

SUNDAY, SEPTEMBER 25TH 2011

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Background: The contribution of quadriceps muscle fatigue to cycling exercise intolerance is well recognized in COPD. Whether muscle fatigue occurs in plantar and dorsi-flexor muscles during walking is still unknown in these patients.

Aim: To compare muscle strength and fatigue induced by walking exercise in plantar and dorsi-flexor muscles between COPD patients and healthy subjects.

Method: Eleven patients with COPD (FEV1 58±15%pred.) and 11 healthy subjects matched for age and BMI performed a 12-minute walking exercise. The speed and slope of the treadmill were adjusted to achieve a targeted 40 Kcal energy expenditure for each subject. Maximal voluntary contraction (MVC) and twitch force (Tw) measured by magnetic stimulation were obtained for plantar and dorsi-flexor muscles prior to and 15 minutes after exercise.

Results: At rest, MVC and Tw tended to be lower in COPD patients compared to healthy subjects for plantar (51.5±12.8 vs 65.6±21.7 kg, p=0.08 and 10.9±3.7 vs 13.2±2.6 kg, p=0.09) and dorsi-flexor (24.8±10.7 vs 32.7±8.4 kg, p=0.06 and 4.2±1.4 vs 6.12±1.3 kg, p<0.05) muscles. In COPD patients both, MVC and Tw were significantly decreased 15 min after exercise for plantar-flexor (-8±10% and -15±21%, p<0.05) and for dorsi-flexor (-6±11% and -31±19%, p<0.05) muscles. There was no difference in healthy subjects post-exercise for either plantar-flexor (1±10% and -4±14%), or dorsi-flexor muscles (1±3% and 4±7%).

Conclusion: Muscle weakness and a susceptibility to develop muscle fatigue after walking occur in the plantar and dorsi-flexor muscles in patients with COPD compared to controls.

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P1256

Upper and lower limbs muscle in patients with COPD: Similar muscle efficiency but differences in resistance to fatigue

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Background: It is still controversy whether the impairment of muscle function is homogeneous between the upper and lower limbs in patients with COPD.

Objective: To compare muscle function between quadriceps femoris (QF) and middle deltoid (MD) after a fatigue protocol and also the recovery time fatigue.

Methods: Twenty-one patients (VEF₁: 46±10% predicted) performed for both muscles: maximum voluntary isometric contraction (MVIC) pre and post 10, 30, 60min and 24h after completing an isometric endurance test (IET, 60%MVIC). All measurements were made with surface electromyography (sEMG) recording. For the temporal analysis the amplitude of the sEMG signals was expressed as root mean square (RMS, 1-s moving window), normalized by MVIC and then, the RMS EMG was integrated (iEMG). For the time-frequency analysis, EMG data were analyzed with a FFT applied to 1-s epochs and the median frequency (MF) of the spectrum for each epoch was obtained. Mid-arm and mid-thigh muscle mass were estimated from anthropometric measurements.

Results: No significant difference was observed between muscles when MVIC was corrected for muscle mass. The endurance time differed significantly between MD and QF (50±40s vs 127±77s). During IET, iEMG increased significantly just for QF but a significant reduction in MF was observed for QF [92.7 (90.4–94.2) vs 88.5 (85.4–89.4)] and MD [89.5 Hz (81.7–91.0) vs 73.5 Hz (67.4–83.6)]. A significant reduction in MVIC after IET was observed just for MD at moments 10, 30, 60 minutes and it was recovered in 24h.

Conclusion: Despite similar muscle efficiency (strength/muscle mass), muscle fatigue was early and more pronounced for MD.

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How should we measure arm exercise capacity in COPD? A systematic review

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Background: There are no recommendations on how to measure arm exercise capacity in individuals with chronic obstructive pulmonary disease (COPD). The objectives of this study were to: (i) synthesize the literature on measures of arm exercise capacity in individuals with COPD; (ii) describe the psychometric properties and the target construct of each measure and (iii) make recommendations for clinical practice and research.

