158. Exercise training: new populations, new techniques

Preliminary results of pulmonary rehabilitation in interstitial lung diseases:
A randomised controlled trial B3222009S560
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Background: Pulmonary rehabilitation (PR) is an excellent therapeutic option in chronic lung diseases, however there are little data on PR in interstitial lung diseases (ILD).

Aims: To report preliminary 3month outcomes of a randomised controlled trial evaluating the effects of PR on exercise capacity (Six Minute Walking Distance, 6MWD; Peak Work Rate, Wmax), quality of life (SGRQ, CRDQ) and muscle force (QF) in 50 ILD patients over 1 year.

Method: Patients were randomly assigned to receive a PR program or usual medical care. Mean changes in outcomes were compared between the study arms.

Results: 3month data are currently available in 34 patients (table 1). 6MWD and Wmax increased significantly in the PR group compared to the control group (mean differences 67m [95%CI 34 to 101m] (figure 1) and 16W [95%CI 5 to 26W]). An improvement in QOL was also observed (SGRQ -12.5 [95%CI -18 to -7] and CRDQ 17.5 [95%CI 12 to 23]). Improvements in QF between both groups did not reached statistical significance (p=0.06).

<table>
<thead>
<tr>
<th>Controls (n=17)</th>
<th>PR (n=17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>65±9</td>
</tr>
<tr>
<td>Gender M/F</td>
<td>7/10</td>
</tr>
<tr>
<td>DLCO (%pred)</td>
<td>41±11</td>
</tr>
<tr>
<td>6MWD (%pred)</td>
<td>78±12</td>
</tr>
<tr>
<td>Wpeak (%pred)</td>
<td>72±27</td>
</tr>
<tr>
<td>QF (%pred)</td>
<td>75±37</td>
</tr>
<tr>
<td>SGRQ (points)</td>
<td>38±17</td>
</tr>
<tr>
<td>CRDQ (points)</td>
<td>86±23</td>
</tr>
</tbody>
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Non-linear exercise training is the preferred training method in patients with severe COPD

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Methods: COPD patients underwent exercise training 3-times/week for 12 weeks and were randomized to either NLE [N=36; FEV1: 31.9±2.0%pred; 61.7±1.7yr; fat-free mass (FFM) index 15.4±2.6 kg FFM/m²] or combined endurance and progressive resistance training (Spruit et al EJR 2002) [EJR N=36; FEV1: 33.9±5.9%pred; 61.5±4.5yr; FFM-index 15.2±2.3 kg FFM/m²]. NLE: resistance training with varying repetition zones based on maximum load (1RM): strength 1-3, 4-6, 8-10 reps, 50-85%1RM; local muscle endurance 12-15, >20 reps, 30-50%1RM; ergometer training with varying intensity zones (%maximum workload Wmax) from maximum exercise test: 60%, 65-80%, 80-85%, >85%.

Results: After 12 weeks cycle endurance time at 75%Wmax increased in both groups with significant larger improvements with NLE training (387.8±158 to 1049±244sec) compared to EPR (384±268 to 631±346sec) p<0.001. The NLE group showed significant larger improvements compared to EPR for dyspnea 1±.6±1.3 vs 0.8±1.2 and fatigue 1±.4±1.6 vs 0.6±1.2 domains of Chronic Respiratory Questionnaire (p<0.01). Both groups showed similar improvements for emotional functioning 0.4±1.3 vs 0.4±1.1 and mastery 0.1±1.2 vs 0.1±1.2.

Conclusion: NLE is the preferred method of exercise training in patients with severe COPD compared to the present guideline based method because of better improvement of both endurance and health-related quality of life.

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Effects of whole body vibration in patients with COPD: A randomized study

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Introduction: Besides conventional resistance training (CRT), whole body vibration (WBV) has been shown to be effective. Effects of WBV in COPD patients have not been assessed so far.

Aim: To compare the effects of WBV with those obtained by CRT on exercise capacity, muscle force and QoL.

Methods: Patients with COPD, referred for pulmonary rehabilitation, were randomized in one of two training groups. Patients in CRT group performed resistance training (n=17) or a control intervention consisting of instructions to be performed at home (n=17).

Results: 70 patients with COPD, showed at baseline an impaired exercise capacity, muscle force and QoL, no significant differences were seen between groups. Both groups improved the exercise capacity, muscle force and QoL over time. There were no significant differences after training.

Conclusion: WBV is a promising training modality, which yielded the same magnitude of training effects as those obtained with CRT.

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Home-based rehabilitation program for lung cancer patients

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Effects of exercise training after lung transplantation: 1 year follow-up of a randomized controlled trial

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In this study we investigated the effects of a 3-months exercise training program that was initiated immediately following hospital discharge after lung transplantation (LTXs). Primary outcomes were participation in daily physical activity and physical fitness after LTXs.

