P1895
Does a predominant clinical COPD phenotype predict different outcome responses to pulmonary rehabilitation?
Ilenia Presi, Giulia Innocenti Bruni, Emanuele Vulpio, Barbara Lanini, Isabella Romagnoli, Claudia Coli, Barbara Binizzi, Lorelana Stendardi, Francesco Gigliotti. Section of Respiratory Rehabilitation, Fondazione Don Gnocchi IRCCS, Firenze, Italy

Introduction: A new multivariate model, using HRCT as a criterion standard, based on variables collected at rest has been proposed to identify two or more relevant phenotypes of COPD, emphysema (E) and chronic bronchitis (BC) (Pistolesi et al. Respir Med 2008;102:367-76). The aim of the study is to verify whether two distinct COPD groups whose characteristics correspond to either an airway obstructive or a parenchimal destructive COPD phenotype exhibit different outcome responses to a pulmonary rehabilitation program.

Methods: In 55 BC and 38 E patients we assessed the outcome responses to a pulmonary rehabilitation program (PRP): chronic exertional dyspnea (MRC, BDI and TDI), leg and arm ergometry, and exercise dyspnea by Borg scale during 6mWT. Four cluster descriptors of the language of dyspnea (work/effort, inspiratory difficulty, shallow breathing and expiratory difficulty) allowed the qualitative assessment of the symptom.

Results: At baseline, age, BMI, FEV1 and DLco were lower, while FRC and TLC were higher in E. 6mWT, Borg, SGRQ and ergometry were similar in E and BC. Frequency of response for inspiratory difficulty cluster during 6mWT was significantly greater in E than in BC. PRP significantly improved most outcomes, similarly in the two groups, but neither in E nor in BC did significantly modify the frequency of response of cluster descriptors.

Conclusion: PRP allowed both COPD groups to improve similarly health status and exercise tolerance and to modify the intensity but not necessarily the quality of dyspnea.

P1896
Efficacy of pulmonary rehabilitation in patients with interstitial lung disease
Atsuhito Nakazawa1, Eri Hagihara2, Ou Yamaguchi1, Ryos Ogata1, Takashi Shimohara3, Yusuke Matsumoto3, Kaori Yumura1, Takuma Sasaki2, Takashi Ogura1. 1Department of Respiratory Medicine, Kanagawa Cardiovascular and Respiratory Center, Yokohama, Japan; 2Department of Rehabilitation Medicine, Kanagawa Cardiovascular and Respiratory Center, Yokohama, Japan

Objectives: There are few reports describing the efficacy of pulmonary rehabilitation (PR) in patients with interstitial lung disease (ILD). We studied whether PR could improve functional status in a group of patients with ILD.

Methods: PR was carried out for 12 weeks for clinically stable outpatients of our institute. Fifteen patients with ILD were enrolled in this prospective study. Six-minute walking test (6MWT), lung function test and evaluation of health-related quality of life including SGRQ were performed before and after the program. 6MWT and lung function test were also evaluated in 18 ILD patients without PR program with an interval of 12 weeks and compared with ILD patients who completed the program.

Results: There was no significantly improved factor with the program in patients with ILD. %FVC (67.3% to 62.6%, p<0.05) and body weight (64.9 kg to 63.7 kg, p<0.05) were significantly decreased contrary to expectations. However, 6-minute walking distance (6MWD) was slightly improved after the program (369.3 m to 382.7 m) in contrast to the significant decrease in ILD patients without PR (409.4 m to 375.8 m, p<0.05). Statistically significant difference was confirmed in the amount of change in 6MWD in these two groups (13.3 m vs. -33.5 m, p<0.05). Despite that ILD patients with PR had lower lung function than those without PR at the initiation of the study, PR was effective to keep the exercise performance from deteriorating.