Methods: Studies conducted in COPD that included a measure of arm exercise capacity were identified after searches of 5 electronic databases (MEDLINE, CINAHL, EMBASE, Physiotherapy Evidence Database and Cochrane Library) and reference lists of pertinent articles. One reviewer performed data extraction and two assessed quality of studies that described measurement properties using the Consensus-based standards for the selection of health measurement instrument.

Results: Of 654 reports, 41 met the study criteria. Five types of arm exercise tests were identified: arm ergometry, ring shifts, dowel lifts, proprioceptive neuromuscular facilitation, and activities of daily living (ADL) tests. Four studies assessed measurement properties of the Unsupported Upper Limb Exercise test (UULEX), 6-minute Pegboard and Ring test (6PBRT), a test involving weight shifts and

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Lower limb fatigue, during walking in patients with COPD

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the Grocery Shelving Task (GST). Validity studies were of fair to good quality, whereas reliability studies were of poor quality.

Conclusions: Arm ergometry may be best for measuring peak arm exercise capacity and endurance during supported exercises, while the UULEX, 6PBRT and GST may better reflect ADL and should be the tests of choice to measure peak unsupported arm exercise capacity (UULEX) and arm function (6PBRT and GST).

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Work of walking in cystic fibrosis

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Aim: The work of walking (WOW) can be a better outcome measure of functional capacity. The aims of this study were to compare WOW between patients with cystic fibrosis (CF) and healthy controls, and to determine the factors affecting WOW during 6-minute walk (6MWT) in patients with mild cystic fibrosis.

Materials and methods: Twenty-five mild CF patients (FEV1 88.6±19.2%, 12.6±3.3 years) and 20 healthy subjects (13.8±4.5 years) participated in this study. 6MWT was performed, and WOW calculated as body weight×6MWT distance. Peripheral muscle strength (knee extensors, shoulder flexors, hand grip) were assessed using a dynamometer. Inspiratory and expiratory muscle strength (MIP and MEP) were determined with a mouth pressure device. Fat free mass percent (%FFM) was assessed using skinfold method. Health status was determined with Childhood Health Assessment Questionnaire (CHAQ).

Results: Lung function, WOW, and quadriceps muscle strength were significantly lower in CF patients as compared to healthy subjects (p<0.05). The WOW in 6MWT was significantly related with knee extensor strength (r=0.71), shoulder flexor strength (r=0.65), hand grip strength (r=0.78), MIP (r=0.52), MEP (r=0.64), %FFM (r=0.38), CHAQ activities of daily living (r=-0.56) and total scores (r=-0.47, p<0.05). Quadriceps muscle strength and MEP explained 82% variance in WOW in 6MWT.

Conclusion: Quadriceps muscle strength and WOW decrease in mild CF patients. The WOW performed during a functional capacity test is related to peripheral and respiratory muscle strength, health status, and body composition in CF. Quadriceps muscle strength and MEP are the independent factors determining WOW in CF patients. The work of walking can be used as outcome measure in these patients.

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Six minute walk test in obese children and adolescents

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Background: Six minute walk test (6MWT) is an accessible tool to evaluate the submaximal physical capacity. There are few studies that evaluate the 6MWT in obese children and adolescents.

Aim: To compare the performance of obese and healthy children and adolescents in the 6MWT analyzing the walked distance (WD), the work (W) and the physiological cost.

Method: Comparative, analytical and cross sectional study including, eighty four subjects (28 obese and 56 eutrophic) with age between 5.7 and 16.8 years. Obesity was defined according to CDC standards (IMC≥p95). Subjects with respiratory diseases were excluded. The 6MWT followed the ATS guidelines.

Results: The obese subjects walked a significantly shorter distance than the eutrophic subjects in the 6MWT (p=0.00). The W (W=body weight X WD) in the obese group was significantly higher than the healthy group (p=0.00). There were not differences between the groups in the PC (PC=ΔHeart Rate/Median Velocity). Mann-Whitney test was used to compare the groups.

