

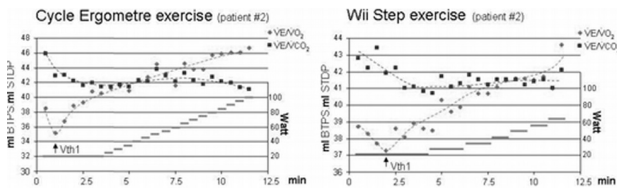
**236. The best abstracts in rehabilitation and chronic care 2011 (sponsored by Nutricia Advanced Medical Nutrition)**

**1886**

**Late-breaking abstract: Wii Fit™-step is a suitable exercise in rehabilitation programs in patients with COPD: A feasibility study**

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Patient with COPD can be involved in pulmonary rehabilitation program, by using cycle ergometer exercises. They often give up with this exercise either during the program or when they have to manage it themselves. 16 patients (FEV1% =52±3%) underwent two sessions of incremental exercise to their limit of tolerance first on a cycle ergometer, and then on Wii Fit step game by adjusting the frequency of movements and the step height. Ventilatory threshold (Vth1), heart rate (HR), maximal oxygen uptake, RER (respiratory exchange ratio) and their respective timing were determined and compared within each session.



We found many similarities between these exercises. No difference was obtained regarding the time to exhaustion, the occurrence of Vth1 and VO2max. VO2max value and oxygen uptake at Vth1 were similar, and maximal HR at the end of exercise, or HR at Vth1 and at VO2max were not different during the two tests. Vth1 was obtained at 58±11% of the maximal HR on cycle ergometer and at 66±9% for on Wii Fit, with a RER being below 1, i.e. mainly aerobic exercise. Finally a majority of patients had preferred the Wii Fit-step (50%) or had no specific preference (31%).

Therefore we conclude that this exergame is a suitable tool for further chronic rehabilitation programs in patients with COPD, inducing similar cardiopulmonary workload, and it could increase both the patients' involvement and their motivation.

**1887**

**Obstructive lung disease is associated with increased abdominal visceral fat and elevated systemic adipocytokines**

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**Background:** The source of systemic inflammation in clinically stable Obstructive Lung Disease (OLD) is unknown. Visceral adipose tissue (VAT) is related to systemic inflammation. We hypothesized that in OLD subjects a redistribution of fat mass towards more VAT is present and associates with increased levels of systemic adipocytokines.

**Methods:** From the Health ABC Study (n=3075), pulmonary function, VAT quantification (by abdominal CT), body composition (by whole-body DXA) and systemic adipocytokine levels were available from n=2139 participants. From this sample, n=243 OLD cases (FEV1/FVC<LLN) were identified (FEV1 63±18%pred, 58% men, age 73±3 y, BMI 26±5 kg/m<sup>2</sup>, 28% smokers, pack years 38 [IQR 9-57]). Propensity scores were calculated based on sex, age, race, BMI, smoking

status and pack years for the n=2139 subjects, and 3:1 propensity score matching was performed successfully matching n=729 non-OLD controls to the cases.

**Results:** Compared to controls, cases had greater VAT area (143±77 vs 123±59 cm<sup>2</sup>, p<0.001) and elevated interleukin (IL)-6 (2.16 [1.52-3.34] vs 1.75 [1.20-2.69] pg/ml, p<0.001), Plasminogen Activator Inhibitor-1 (PAI-1) (22 [12-37] vs 18 [11-31] ng/ml, p=0.008) and adiponectin (11 [7-16] vs 10 [6-15] µg/ml, p=0.037). Neither whole-body nor appendicular/trunk fat mass were different between cases and controls (p>0.05).

**Conclusion:** This study shows that OLD patients have greater VAT and elevated systemic IL-6, PAI-1 and adiponectin levels compared to non-OLD controls matched for sex, age, race, BMI and smoking. Greater VAT in OLD may reflect a disturbed metabolic regulation contributing to systemic pathology. Performed within TI Pharma project T1-201.

**1888**

**Does protein supplementation enhance the effects of resistance training in patients with COPD?**

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**Introduction:** Protein supplementation (PS) & resistance training (RT) enhances muscle growth in healthy elderly subjects. Its role in patients with COPD is unknown.

**Hypothesis:** Adding PS to RT will yield greater increases in function than RT alone.

**Method:** We conducted a randomised, double-blind, placebo controlled trial. 59 patients [mean (SD) age 67.9 (9.1)yr, BMI 26.7 (2.7), FEV1/46.8 (17.6)% pred, 36men] completed 8weeks of quadriceps RT. Training was 5x30 bilateral knee extensions; 3 times/week on an isokinetic dynamometer (Cybex: speed=180°/sec). Subjects received PS or placebo after each RT session. Isometric & isokinetic quadriceps strength at 60°/sec [Cybex: Newton-meters (Nm)], thigh lean mass [DEXA: grams (g)] & incremental cycle performance [peak work (W) & peak oxygen uptake (VO<sub>2</sub>: ml/kg/min)] were assessed at baseline & 8 weeks.