Conclusions: Our results show that PR prevents the deterioration of functional status in patients with ILD. PR should be considered as a standard of care for ILD patients.
P1897

Effect of interval training on the BODE index, SF-36, EuroQol and St-George’s Respiratory Questionnaires scores in COPD patients across GOLD stages I-IV

Vassilis Andrianopoulou1, Stavroula Sptselioti2, Alexandra Chatzi3,
Nikolaos Chrimizis4, Ioannis Nasi5, Theodora Vasiliouanakopoulou6, Anastasia Fanagopoulou7, Emmanouela Kostaki7, Georgia Koutsoflini8, Nikolaos Koulouri9, Ioannis Vogiatzis10,11, Department of Respiratory Medicine, Pulmonary Rehabilitation Unit, National and Kapodistrian University, Athens, Greece; 2Department of Physical Education and Sports Science, National and Kapodistrian University, Athens, Greece; 3Department of Physiotherapy, Technological Educational Institute, Lamia, Greece

In COPD patients, functional capacity, health-related quality of life and health status are respectively assessed by the clinical tools of BODE index, SF-36, Euro-Qol and St-George’s Respiratory Questionnaires. Interval training as a therapeutic modality elicits substantial physiological effects; however, the impact of interval training to those tools across the whole spectrum of COPD severity still remains unknown.

Objective: To investigate whether beneficial effect of interval training is reflected to BODE and the 3 Questionnaires in GOLD stages I-IV.

Methods: In a large cohort of 106 COPD patients, rehabilitative intervention and control groups consisted of 71 and 35 patients, respectively. Exercise training involved 30min cycling by alternating 30-s exercise intervals at 100%Wpeak with 30-s rest and large-muscle group resistance training for a period of 10 weeks, 3-times/week.

Results: Interval training significantly improved the clinical condition of patients across GOLD stages II (BODE:1.9 vs 1.1, SF-36pcs:38.5 vs 44.9, SF-36scs:43.7 vs 49.3, Euro-Qol-VAS:54.1 vs 70.8, St-George’s:50.5 vs 38.9), III (BODE:3.8 vs 2.1, SF-36pcs:38.5 vs 43.0, SF-36scs:40.1 vs 47.4, Euro-Qol-VAS:45.6 vs 65.5, St-George’s:52.6 vs 40.4), IV (BODE:5.7 vs 4.1, SF-36pcs:33.1 vs 40.9, SF-36scs:33.2 vs 40.6, Euro-Qol-VAS:40.4 vs 58.2, St-George’s:60.1 vs 46.2). (P<0.05) No significant changes were found for patients in GOLD stage I and the control group.

Conclusions: Beneficial effects of interval training in functional capacity, health-related quality of life and physical status are reflected by improved clinical condition of patients in GOLD stages II-IV.

P1988

Pulmonary rehabilitation in patients with sarcoidosis – First results of the SGQR (total score) 38.2 ± 0.78, 22.6 ± 0.73 (p-value < 0.001)

Konrad Schlieter1, Renate Braune1, Bernd Quaader1, Wilhelm Buchbinder1, Heike Buhler-Schiltz,2 Stefan Humeiml,3 Ulrich Tonnemann,4 Jochen van der Meyden5, Anika Groeben,6 Tanja Schleef7,8,9,10,11

Background: PR leads to behaviour modification. These data suggest a high impact of rehabilitation on health related outcomes in sarcoidosis. Sponsoring by Sankdose Stiftung and Deutsche Lungenstiftung e.V.

Objective: To investigate whether beneficial effect of interval training is reflected to BODE and the 3 Questionnaires in GOLD stages I-IV.

Methods: In a large cohort of 106 COPD patients, rehabilitative intervention and control groups consisted of 71 and 35 patients, respectively. Exercise training involved 30min cycling by alternating 30-s exercise intervals at 100%Wpeak with 30-s rest and large-muscle group resistance training for a period of 10 weeks, 3-times/week.

Results: Interval training significantly improved the clinical condition of patients across GOLD stages II (BODE:1.9 vs 1.1, SF-36pcs:38.5 vs 44.9, SF-36scs:43.7 vs 49.3, Euro-Qol-VAS:54.1 vs 70.8, St-George’s:50.5 vs 38.9), III (BODE:3.8 vs 2.1, SF-36pcs:38.5 vs 43.0, SF-36scs:40.1 vs 47.4, Euro-Qol-VAS:45.6 vs 65.5, St-George’s:52.6 vs 40.4), IV (BODE:5.7 vs 4.1, SF-36pcs:33.1 vs 40.9, SF-36scs:33.2 vs 40.6, Euro-Qol-VAS:40.4 vs 58.2, St-George’s:60.1 vs 46.2). (P<0.05) No significant changes were found for patients in GOLD stage I and the control group.

