have/are:**
  - Diagnosis of ILD
  - Between 21-80 years old
  - WHO functional class II-III
    - I and IV with exceptions
  - No syncope or chest pain
  - No pulmonary rehabilitation within past 6 months
  - Physically sedentary
  - No pulmonary hypertension

- **And must NOT have/be:**
  - Heart problems
  - Severe liver or kidney disease
  - Cancer with a life expectancy of less than 1 year
  - Substance abuse problem
  - Current tobacco user
  - Pregnant
  - On a lung transplant waiting list
Current NIH Study

• Purposes of study
  • To determine the safety of exercise training for people with ILD
  • To better understand how the bodies of people with ILD adapt to exercise training
  • To better understand how exercise influences participation in common every-day activities
  • To determine how exercise affects psychological well-being and health-related quality of life
For More Information

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https://clinicaltrials.gov
Study number: NCT02019641