Conclusion: The worse performance in the obese group must be associated to a limitation in the physiological mechanisms involved in the exercise and the excessive charge that difficult the performance. It is necessary more studies in order to define the limiting mechanisms in the physical performance in obese children and adolescents during the walking.

P1260

An adaptation of Chester step test for use in patients with COPD

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The work rate increment during Chester step test (CST) could limit its use in patients with COPD who present a wide range of exercise tolerance at similar levels of pulmonary impairment.

Objective: To compare exercise tolerance time, cardiopulmonary stress, and perception of effort between CST and a modified incremental step test (MIST).

Methods: Thirty-two patients with COPD (FEV₁: 50±15% of predicted) underwent the CST and MIST at the same day, an hour apart, on a single step (20 cm of high). Both tests were externally paced by sonorous stimulus previously recorded on a CD. CST started with a rhythm of 15 steps/minute and increments of five steps were performed every two minutes, with a total time of ten minutes. MIST started with 10 steps/minute and increments of one step every 30 seconds until the limit of tolerance.

Results: CST had shorter duration than MIST (4±2 min vs 6±3 min, respectively; P < 0.05) and also lower total number of steps (77±51 vs 103±60, P < 0.05). However, similar cardiopulmonary responses were observed at peak: VO₂ (1.22±0.59 L/min vs 1.24±0.55 L/min), VE/MVV (0.63±0.14 vs 0.61±0.14), HR (86±13% vs 85±13%) and SpO₂ (87±7% vs 87±6%). Dyspnoea and leg fatigue did not differ between tests.

Conclusion: Although a slower work rate increment during MIST has determined a higher exercise tolerance, cardiopulmonary stress and perceived exertion at peak exercise were equivalent between CST and MIST.

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Stepping determines greater oxygen desaturation than cycling in patients with COPD

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Background: It has been shown that walking is more sensitive to detect exercise-induced desaturation than cycling in patients with COPD. However, it is unknown whether the same phenomenon occurs between stepping and cycling.

Objective: To compare exercise-induced desaturation and metabolic and ventilatory adaptations during stepping and cycling.

Methods: Twenty-one patients with COPD (FEV₁: 47±13% predicted) underwent, on different days, the maximal cardiopulmonary exercise testing (CPET) and incremental step test (IST) performed on a cycle ergometer and a 20-cm bench, respectively. During CEPT, the work rate (WR) was continuously increased (5–15 W.min⁻¹). IST started with 10 steps/minute and increments of one step every 30 seconds until the tolerance limit. Pulse oximetric saturation (SpO₂) was recorded every minute in both tests and desaturation was considered a fall ≥ 4% from resting SpO₂.

Results: IST induced a higher desaturation compared to CEPT (-6±4.5% vs -3±3%). Seven patients presented desaturation at IST but not at CPET while two patients showed the opposite. Desaturation in both tests and non desaturation in either tests were observed in five and seven patients, respectively. Among the metabolic and ventilatory variables measured at peak exercise, higher oxygen uptake and lower ventilatory equivalent for oxygen were observed for IST as compared with CEPT (1.3±0.4 L/min vs 1.2±0.4 L/min and 33.5±7.4 vs 36.3±7.8; P < 0.05).

Conclusion: The desaturation was detected only during IST in 33% of patients. VO₂ peak is higher, ventilatory demand is lower and desaturation more pronounced during stepping than cycling.

P1262

Quality of life and functional capacity in heart failure patients

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Introduction: Patients with heart failure (HF) show a progressive disability and decline in quality of life, both related to dyspnea and fatigue. Thus, there is a growing interest in measuring quality of life (QoL), either with generic instruments, such as the 36-item Short-Form Health Survey (SF-36), or with specific ones, such as the Minnesota Living with Heart Failure Questionnaire (MLHFQ).

Objective: This study aimed to investigate which QoL questionnaire, SF-36 or MLHFQ, best expresses the functional capacity in HF.