Conclusions: Beneficial effects of interval training in functional capacity, health-related quality of life and physical status are reflected by improved clinical condition of patients in GOLD stages II-IV.

P1900

Prescribing exercise in advanced COPD: Training smart, not just hard! Peter Klim1, Anten Van Kempen2, Monique Legrand3, Jochen van der Meyden4, Henrik van Stee5, Department of Pulmonology, Merem Treatment Centers, Asthma Center Heideheul, Hilversum, Netherlands; 2Department of Pulmonology, Academic Medical Center, Amsterdam, Netherlands; 3Respiratory Rehabilitation, Katholieke Universiteit Leuven, Belgium; 4Julius Center for Health Sciences and Primary Care, University Medical Center, Utrecht, Netherlands

The high-intensity paradigm is prevailing in COPD training. Individualising training variables is considered the gold standard. Nonlinear periodized exercise (NLE) uses variation of the training variables (mode of exercise, work phase, rest phase, intensity, number of repetitions) to individualize training. The aim of this study was to compare the effects of NLE with traditional endurance and progressive resistance training (EPR) on cycle endurance time (CWT) at 75%Wmax.

Methods: Patients with severe COPD (N=110, FEV1 ≥ 32%pred, 61 yrs) were stratified on normal or depleted fat-free mass index (depleted FFMi; male FFMi < 15 kg/m2female FFMi < 12 kg/m2). Per FFMi-group, patients were randomly assigned to NLE or EPR (3-times/week for 12 weeks). Difference in change was tested with intention-to-treat analysis using linear mixed-effects modeling. Trial number NTR 10455

Results: NLE showed more improvement in cycle endurance at 12 weeks: NLExgroup (N=33, Δ66hs = +143%) compared to EPRxgroup (N=34, Δ262+Δ66hs=+66%), difference in change (30%, 95% CI: 162–425) and NLExdepleted (N=22, Δ52hs = +123%) compared to EPRxdepleted (N=21, Δ198hs = +46%), difference in change (329%, 95%CI: 182–477). During the training, patients in the NLE groups had significantly more repetitions, lower % 1-repetition maximum load, shorter cycle time and lower Borg dyspnea, fatigue and exertion scores than the patients in EPR groups.

Conclusion: Nonlinear periodized exercise results in >5min more improvement in cycle endurance than traditional endurance and resistance training in patients with advanced COPD and depleted or normal FFM. Applying principles of nonlinear exercise training in athletes to the COPD population is feasible and worthwhile.

The significant and clinically meaningful short term results of relevant outcomes include exercise capacity (6MWD), quality of life (SGRQ), SF-36, fatigue (FAS) and dyspnea (MRC) suggest a high impact of rehabilitation on health related outcomes in sarcoidosis. Sponsoring by Sankdose Stiftung and Deutsche Lungenstiftung e.V.
P1901
Effect of Pulmonary Rehabilitation on Cardiac Output Responses during Exercise in COPD

Objectives: The aim of this study was to investigate the utility of a pulmonary rehabilitation (PR) program on mobility, pulmonary function, dyspnea and quality of life in patients with advanced lung cancer during chemotherapy.

Methods: This study included patients with newly diagnosed advanced lung cancer. Study group consisted of 12 pts with advanced non-small cell lung cancer and 5 pts with small cell lung cancer. Pulmonary function (FVC, FEV1), mobility (6 MWT), perceived of dyspnea (MRC, ODI, BDI) and quality of life (SF-36, EORTC) were evaluated during exercise in COPD patients (GOLD stages II-IV) were studied (including 15 patients in CLE and 4 patients in IE). The patients were divided into two groups: Group O: pulmonary rehabilitation during CLE and Group C: usual care. The patients were followed up for 3 months after the intervention. The patients pulmonary rehabilitation program was based on Nordic Walking exercise training and respiratory muscle training. Sessions occurred twice daily, each lasting approximately 60 minutes.

