Conclusion: Changes in endurance shuttle walking performance, especially improvements, are well perceived by patients with COPD. From this set of data, it should be possible to identify the smallest change in walking performance with a high likelihood of being perceived by the patients (MCID).

Aerobic Training with Hyperoxia in Patients with Mild/Severe Brain Injury

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Background: Previous studies have shown that aerobic training can induce physiological benefits for brain injured patients. However these benefits seem to be limited. Compared with untrained subjects who follow the same training program, patients with brain injury have a reduced exercise capacity and have difficulty in reaching a high intensity exercise level. A possible alternative to help these patients is to conduct the training in hyperoxia (O₂ supply). Studies with untrained subjects have shown that training in hyperoxia enhances the fitness performance. Thus, the purpose of this study was to measure the effects of an aerobic training in hyperoxia with brain-injured patients.

Methods: Twelve patients were randomly assigned to either one of two aerobic training protocols: A) 100% O₂; B) 20.9% O₂ (room air). In both protocols training was on stationary bicycle, 2 sessions per week over 10 weeks. Each session lasted 25 min and was composed of 6 intervals with intensity ranging from 60 to 85% of the max HR. The first interesting result is that all patients were able to reach and sustain the 80-85% level of exercise. To measure the working capacity during the training, we recorded the workload (watts) reached at the third interval (80-85% of the HRmax) of each session.

Results: A difference ($P < 0.05$) in the power output on the ergocycle was observed between the pre test (measured on the first week) and the post test (measured on the 6th week) for subjects trained in hyperoxia but no difference was observed for subjects trained in normoxia. However, no difference was ob-

served in the 6 min walk test for all subjects before and after the aerobic training. There was no difference in oxygen consumption (submaximal test 85% HRmax) between the pre and post tests in both groups of subjects ($P = 0.18$). Nonetheless, subjects trained in hyperoxia showed a 16% average increase in their VO₂ (85% HRmax) compared with subjects in normoxia who had a 4% average decrease.

Conclusion: Our results show that oxygen supply seems to accelerate the benefits of the aerobic training with brain injured patients. We believe that it is the combination of the training protocol (i.e. intervals) and the oxygen addition that induced the early benefits observed.

Chronic Obstructive Pulmonary Disease (COPD) as a Risk Factor for Glucose Metabolism Perturbation and Insulin Resistance.

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Background: High body mass index (BMI) is associated with better survival in COPD. However, increased BMI and especially waist circumference is associated with elevated pro-inflammatory systemic markers that might contribute to glucose intolerance. On the other hand, COPD is a chronic inflammatory disease that could be a risk factor for impaired glucose metabolism. The objective of this study was to compare the prevalence of glucose intolerance in COPD patients and control subjects with high waist circumference.

Methods: Eleven patients with COPD (age: 68 ± 8 yr mean $\pm$ SD; FEV₁: $49 \pm 17\%$ pred) and 10 control subjects (C) (age: 63 ± 6 yr) underwent a 75g oral glucose tolerance test (OGTT). All subjects had a waist circumference > 102 cm and no previous history of diabetes. Height and weight were measured and each subject underwent dual-energy X-ray absorptiometry (DEXA) to evaluate fat-free mass (FFM) and fat mass (FM) and abdominal tomography to evaluate visceral fat (VF). Blood samples were taken to measure

inflammatory markers (C-reactive protein (CRP), tumor necrosis factor (TNF), interleukin (IL)-6). Venous blood samples of glucose and insulin were taken while fasting and during OGTT. Insulin resistance was estimated with the fasting homeostasis model assessment (HOMA) index.

Results: FM, FFM and VF were not different between groups. Diabetes was diagnosed in two subjects in both groups (2hr post OGTT glucose ≥ 11.1 mmol/l). Four COPD and 1 C had impaired fasting glucose (fasting glucose 5.6–6.9 mmol/l) while 1 COPD and 2 C had impaired glucose tolerance (2hr post OGTT glucose 7.8–11.1 mmol/l). In COPD patients a negative correlation was found between the HOMA index and FEV₁ ($r^2:0.52$, $P<0.05$).

Conclusions: COPD subjects with high waist circumference are similar to control subjects in term of FFM and FM, level of systemic inflammation and response to OGTT. In COPD, the severity of the disease is associated with an insulin resistance that may potentiate the risk for the development of type 2 diabetes in these patients.

Assessment of Two Training Modalities Effects on Exercise Tolerance after a Cardiac Rehabilitation Program and 3 Months Later in Off-Pump Coronary Artery Bypass Patients

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Background. Physical training is recommended as an efficient therapy in patients with coronary disease. However its effects should depend on its modalities. The aim of this study was to compare the effects of continuous and interval training after off-pump coronary artery bypass surgery (CABG).

Methods. Twenty-three male patients (59.5 ± 1.2 yr) underwent a randomized physical training using con-

tinuous (C, $n=10$) or interval (IT, $n=13$) modalities, over 3 weeks (5 h. a week). All patients performed a symptom-limited exercise test with measurements of ventilatory threshold (VT) and peak workload (WL), oxygen uptake (VO₂) and heart rate (HR), before, at the end and 3 months after the training period. They also completed the SF-36 questionnaire to assess their quality of life.

Results. Both C and IT improved WL and VO₂ at VT ($P<0.05$) and at peak exercise ($P<0.05$). Only IT increased peak HR and HR reserve ($P<0.01$). In both groups quality of life was improved ($P<0.05$). In both groups, compared to after training, the 3-months assessment showed an increase in peak and ventilatory threshold WL, and in peak HR ($P<0.05$) without any change in peak VO₂ and VT HR. No difference was observed between groups whatever the period studied. Back to home, in accordance with the given recommendations, most of the patients carried on their physical training over 3 months. They performed either outside walking ($n=9$) or cycling sessions ($n=1$) or both activities ($n=11$). No difference concerning the global training schedule was noted regardless their group (5.4 ± 1.2 vs. 6.0 ± 1.1 h.week⁻¹ for C and IT, respectively).

Conclusions. In off-pump CABG patients, similar improvements of exercise capacity and quality of life perception were observed after both C and IT programs. Only peak HR was increased after interval training. Thus, IT is a good alternative to C training in this population. Aerobic fitness still remained stable or increased after 3 months of individual practice which duration exceeded the minimal values recommended.

The Effect of Pulmonary Rehabilitation on Pedometer-Measured Physical Activity

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Background: Pulmonary rehabilitation results in favorable outcomes across multiple areas, including exercise capacity, dyspnea, and health status. The effectiveness of this intervention on increasing physical