Methods: We used the SF-36 and MLHFQ for assessment of QoL. For assessment of functional capacity, we used the cardiopulmonary test, on a treadmill, using the Weber protocol, and the distance walked during the six-minute walk test (6MWT).

Results: 46 patients diagnosed with HF (22 men, mean age 52 years), Class II and III of the New York Heart Association. We observed a significant correlation between the physical and emotional domains of the SF-36 and VE/VCO₂ peak (r = -0.3, p < 0.05) and the distance walked in 6MWT (r = 0.4, p < 0.05), respectively. We also observed significant correlations of total score MLHFQ with peak VO₂ (r = -0.5, p < 0.05), anaerobic threshold (r = -0.4, p < 0.05) and distance on the 6MWT (r = -0.5, p < 0.05).

Conclusion: The MLHFQ had higher correlation values when considering the variables of cardiopulmonary exercise testing and the distance walked in 6MWT compared to the generic instrument for assessing quality of life, the SF-36.

P1263**The minimal important difference of the pulmonary functional status and dyspnea questionnaire – Modified version in patients with COPD**

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Background: The modified version of the Pulmonary Functional Status and Dyspnea Questionnaire (PFSDQ-M) is commonly used in COPD to obtain information about their symptoms and functional status. It has been shown to be responsive to change following pulmonary rehabilitation. The minimal important difference (MID) of the PFSDQ has never been established.

Aim: To establish the MID of PFSDQ-M using different approaches.

Methods: 416 patients with COPD (FEV₁ 42±15%pred) completed the PFSDQ-M before and after a 3-month pulmonary rehabilitation program (ΔCRDQ +16±12points, Δ6MWD +45±89m, both p<0.001). The correlation between the ΔPFSDQ-M and the anchors ΔCRDQ and Δ6MWD was calculated. When r ≥ 0.3 linear regression analyses were performed to predict the MID from these anchors (i.e. establish the ΔPFSDQ corresponding with 10points ΔCRDQ, 2.5points ΔCRDQdys, 30m Δ6MWD). We also applied the distribution-based Cohen's effect size technique to confirm the MID.

Results: Anchor and distribution - based methods estimates are summarized in Table 1.

Table 1

Method	MID of PFSDQ-M (95% CI)	Score
Anchor based		
CRDQ dyspnea score (MID=2.5)	-5 (-6 to -3)	Activity
	-4 (-5 to -2)	Dyspnea
	-3 (-4 to -1)	Fatigue
CRDQ total score (MID=10)	-4 (-7 to -2)	Activity
	-4 (-6 to -1)	Dyspnea
	-3 (-5 to -1)	Fatigue
6MWD (MID=30)	-6 (-7 to -4)	Activity
Distribution based		
Cohen effect size: activity, dyspnea, fatigue	-3	

Conclusion: The MID of the PFSDQ-M ranged from - 3 to -6 points in patients with moderate to very severe COPD. The estimate was similar with both statistical techniques.

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P1264**The modified version of the pulmonary functional status and dyspnea questionnaire: A valid measure to evaluate functional status in patients with COPD**

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Background: The modified version of the Pulmonary Functional Status and Dyspnea Questionnaire (PFSDQ-M, Lareau et al., *Heart & Lung* 1998; 27(3):159-168) is a reliable tool which aims to evaluate perceived functional status in patients with chronic obstructive pulmonary disease (COPD).

Aim: To establish the relationship between PFSDQ-M score and different objective measures reflecting different aspects of functional status.

Methods: PFSDQ-M (total score, subdomains change in daily activities compared to the period before disease onset, dyspnea and fatigue symptoms related with daily activities), daily number of steps (Dynaport Minimod, McRoberts, the Netherlands), six-minute walking distance (6MWD) and isometric quadriceps strength were assessed in 40 patients with COPD (age 67±7 yrs, FEV₁ 46±16%pred). Pearson correlations were computed between questionnaire outcomes and direct measurements related with functional status.