Results: Intention-to-treat analysis indicated that 6MW distance increased 55m (95% CI, 18-75, p=.012) with no change in pulmonary function tests (FVC, FEV1) during incremental (IE) and constant-load exercise (CLE).

Conclusion: In patients with COPD pulmonary rehabilitation (PR) induces true physiological effects reflected by reduced ventilatory requirement and improved muscle function. The effect of PR on central hemodynamic responses during exercise remains largely unknown. Aim: To examine the impact of PR on cardiac output (Q) responses during incremental (IE) and constant-load exercise (CLE). Method: 60 COPD patients (GOLD stages II-IV) were studied (including 15 patients in CLE and 4 patients in IE). The patients were divided into two groups: Group O: pulmonary rehabilitation during CLE and Group C: usual care. The patients were followed up for 3 months after the intervention. The patients rehabilitation program was based on Nordic Walking exercise training and respiratory muscle training. Sessions occurred twice daily, each lasting approximately 60 minutes.

Results: At Wpeak there was an increase in Q after PR (from 10.1±3.0 to 12.4±4.0, L/min, p<0.001) due to increased SV (from 90.6±32.3 to 105.4±42.4, L/min, p<0.001). Post-rehabilitation at an identical work rate during IE, Q did not differ compared to pre-rehabilitation; however SV was higher (pre: 90.3±3.2; post: 95.3±3.2 ml/min) and HR lower (pre: 113±3; post: 106±3.6 beats/min, p=0.008). Post-rehabilitation during CLE there were significant reductions in Q mean response (30s) (MRT at the onset and offset of exercise (pre: 79.8±4.4; post: 66.9±4.5, 5 sec, p=0.001) and (pre: 79.1±4.3; post: 66.1±4.2 sec, p=0.001), respectively.

Conclusion: Pulmonary rehabilitation induces an improvement in central hemodynamic responses to incremental and constant-load exercise in patients with COPD across GOLD stages II to IV. MONDAY, SEPTEMBER 3RD 2012

P1905
A multi-disciplinary integrated palliative care approach for patients with advanced COPD – A review of the breathing space clinic

Background: COPD is a leading cause of morbidity and mortality worldwide. There is strong evidence demonstrating the impact of disease and the unmet needs of these patients. Aims: To develop a hospice-based clinic for patients with advanced COPD. This multidisciplinary approach that leads to significant increases of exercise capacity and tends to improve HRQL. In view of a progressive disease with only a few therapeutic options rehabilitation should be considered early in the treatment of LAM, especially when LTx is necessary.

Introduction: In patients with COPD pulmonary rehabilitation (PR) induces true physiological effects reflected by reduced ventilatory requirement and improved muscle function. The effect of PR on central hemodynamic responses during exercise remains largely unknown. Aim: To examine the impact of PR on cardiac output (Q) responses during incremental (IE) and constant-load exercise (CLE). Method: 60 COPD patients (GOLD stages II-IV) were studied (including 15 patients in CLE and 4 patients in IE). The patients were divided into two groups: Group O: pulmonary rehabilitation during CLE and Group C: usual care. The patients were followed up for 3 months after the intervention. The patients rehabilitation program was based on Nordic Walking exercise training and respiratory muscle training. Sessions occurred twice daily, each lasting approximately 60 minutes.

Results: At Wpeak there was an increase in Q after PR (from 10.1±3.0 to 12.4±4.0, L/min, p<0.001) due to increased SV (from 90.6±32.3 to 105.4±42.4, L/min, p<0.001). Post-rehabilitation at an identical work rate during IE, Q did not differ compared to pre-rehabilitation; however SV was higher (pre: 90.3±3.2; post: 95.3±3.2 ml/min) and HR lower (pre: 113±3; post: 106±3.6 beats/min, p=0.008). Post-rehabilitation during CLE there were significant reductions in Q mean response (30s) (MRT at the onset and offset of exercise (pre: 79.8±4.4; post: 66.9±4.5, 5 sec, p=0.001) and (pre: 79.1±4.3; post: 66.1±4.2 sec, p=0.001), respectively.

