Long-Term Exercise After Pulmonary Rehabilitation (LEAP): Results of Cardiorespiratory Function From a Pilot Randomized Trial of Tai Chi

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Introduction

• COPD is a major health concern that contributes to a reduction in exercise capacity1
• Physical activity is recommended for all patients with stable COPD and is the cornerstone of pulmonary rehabilitation programs (PR)1,3
• However, progress achieved in PR is generally lost due to physical inactivity following PR completion4
• Studies show that Tai Chi can be a safe exercise in older adults and those with chronic disease1,5
• The goals of this analysis were to: 1) explore longitudinal changes in respiratory function following a 24-week pilot post-PR Tai Chi intervention (TC)1,4 2) characterize acute/initial cardiorespiratory response to TC vs. walking (WLK)1
• We hypothesized that TC would improve measures of FVC and TC would be indicative of a lower intensity compared to WLK

Methodology

• Secondary analysis of cardiorespiratory data available from a pilot RCT (randomized 2:1:2 to a 24-week twice weekly TC class, twice weekly group walking (WLK) class, or usual care (UC))
• Respiratory function was assessed at baseline and 24 weeks using spirometry
• Acute in-class cardiorespiratory responses during TC and WLK at 24 weeks were assessed using a portable metabolic cart in 5 phases 1) Swinging and Drumming 2) Tai Chi Standing Meditation 3) Seated Breathing Meditation 4) Raising the Power 5) Tai Chi Push
• The walking was maintained at a continuous light intensity throughout the 4 phases (P2-P5) after gentle stretching (P1)
• Continuous heart rate data during both was analyzed for conventional heart rate variability (HRV) indices

Results

Aim 1: Pre to Post Intervention Spirometry (Total N=85; 34 in TC, 16 in WLK, 35 in UC)

Table 1. Baseline demographics of all participants prior to study beginning. Data were analyzed as Standard of Care vs Tai Chi vs Walking with ANOVA.

<table>
<thead>
<tr>
<th>Phase of Activity</th>
<th>TC</th>
<th>Walking</th>
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<tr>
<td>Rest</td>
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<td>Post</td>
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Aim 2: Acute/Initial Response to TC (n = 19) vs Walking (n = 9)

Discussion and Conclusion

• After 6 months, TC appeared to attenuate the decline in FVC seen in SC (Fig 2)
• Although TC was of lesser aerobic intensity than WLK, TC was associated with more favorable ventilatory efficiency during exercise (Fig 3)
• This improved efficiency was supported by lower respiratory rate, indicative of reduced rapid shallow breathing seen in COPD
• The lower intensity of TC may be supportive of improved exercise adherence in COPD patients as lifestyle modification
• An exploratory HRV index (Fig 3) supports that TC maintains vagal tone and vagal tone was elevated in TC during rest following exercise
• The acute and longitudinal changes in cardiorespiratory function with TC in COPD and related conditions warrant further investigation

References

1. Patel et al, Cureus, 2019
5. Maris et al, JAR, 2014

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