Results: Daily number of steps, 6MWD and quadriceps force were 3126±2601, 66±17%pred and 72±19%pred respectively. Total score and different subdomains of PFSDQ-M were significantly related with daily steps, 6MWD and quadriceps strength (table).

PFSDQ-M	Daily steps	6MWD	Quadriceps strength
Total	-0.37*	-0.51**	-0.45**
Activities	-0.37*	-0.51**	-0.44**
Dyspnea	-0.36*	-0.50**	-0.41*
Fatigue	-0.36*	-0.49**	-0.49**

*p<0.05, **p<0.01.

Conclusion: These findings add to the validity of the PFSDQ-M as a subjective tool to evaluate functional status in patients with COPD.

P1265**Anxiety and depression in patients referred for pulmonary rehabilitation**

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Introduction: Psychological morbidity is well recognised in chronic respiratory disease, but the effect of uptake, completion and response to pulmonary rehabilitation (PR) is unknown.

Method: In 3000 consecutive patients referred to an 8-week outpatient PR program, the Hospital Anxiety and Depression Score (HADS) was used to assess symptoms of anxiety and depression. A HADS domain score of ≥11 identified patients with moderate levels of anxiety and depression. Subsequent uptake and compliance with PR was recorded. Pre- to post-PR changes in incremental shuttle walk (ISW) and self-reported Chronic Respiratory Disease Questionnaire (CRDQ) were compared between those with moderate anxiety (ANX) or moderate depression (DEP), and those without, defined as HADS ≤7 (NA and ND).

Results: 71 (23.5%) and 59 (19.5%) patients had evidence of moderate anxiety and depression respectively. 22 (31%) of ANX and 21 (36%) of DEP either failed to start or complete PR. Despite similar FEV₁% predicted, ANX had significantly impaired baseline ISW (median 100 vs. 180 m; p<0.01) and health status (CRDQ-SR 55 vs. 86) compared to the NA group. There was no significant difference in median pre- to post-PR change in ISW and CRDQ between ANX and NA completers. Similarly, the DEP group had comparable FEV₁% predicted to ND, but had significantly impaired baseline median ISW (90 vs. 200 m; p<0.01) and mean CRDQ (53 vs. 84; p<0.01). However ISW and CRDQ response to PR was similar between DEP and ND.

Conclusion: Significant psychological morbidity is prevalent in patients referred to PR. Over 30% fail to start or complete PR. These patients also have impaired exercise capacity and quality of life, but completers respond normally to PR.

P1266**Breathlessness is associated with lower completion rates of pulmonary rehabilitation classes**

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Background: It is important to develop specific approaches to improve completion rates in pulmonary rehabilitation (PR). Currently, it is not clear what parameters predict completion & non-completion. We hypothesised that specific demographic parameters are associated with completion rates of PR.

Methods: Respiratory patients who commenced PR classes at the Royal Brompton Hospital from September 2007 were included. At assessment we recorded age, MRC dyspnoea score, FEV₁(% pred), FVC & body mass index. Completion was defined as attendance of 12 or more out of 16 sessions. T-tests and logistic regression tests were performed on the variables.

Results: Data was available for 167 patients (77 females, mean (SD) age 66 (9.7) yrs, FEV₁ 1.15 (0.6) litres (46.1% pred (21.3)), MRC 3 (1). We included a range of diseases (122 COPD, 16 bronchiectasis, 12 asthma, 14 restrictive disease and 3 normal spirometry). The 105 patients who completed PR had a lower baseline MRC dyspnoea score, which was significant. The remaining tested parameters were not independently associated with completion rate. Of the non-completers 37% failed to attend classes and 21% stopped due to an exacerbation. Completion rates were not different in those with or without COPD.