Conclusion: Pulmonary rehabilitation induces an improvement in central hemodynamic responses to incremental and constant-load exercise in patients with COPD across GOLD stages II to IV. MONDAY, SEPTEMBER 3RD 2012

P1903
Is pulmonary rehabilitation (PR) an effective therapy in lymphangioleiomyomatosis (LAM)?

Background: LAM is an orphan lung disease affecting young women. There is an estimated prevalence of 200 patients in Germany. Beside supportive treatment of respiratory distress there are only few drug therapies (progesterone, sirolimus) of unknown effectiveness. In end-stage LAM lung transplantation (LTx) may be the only remaining therapeutic option. The role of PR is not yet defined.

Methods: A prospective open clinical trial data of 22 LAM patients prior to LTx (LAM-P) (45.9±9.9 y, FEV1=1±3.4±17%pred, diffusion capacity=35.8±13%, paO2=9±6±9 mmHg, LTOT 19±19) and 24 LAM patients after LTx (LAM-Tx) (42.8±10±y, FEV1=65±7±9%pred) were evaluated. All patients underwent a specialized multidisciplinary inpatient PR for 45±9.6 (LAM-P) and 35±4.18 (LAM-Tx) days.

Results: We found significant and clinically relevant changes for both PR approaches.

Conclusion: The outcome demonstrates a trend towards improvement in all domains. It is not possible to conclude that the clinic intervention is solely responsible

Thus the benefit of post LTx-PR in LAM-patients is comparable to the results of lung transplant patients with other underlying disease. Health-related quality of life (HRQL) (SF36) improved significantly for the mental summary score in LAM-Tx.

Lung function parameters did not change for LAM-P but FEV1 improved significantly for LAM-Tx patients.
for these changes, these early data and patient feedback supports the effectiveness of this model.

**P1906**

**Correlation between 6-minute pegboard and ring test and upper extremity activities of daily living in patients with chronic obstructive pulmonary disease**

Kenichi Takeda1, Yuji Kawasaki2, Kazuma Yoshida1, Yoji Nishida1, Tomoya Harada1, Kosuke Yamaguchi2, Kiyotaka Hashimoto2, Shingo Matsumoto1, Akira Yamashita1, Tadao Ighji2, Eiji Shimizu1, 1Division of Medical Oncology and Molecular Respirology, Tottori University, Yonago, 2Tottori University, Yonago, 3Department of Medical Oncology, Tottori University, Yonago, 4Department of Respiratory Medicine, Tottori University, Yonago, 5Department of Rehabilitation Medicine, Yoka Hospital, Yoka, Hyogo, Japan

**Background:** Upper extremity training is recognized as an important component of pulmonary rehabilitation (PR). 6-minute pegboard and ring test (6PBRT) was developed for testing arm exercise capacity of patients with COPD. The purpose of this study was to appraise characteristics of this test and to evaluate the relationship between 6PBRT and upper extremity activities of daily living (ADL) in patients with COPD.

**Methods:** Twenty outpatients with COPD performed 6PBRT, spirometry, maximal inspiratory pressures, maximal expiratory pressures and grip strength. The 6PBRT was done according to the method of Zhan et al. In brief, subjects were asked to move as many rings as possible, and the final score was the number of worked rings during a 6-minutes period. Upper extremity ADL was evaluated with the upper extremity activities subdomain of Pulmonary Functional Status & Dyspnea Questionnaire-Moderated Version (FPSIQ-M). Upper extremity ADL was also measured objectively by the wrist accelerometer (Actiwatch®) all day long for a week.

**Results:** There was a positive correlation between 6PBRT scores and inspiratory capacity (IC) (r = 0.71, p < 0.001), inspiratory capacity/total lung capacity (IC/TLC predicted) (r = 0.68, p < 0.001), forced vital capacity (FVC) (r = 0.57, p = 0.01). And there was a positive correlation between 6PBRT scores and Actiwatch® counts (r = 0.54, p < 0.05), and a negative correlation between 6PBRT scores and BMI (r = -0.49, p < 0.05).