**Results:** Table 1 shows mean change from baseline and between group differences for all outcomes. There were significant within group changes in all outcomes in both groups (except peak VO<sub>2</sub> in the PS group). There were no significant differences between groups.

Table 1

	Within Group Change		Between Group Mean Difference
	PS (n=30)	Placebo (n=29)	
Isometric strength	19.6 (12.2 to 27.0)**	16.6 (9.5 to 23.6)**	3.0 (-7.0 to 13.1)
Isokinetic strength	17.7 (10.2 to 25.2)**	19.8 (13.0 to 26.6)**	-2.1 (-12.0 to 7.9)
Thigh lean mass	180.1 (102.2 to 258.0)**	230.4 (140.0 to 320.7)**	-50.3 (-166.7 to 66.2)
Peak cycle work	9.9 (4.2 to 15.7)*	8.2 (3.5 to 12.8)*	1.8 (-5.4 to 8.9)
Peak cycle VO <sub>2</sub>	0.5 (-1.9 to 2.8)	2.3 (0.1 to 4.5)*	-1.9 (-5.0 to 1.3)

\*p<0.05; \*\*p<0.001 within group change.

**Conclusion:** There were significant improvements in quadriceps strength, thigh mass & whole-body cycle work following RT. The addition of PS did not augment the functional benefits of RT.

**1889**

**Stability of life-sustaining treatment preferences of patients with advanced chronic organ failure**

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**Objectives:** We aimed to investigate 1-year stability of preferences regarding cardiopulmonary resuscitation (CPR) and mechanical ventilation (MV) of patients with advanced COPD, chronic heart failure (CHF) or chronic renal failure (CRF), and to identify clinical determinants associated with these preferences.

**Methods:** 265 clinically stable outpatients with COPD, CHF or CRF were visited at baseline and every 4 months for 1 year, to assess preferences for CPR and MV. Generalized estimating equations were used to study the association between preferences and several potential predictors including co-morbidities, hospital admissions, health status (EQ5D), care dependency (CDS), mobility, depression (HADS-D) and anxiety (HADS-A).

**Results:** 78% of the patients completed 1-yr follow-up (64% men; mean (SD) age: 67 (13) yrs). CPR and MV preferences changed in 38% of the patients during follow-up. The odds ratio (95% CI) combining the time and factor effects show

an association between preference for CPR and change in EQ5D (+1 pt: OR 1.7 (1.2-2.5)), CDS (+9 pt: OR 1.5 (1.2-1.9)), HADS-D (+6 pt: OR 0.5 (0.4-0.8)), HADS-A (+5 pt: OR 0.7 (0.5-0.9)) and change in marital status (single vs. living with partner: OR 0.5 (0.3-0.9)); and an association between preference for MV and change in EQ5D (+1 pt: OR 1.5 (1.1-2.2)), CDS (+9 pt: OR 1.5 (1.1-1.9)) and HADS-D (+6 pt: OR 0.6 (0.4-0.8)).

**Conclusions:** More than a third of outpatients with advanced COPD, CHF or CRF changed their preferences regarding CPR and/or MV during 1 year at least once. Regular re-evaluation of advance care planning is necessary when patients experience a change in health status, care dependency, mood status or marital status.

**1890**

**Effect of resistance training during hospitalization in the systemic inflammation, functional capacity and muscle strength in COPD patients**

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**Background:** Resistance training (RT) during hospitalization improves skeletal muscle strength; however its effect on systemic inflammation and to modify the level of activity remains unknown.

**Objective:** Our aim was to evaluate the effect of RT in the systemic inflammation and functional capacity in COPD patients during and after hospitalization.

**Methods:** Twenty nine out 102 patients hospitalized due to COPD exacerbation were randomly assigned to either Control (CG) or RT (RTG) groups. They were evaluated on the 2nd day of hospitalization, at hospital discharge and after 30 days. It was evaluated systemic inflammatory markers (TNF- $\alpha$ , RCP, IL1 $\beta$ , IL-12p70, IL-6, IL-8, IL10), level of physical activity, health-related quality of life (HRQL), and upper and lower limbs muscle strength.

**Results:** Patients from RTG showed an improvement in the lower limb muscle strength, in the six-minute walking test (6MWT) and in all domains of HRQL (p<0.05). In contrast, CG showed a reduction in the lower limb muscle and 6MWT and a worsening in the HRQL. No difference between groups was observed in the systemic inflammatory markers analyzed during hospitalization and after 30 days of hospital discharge. In addition, most patients from both groups remained physically inactive (70%) in the hospital and at home.

**Conclusion:** Our results suggest that resistance training during hospitalization improves lower limbs muscle strength, health-related quality of life and physical capacity; however does not change either systemic inflammatory levels or physical activity during or after hospital discharge.

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**1891**

**Effects and feasibility of different types of endurance training in patients with end stage lung disease before lung transplantation**

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**Objective:** Aim of this study was to compare the effects and the feasibility of continuous moderate endurance training (CT) versus high-intensity interval training (IT) in patients with end-stage COPD before lung transplantation (pre-LTx) during a specialized 3-week in-patient pulmonary rehabilitation programme.