Demographics of patients in the completion and non-completion groups

	Completers (n=105) Mean (SD)	Non-completers (n=62) Mean (SD)	P value
Age (yrs)	66.8 (9.9)	64.8 (9.2)	0.19
MRC	3.2 (0.9)	3.5 (1.1)	0.035*
BMI (kg/m ²)	27.1 (5.6)	27.4 (6.8)	0.76
FEV ₁ (l)	1.15 (0.61)	1.14 (0.65)	0.95
FEV ₁ (% pred)	46.7 (22.4)	45.2 (19.2)	0.65
FVC (l)	2.37 (0.89)	2.36 (0.91)	0.95

Conclusion: A more tailored approach to improve completion rate of PR classes may need to focus on the more breathless & exacerbating patients.

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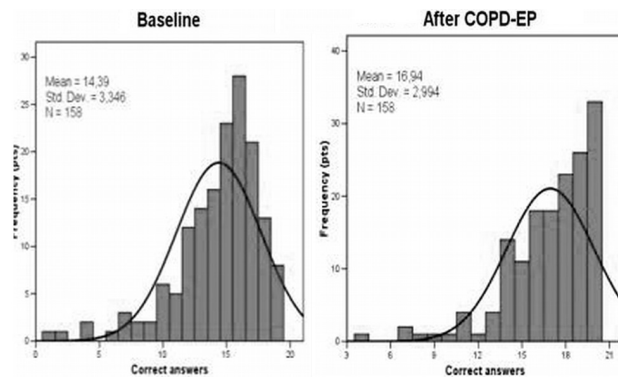
P1267**Feasibility and effectiveness of an educational program in COPD (COPD-EP)**

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Introduction: Self-management is essential to improve outcomes and to reduce social costs in COPD patients. This may be obtained through a specific education. **Aim:** We tested a hospital-based COPD-EP aiming at evaluating: 1) the basal patients' knowledge on disease and therapies, 2) the feasibility of the program, 3) the program learning effect.

Methods: COPD patients with a Mini-Mental State Examination (MMSE) score > 20 were included. All subjects received a written brochure and attended seven 30-min educational group sessions. A multidisciplinary team was in charge for education. A multiple-choice 20-item questionnaire (KI) to test the learning effect was administered pre and post EP.

Results: One-hundred-fifty-eight patients (71±8 years) of different degree of severity were included and completed the study in six different hospitals. The number of correct answers (from 14,4±3,3 to 16,9±2,9) and the rate of patients who correctly answered to all questions (from 5,1% to 21,5%) significantly improved post EP. Figure shows the frequency distribution of correct answers pre (left panel) and post (right panel) program.



Conclusion: The level of knowledge on the disease seems to be quite sufficient in this population of COPD. Nonetheless, our program is highly feasible and may determine a further gain in the educational level of the patients. These preliminary data warrant future research to validate specific learning instruments and/or strategies.

P1268**Larger improvements in endurance capacity in fat-free mass depleted COPD patients by non-linear resistance training**

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COPD patients with wasting of fat-free mass (FFM) are characterized by skeletal muscle weakness. Progressive linear resistance training with a moderate number of repetitions (8-10) and high intensity 70% 1RM (maximum load) leads to improvements in muscle strength and exercise performance. Non-linear resistance training (NLR) with variation or periodization (i.e. programmed daily variation in the training stimuli) has shown to enhance training effects in healthy subjects. Therefore, we studied the effects of a 6-week non-linear resistance training program in FFM depleted COPD patients.

Methods: COPD patients (FEV₁ <50%pred) were randomized to 3 times/week NLR alone [N=26, FFM-index 13.8±1.1 (kg FFM)/m², FEV₁ 32±9.4%pred, 59±7.6yr] or combined endurance and progressive resistance training (Spruit et al ERJ 2002) [EPR; N=28, FFM-index 14±1.3 (kg FFM)/m², FEV₁ 33±10.3%pred, 60±5.3yr]. NLR uses varying loading schemes on a daily basis to train relevant neuromuscular components (strength [1-3, 4-6, 8-10 repetitions, ≥50% 1RM]; local muscular endurance [12-15, >20 repetitions, 30-50% 1RM]).