**Conclusion:** 6PBRT may be one of the predictive tests for PR to maintain and improve upper extremity ADL in patients with COPD.

**P1907**

**Effect of BMI on task-related VO2 and dyspnea during activities of daily life (ADLs) in COPD**

Anoush V. Vyas1,2, Frits M.E. Franssen1, Kenneth Meijer3, Martijn W.J. Cuipers1, Emiel F.M. Wouters1,2,3, Erica P.A. Rutten2,3, Martijn A. Spruijl1,4, 1Physiotherapy, Ciro+, Horn, Netherlands; 2Physiotherapy, Ciro+, Horn, Netherlands; 3Department of Human Movement Science, School for Nutrition, Toxicology and Metabolism of MUMC+, Maastricht, Netherlands; 4Respiratory Medicine, MUMC+, Maastricht, Netherlands

**Background:** The aim of the present study is to ascertain the nutritional status of all pneumological patients with COPD from 2005 to end of 2011. To date, the influence of BMI on the task-related metabolic demands remains unknown. Therefore, we aimed to study the effects of BMI on metabolic load in 94 COPD patients (61% men, age 60±16 years). The patients performed 5 consecutive domestic ADLs: putting on socks, shoes and vest, ADL1; folding 10 towels, ADL2; putting away a laundry basket, ADL3; washing a dish, ADL4; sweeping the floor for 10 minutes, ADL5. The metabolic load in each ADL was measured using a mobile oxygen uptake monitor. The metabolic load was expressed as metabolic equivalent (MET) units. The main outcome parameters were VO2 during each task and the change in VO2 from baseline to end of each task. A subgroup of 12 participants completed all six tests: 7 male, mean [SD] age 57 [14] years, BMI 34.5 [7.1] kg/m2. The peak VO2 on the TM vs CE was 225 [52] vs 1791 [390] mL/min, respectively. Table 1 shows the duration (ts) and energy expenditure at 80 and 60% VO2 peak on the TM and CE.

**Conclusion:** In obese individuals, treadmill walking (weight unsupported) at a matched metabolic intensity led to significantly higher total energy expenditure than cycling.

**P1908**

**A comparison of the energy expenditure between weight supported and unsupported exercise in obesity**

Rachael Evans1,2, Thomas Dolmage1,4, Priscila Robles1,5, Dina Brooks1,5, Roger Goldenstein1,3, 1Respiratory Medicine, West Park Healthcare Centre, Toronto, Canada; 2Infection, Immunity and Inflammation, University of Leicester, United Kingdom; 3Medicine, University of Toronto, Canada; 4Respiratory Diagnostics and Evaluation Services, West Park Healthcare Centre, Toronto, Canada; 5Physical Therapy, University of Toronto, Canada

**Background:** Weight loss is better achieved by a combination of diet and exercise. We hypothesised that obese individuals may be able to endure cycling (weight supported) for longer than walking (weight unsupported). We therefore investigated whether weight supported or unsupported exercise was associated with greater energy expenditure in obese individuals.

**Methods:** Individuals were recruited from a sleep clinic with a BMI > 30 kg/m2 and treated obstructive sleep apnoea. Patients with pulmonary or cardiac disease were excluded. On separate days in a randomised order, participants performed an incremental cardiopulmonary exercise test on a cycle ergometer (CE) and a treadmill (TM) with expired gas analysis to determine the peak oxygen uptake (VO2peak). Two endurance tests were performed on each modality matched at 80% and 60% of the highest VO2peak determined by the incremental tests. The total energy expenditure during each endurance test was calculated from the total oxygen uptake.

**Results:** 12 participants completed all six tests: 7 male, mean [SD] age 57 [14] years, BMI 34.5 [7.1] kg/m2. The peak VO2 on the TM vs CE was 225 [52] vs 1791 [390] mL/min, respectively. Table 1 shows the duration (ts) and energy expenditure at 80 and 60% VO2 peak on the TM and CE.