Methods: Patients were randomized after hospital discharge to receive either exercise training (n=17) or a control intervention consisting of instructions to be physically active (n=16). Patients were assessed upon hospital discharge following LTX (baseline) and outcomes of interventions were evaluated 1 year later. Comparisons between groups were adjusted for baseline measurements (ANCOVA). Daily activity was assessed with the DynaPort (McRoberts, The Hague, NL) and the SenseWear Monitor (BodyMedia, Pittsburgh, US).

Results: Age, gender distribution (51% female), Type of LTx (21% single LTx), Age, gender distribution (51% female), Type of LTx (21% single LTx), among whose awaiting for a lung resection surgery (LRS).

Conclusion: This study revealed that exercise training initiated immediately following hospital discharge improves functional recovery up to one year after LTXs.
4-week HBRP including moderate intensity aerobic activities (walking and cycling) and muscular training performed three times weekly. Prior to and after the 4-week HBRP, cardiopulmonary exercise test, six-minute walking test (6MWT) and muscle strength were measured. Patients were asked to complete a diary including adverse events and training information.

**Results:** No adverse event was reported during the rehabilitation program and 7 patients completed ≥75% of the HBRP. In the latter, the cycle endurance test duration (277±70Vs 379±165, p=0.08) and the 6MWT (597±59Vs 624±39, p=0.05) tended to be, or significantly, improved with training. There was a significant improvement in strength of triceps and hamstrings (4±4kg and 10±9kg p<0.05, respectively).

**Conclusion:** In patients with lung cancer awaiting for LRS, home-based rehabilitation was feasible and induced some physiological gains, such as improved exercise tolerance. Tolerance and muscle strength. This may be clinically relevant, because poor exercise capacity is a strong predictor of postoperative complications in this population. Project supported by the Canadian Lung Association.

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**Exercise training improves exercise capacity and quality of life in people with dust-related pleural and interstitial respiratory diseases: A randomised controlled trial**

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The use of exercise training as an option for people with dust-related pleural and interstitial respiratory diseases has not been evaluated. A randomised controlled trial was conducted to determine whether exercise training improved exercise capacity and quality of life in people with dust-related respiratory diseases compared to usual care. The inclusion criterion was a medical diagnosis of a dust-related respiratory disease including asbestosis, silicosis and asbestos related diffuse pleural thickening. Participants were randomised to exercise training (eight weeks, three times per week) or usual care (control). Exercise capacity (six-minute walk test and endurance cycle test) and quality of life (St George’s Respiratory Questionnaire) were measured at baseline and at eight weeks by a blinded assessor. Thirty-six of 37 participants completed the study (mean SD) age 71 (7) years, FVC 86 (20) % predicted, D LCO 56 (14) % predicted. Compared to usual care, exercise training significantly increased six-minute walk distance (mean difference 50 metres, 95% CI 29 to 71), endurance cycle time (mean difference 225 seconds, 95% CI 92 to 359) and significantly improved the St George’s Respiratory Questionnaire Total score (mean difference -7, 95% CI -12 to -1). Improvements in exercise capacity and quality of life reached the minimum clinically important difference established for chronic obstructive pulmonary disease. Exercise training is an effective treatment option for improving exercise capacity and quality of life in people with dust-related pleural and interstitial respiratory diseases.

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**Referrals, attendance, delivery, and response in an integrated pulmonary rehabilitation pathway**

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**Introduction:** Pulmonary rehabilitation is the most effective COPD treatment in improving quality of life. Access to PR is variable and rates of completion are relatively low at 35%. In this study of an integrated system-wide PR service we report on outcome, referral rates, and predictors of attendance and completion.

**Method:** Routine data were gathered prospectively on demographics, rolling or stand alone courses, spirometry, walking distance, quality of life, BMI, and referrals. In patients referred for PR between April 2008 and October 2010. Predictors of attendance and course completion were sought using multiple regression.

**Results:** 1563 patients were referred. 1117 attended for assessment and 593 (38%) completed a PR course. Referral patients were of similar age and sex as the COPD population from which they were referred but were more severely affected. All PR programme types showed significant improvements in walking distance and quality of life, reaching the minimum clinically important difference. Twice weekly courses were more effective. Patients who were depressed (OR 0.75, CI 0.63-0.90), had a higher MRC dyspnea score (OR 0.076, CI 0.63-0.91), were from lower socio-economic groups (OR 0.98, CI 0.97-0.99), or were referred by GPs (OR 0.57, CI 0.35-0.94) were less likely to complete courses. Drop-out was not affected by venue, once or twice weekly courses, or rolling or stand-alone programmes.

**Conclusions:** Pulmonary rehabilitation is effective in real-world clinical practice achieving results comparable to clinical trials. We have identified patients in whom special intervention may be required to overcome the obstacles that place them at greater risk of not completing PR.