Results: After 6 weeks a significant larger improvement in cycle endurance time (75%Wmax) was found in NLR (391±177 to 858±369sec) compared to EPR (379±295 to 521±346sec), p<0.001. Significant larger improvements were found for all domains of the Chronic Respiratory Questionnaire in the NLR group: dyspnea 1.2±0.9 vs 0.6±0.9, fatigue 1.1±1 vs 0.6±0.8, emotional functioning 1±0.8 vs 0.4±0.7, mastery 0.9±0.8 vs 0.2±1.1; all p<0.05.

Conclusion: NLR muscle training optimizes exercise and muscle training programs in patients with low FFM and more advanced COPD.

P1269**P1270**

Conclusion: NLR muscle training optimizes exercise and muscle training programs in patients with low FFM and more advanced COPD.

P1270**The effect of pulmonary rehabilitation programme in patients with pulmonary sarcoidosis**

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Background: Pulmonary rehabilitation (PR) has proven effective in treatment of COPD patients. The effectivity of PR in patients with pulmonary sarcoidosis remains unclear and therefore there is a need for further research.

Aim: To evaluate the effect of PR on breathing pattern and health-related quality of life (HRQL) in patients with pulmonary sarcoidosis.

Methods: There were 10 patients with pulmonary sarcoidosis recruited to the 6-week PR programme. The assessment included lung function tests, maximal inspiratory (MIP) and expiratory (MEP) mouth pressures, chest expansion (CE), 6-minute walking test (6MWT) and HRQL by Sarcoidosis Health Questionnaire (SHQ). The evaluation was performed at baseline and after six weeks. The PR programme consisted of respiratory physiotherapy, soft tissue techniques and regular physical activity.

Results: The mean age of patients was 45.9±14.1 years with stages I, II and III of the disease (2, 7 and 1 patient respectively). Six patients were undergoing PR programme simultaneously with corticotherapy. Lung function tests showed normal values in all patients at baseline and after PR.

	Baseline	After PR	p value
MIP (% predicted)	79.9±25.4	105.9±23.8	0.012
MEP (% predicted)	65.4±16.7	78.4±18.7	0.012
CE at 4th intercostal space (cm)	5.17±1.6	6.92±3	0.013
CE at xiphoid process (cm)	5.34±1.9	7.12±2.3	0.022
6MWT (m)	577.4±88.6	624±56	0.008
SHQ (total score)	4.76±0.99	5.14±1.05	0.022

Conclusion: Patients with pulmonary sarcoidosis can benefit from a PR programme, as it improves chest expansion and strength of breathing muscles, which plays an important role in the physical fitness level and is further reflected in an improved HRQL of the patients. Supported by Palacky University, FTK_2010_004.

P1271**The effect of an 8-week outpatient rehabilitation programme on chest expansion and ventilatory parameters in patients with COPD**

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Background: Dysfunction of the breathing mechanisms could lead to an increased

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Abstract P1271 – Table 1

	COPD pre	COPD post	p value (pre–post COPD)	Control	p value (COPD pre–Control)	p value (COPD post–Control)
CE at 4th intercostal level (median, cm)	3.05	4.34	p<0.01	4.81	p<0.01	p>0.05
CE at xiphoid process (median, cm)	2.25	3.15	p<0.01	3.9	p<0.01	p>0.05

inspiratory effort and to a higher prevalence of breathing disorders during activities of daily living in patients with COPD.

Aim: To assess whether patients with COPD have different chest expansion (CE) in comparison with healthy controls and whether the rehabilitation programme (RP) can influence CE and ventilatory parameters in COPD patients.

Methods: The examined group consisted of 36 medically stable adults with COPD (aged 62.9±6.7 years, stage II) who have undergone an 8-week outpatient RP (breathing and postural control exercises, airway clearance techniques and soft tissue techniques) and 30 healthy controls (aged 63.5±3.0 years). Lung function test and CE were measured at baseline and after 8 weeks.