**Conclusion:** In obese individuals, treadmill walking (weight unsupported) at a matched metabolic intensity led to significantly higher total energy expenditure than cycling.

**P1909**

**Nutritional status of pulmonary rehabilitation patients**

Jenneke Sterk, Urban Bormann, Germany

**Introduction:** Only about one-third of all adult German men and about 50% of women are normal weight. By contrast, the percent of overweight/obesity has reached epidemic proportions. Underweight is relatively rare. The nutritional status of the pneumologically ill varies considerably from this disease pattern. The prevalence of underweight in COPD III and IV (FEV1 < 50%) cases ranges from 10% to 60%.

**Aims and objectives:** The aim of the present study is to ascertain the nutritional status of a pneumological patient population and the respective frequency and meaning of underweight and overweight/obesity, using a large database.

**Methods:** From 2005 to end of 2011, the nutritional status of all pneumological patients was ascertained at a German inpatient rehabilitation clinic (n=13804). Additional from July 2010 until January 2012 the nutritional status of COPD patients with severity levels of III and IV based on GOLD was also ascertained for a sub-population.

**Results:** Of all patients (n=13804), the percent of underweight was 8.4%, normal weight 27.5% and overweight/obese 64.1%. Of all COPD patients (n=5470), 10.8% were underweight, 28.3% normal weight and 60.9% overweight/obese. Of the COPD III patients 20.6% were underweight and of the COPD IV group even 25.1%. The anemic (n=3811) had a lower percent of overweight (4.1%) but 72.5% overweight/obese.

**Conclusions:** The prevalence of underweight and obesity in a pneumological patient population is strikingly manifest when compared to a normal population. The percentage of underweight is significantly higher for COPD. Within the COPD, results show considerable differences, depending on degree of severity.

**P1910**

**Effects of pulmonary rehabilitation in patients with COPD with and without fat free mass depletion**

Leonardo Silveira1, Danilo C. Berton1, Cassia C. da Costa2, Rafael M. de Souza3, Paulo I.Z. Texeira4, Internal Medicine, Federal University of Rio Grande do Sul (UFRGS), Porto Alegre, Brazil; 2Health Science Institute, Ferevale University, Novo Hamburgo, Brazil

We aimed contrast the effects of exercise training in COPD patients with and without reductions in fat-free mass (FFM) and evaluate the relationship among changes in body composition, exercise capacity and health related quality of life.
One hundred and four patients submitted to Pulmonary Rehabilitation (PR) were retrospectively stratified according their FFM status. FFM was measured by bioelectrical impedance and patients considered depleted if FFM index was ≤15 in women and ≤16 kg/m² in men. Saint George Respiratory Questionnaire (SGRQ) and 6 minute walk distance (6MWD) were evaluated before and after PR.

Characteristics of all patients are following: 64.1 ± 8.7 years; body mass index (BMI)= 25.1 ± 4.7 kg/m²; FFM index= 17.1 ± 3.0 kg/m²; FVC=66.4 ± 20.1%; FEV₁= 38.9 ± 15.2%; 6MWD= 395.3 ± 85.5m; and oxygen saturation (SpO₂)= 93.2 ± 4.2%. Thirty-two subjects (30.7%) were considered depleted. They had worse resting lung function and SpO₂ (CVP= 59.4 ± 19.5 vs 69.6 ± 19.6%, p=0.02; FEV₁= 33.6 ± 13.2 vs 41.4 ± 15.5%, p=0.02; SpO₂= 91.7 ± 4.8 vs 93.9 ± 3.8, p=0.02). Improvement in 6MWD and SGRQ after PR were not different comparing groups. There is no difference in weight alteration (0.14 ± 3.3 ± 0.43 ± 2.7 kg) whereas depleted patients had a greater improvement in fat free mass (3.71 ± 7.89 vs -0.29 ± 2.56kg, p<0.01). Therefore, 24 of 32 depleted subjects (75%) were no more considered depleted after PR. This improvement has no correlation with SGRQ and 6MWD gains after PR.