**Methods:** 60 lung transplant candidates (age: 53.5 $\pm$ 56.3 yrs; FEV1 pred. 24.9 $\pm$ 7.9%) performed up to 15 training sessions within 3 weeks randomised either to CT (n=30) or IT (n=30). CT was characterised by cycling at 60% Wmax whereas IT consisted of 30 sec exercise (100% Wmax) and 30 sec rest. Total amount of exercise time per session in CT increased from 10 to 30 min respectively from 12 to 36 min in IT yielding equivalent volume of exercise.

**Results:** Both groups achieved similar improvements in 6MWD. The CT group increased by 35.7 $\pm$ 42.21m from baseline 312.7 $\pm$ 98.2m and the IT group by 35.4 $\pm$ 27.89m from 289.5 $\pm$ 108.7m. Despite an increase in cycling time, patients in both groups showed decreased symptoms of dyspnoea during exercise. The overall dyspnoea over the whole training period was significantly (p=0.018) higher in CT (BORG 7.1) than in IT (BORG 6.2). Furthermore, significantly (p<0.001) more unintended interruptions during exercise were observed in CT (28.3) than in IT (7.2).

**Conclusion:** Our study shows, that CT as well as IT can significantly improve exercise capacity in pre-LTx patients. IT seems to be better tolerated, expressed by a lower grade of dyspnoea and significantly better feasibility of the exercise protocol.

**1892**

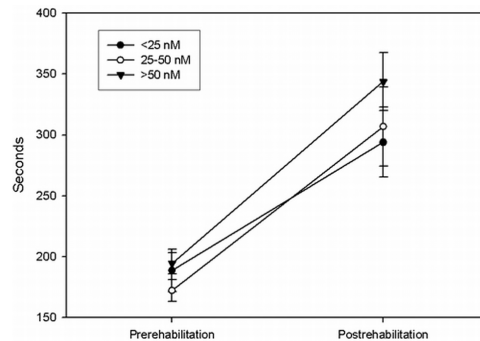
**Vitamin D status in patients with COPD who participate in pulmonary rehabilitation (PR): Characteristics and effects of PR**

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Vitamin D deficiency is common in COPD patients, however no study has evaluated the influence of vitamin D status on effects of pulmonary rehabilitation.

We studied 311 patients, who participated in a 7-week outpatient pulmonary rehabilitation programme (PR). Vitamin D status was assessed at entry and examined for association with patients' characteristics, drop out from PR, and effect on endurance shuttle walk time (ESWT).

Vitamin D level  $\leq$ 25 nM was seen in 61 (19.6%) of the patients. They were significantly younger, were more frequently on long-term oxygen therapy, had higher BMI and FFMI, had worse quality of life score, tended to have lower FEV<sub>1</sub>% predicted value and more frequently to be current smokers. They had a 3-times higher risk of drop out from the PR programme (p=0.003) compared to patients with normal vitamin D status and a poorer improvement in ESWT (p=0.03).



In conclusion, vitamin D deficiency was significantly associated with higher drop out rates from PR and there was a tendency towards a poorer improvement in ESWT.

**1893**

**Anti-inflammatory nutritional support enhances exercise performance and QOL in patients with stable COPD**

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**Purpose:** This study was conducted to investigate the effect of nutritional support using whey protein-rich supplement which has an anti-inflammatory effect on exercise performance and QOL, and systemic inflammation in stable COPD.

**Methods:** Thirty-six patients with stable COPD (mean (SD) age 77.2 (5.8) yrs, FVC 2.70 (0.72)L, FEV1 1.10 (0.44)L, %predicted FEV1 44.5 (16.2)%, FEV1/FVC 44.5 (16.9)%) were studied. COPD patients under continuing pulmonary rehabilitation (PR) were randomly divided into a nutrition group and a control group (education only). In nutrition group whey protein-rich supplement (400 kcal/day) was supplied for 12 weeks. Whey protein, a protein complex derived from milk, has been shown to have a strong anti-inflammatory effect in vitro. PR program consisted of respiratory muscle (RM) stretch gymnastics, RM training, breathing retraining, chest wall mobilization, and chair exercise. Lung functions, six-minute walking distance (6MWD), chronic respiratory questionnaire (CRQ), and inflammatory biomarkers (hsCRP, TNF $\alpha$ , IL-6, IL-8) were evaluated before and 12 week after nutritional intervention.

**Results:** In the nutrition group, inflammatory markers decreased significantly (hsCRP: 2.7 (3.4) vs 1.5 (2.0)mg/L (p<0.01), TNF $\alpha$ : 1.2 (0.4) vs 1.2 (0.4)pg/ml, IL-6: 2.7 (1.4) vs 2.2 (1.1), IL-8: 2.0 (1.3) vs 1.1 (1.1)pg/ml (p<0.01)). 6MWD increased significantly from 322 (183) to 368 (182)m (p<0.01). The total values of CRQ also increased from 103 (16) to 109 (17).

**Conclusions:** We conclude that anti-inflammatory nutritional support using whey protein-rich supplement might enhance exercise capacity and QOL in stable COPD by improving systemic inflammation.