Results: COPD patients had significantly reduced CE in comparison with control group at baseline. CE was significantly higher after RP in patients with COPD and there was no significant difference among control group and COPD patients after RP.

There was an improvement of ventilatory parameters in COPD patients after RP, although the severity of the peripheral airway obstruction remained at the same level.

	Mean improvement (%)	p value
VC	9.4	p<0.01
FEV1	9.1	p<0.01
PEF	10.3	p<0.01
MEF25	3.4	p>0.05
MEF50	7.5	p=0.05

Conclusion: Our results show that physiotherapy treatment approaches can influence chest mobility and improve breathing mechanisms in COPD patients.

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The effects of an 8 week pilot community pulmonary rehabilitation programme on exercise tolerance and quality of life

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Introduction: Hospital gyms have been common sites for pulmonary rehabilitation programmes, however they are high in demand and weekly availability can be limited [1]. Pulmonary rehabilitation in a community environment may enable more patients to access this essential component of care. The aim of this pilot community pulmonary rehabilitation programme was to examine its effects on quality of life and exercise tolerance.

Methods: Seven patients (3 female, 4 male) from the SJH pulmonary rehabilitation waiting list were included in the programme. All underwent an 8-week programme (8 supervised sessions, 16 unsupervised home sessions) of exercise training and education. Subjects were assessed at baseline and on programme completion on measures of exercise capacity (6MWT) and quality of life (Chronic Respiratory Questionnaire).

Results: Six patients (3 female, 3 male) completed the programme-mean age 66.6 years, mean% predicted FEV1 43.8%. The mean number of classes attended was 7 and mean number of home sessions completed was 9. On completion of the programme there was a significant increase in the 6MWT of 75.5metres, a significant decline in the fatigue domain of the CRQ (4.6 to 4.1) and no other significant changes in the CRQ.

Conclusion: Results of this pilot study support the potential role of community pulmonary rehabilitation programmes in improving exercise tolerance in patients with chronic respiratory disease.

References:

[1] Ward JA, Akers G, Ward DG, Pinnuck M, Williams S, Trott J et al. Feasibility and effectiveness of a pulmonary rehabilitation programme in a community hospital setting. *British Journal of General Practice* 2002; 52(480):539-542.

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Pulmonary rehabilitation: Are the effects similar in populations from different countries?

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Background: There are no studies investigating whether differences in socioeco-

nomics, ethnic or climate characteristics could interfere with outcomes of pulmonary rehabilitation (PR) programs.

Objective: To compare the training effects of similar exercise training programs applied to two groups of patients with chronic obstructive pulmonary disease (COPD) living in different world regions: one from Western Europe (Belgium) and another from South America (Brazil).

Methods: 564 patients with moderate to severe COPD (45 in Brazil and 519 in Belgium) underwent similar high-intensity outpatient PR programs. Baseline values and their respective post-training changes of pulmonary function, exercise capacity, physical activities in daily life, respiratory muscle force, health-related quality of life (HRQoL) and functional status were compared between centers.

Results: Patients were matched for age, BMI and FEV₁. Baseline differences were found in the 6-minute walking test (67±12%pred in Brazil vs 57±20%pred in Belgium; p<0,01), expiratory muscle force (96±28cmH₂O in Brazil vs 143±48cmH₂O in Belgium; p<0,01) and functional status (all domains had better scores in Brazil in the Modified Pulmonary Functional Status and Dyspnea questionnaire; p<0,01). After 3 months of training, only the dyspnea domain of the Chronic Respiratory Disease questionnaire showed significant difference between centers (0,50 [-2 – 5] in Brazil vs 5 [2 – 8] in Belgium; p<0,01).

Conclusions: Similar PR programs applied in populations from different countries yield similar improvements in exercise capacity, respiratory muscle function, functional status and most HRQoL outcomes. Dyspnea was more enhanced in Belgian patients.