Concluding, the clinical benefits of PR were not different comparing FFM depleted and non-depleted COPD patients. However, improvement in FFM was greater in depleted patients leading the majority of them to be considered non-depleted after PR.

P1911

Glucomerulopathy, microvascular damage and aortic stiffness in patients with COPD

Michelle John¹, Sam Hassain¹, Rebecca Simms¹, John R. Cockcroft², Andrew Prayle¹, Charlotte E. Bolton¹.¹Nottingham Respiratory Research Unit, University of Nottingham, United Kingdom; ²Wales Heart Research Unit, Cardiff University, Cardiff, United Kingdom; ³Department of Child Health, University of Nottingham, United Kingdom

Background: The increased aortic stiffness in patients with COPD will lead to increased pulsatile energy which may in turn damage the microvasculature. The renal vascular bed is particularly susceptible. We hypothesised that urine albumin creatinine ratio (UACR) as a measure of glomerular damage would be related to aortic stiffness: pulse wave velocity (PWV).

Methods: Subjects with and without COPD, all with >10 pack year history of smoking had aortic PWV, BP, oxygen saturations, spirometry as well as urine for renal biomarkers measured at clinical stability.

Results: Age, gender and BMI were matched between patients, n=52 and controls, n=34. The UACR was increased in patients compared to controls, p<0.05, Figure 1 (median and IQR). Log₁₀ UACR was related to aortic PWV (r=0.43, p<0.001). Mean GFR was similar between groups but low (<60ml/min) in 29% of each group. Biomarkers of proximal tubular damage (NGAL and KIM-1) standardised for urine concentration were not different between patients and controls. In multiple group. Biomarkers of proximal tubular damage (NGAL and KIM-1) standardised for urine concentration were not different between patients and controls. In multiple

Concluding, the clinical benefits of PR were not different comparing FFM depleted and non-depleted COPD patients. However, improvement in FFM was greater in depleted patients leading the majority of them to be considered non-depleted after PR.

P1912

Characteristics and comorbidities associated with pain in people with chronic obstructive pulmonary disease (COPD)

W. Darlene Reid¹, Bahareh HajGhanbari¹, Cristiane Yamabayashi¹, Vanessa Solorio¹, Jeremy Road³.¹Physical Therapy, University of British Columbia, Vancouver, BC, Canada; ²Division of Respiratory Medicine, Dept of Medicine, University of British Columbia, Vancouver, BC, Canada

Background: A recent survey demonstrated that the prevalence of pain in people with COPD was more than twice that in age-matched people without COPD, and pain was ~2.5 times more severe.

Purpose/Hypothesis: To determine the characteristics and comorbidities associated with pain in people with COPD.

Methods: Patients were recruited from respiratory clinics and pulmonary rehabilitation programs. Respondents participated in a mail survey that included: the McGill Pain Questionnaire (MPQ), the Brief Pain Inventory (BPI), a form to list comorbidities (modified from the Charlson Index) and medications.

Results: Sixty-five of 92 COPD patients responded to the survey (70% response rate). They had an FEV₁ of 44.1 ± 7.9% pred, a BMI of 27.6 kg/m² and were 74.8 ± 8 years. Forty-four respondents (67%) self-reported pain. On the BPI, 64% of these COPD patients had moderate to very severe pain and 73% had moderate to very high pain interference with daily activities. Average pain severity scores on the MPQ and BPI were correlated (r= 0.74). Of 44 COPD patients who experienced pain, 39 (89%) reported ≥2 comorbidities and 20 (45%) reported ≥4 comorbidities; the most common were musculoskeletal (21%) and circulatory disorders (21%). Twenty-eight (64%) of COPD patients used pain alleviating treatments, the most common were non-prescription pain medications (acetaminophen and ibuprofen [n=18; 64%] followed by prescription NSAIDS and narcotics.

Conclusions: Moderate to severe pain is common in people with COPD. This pain likely compromises full participation in rehabilitation and the ability to increase physical activity. Musculoskeletal causes appear to be a major contributing factor.