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201. Rehabilitation in non-COPD patients

E2204

Inspiratory muscle strength training improves outcome in failure to wean patients

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Inspiratory muscle weakness has been implicated as a contributor to failure to wean (FTW) from prolonged mechanical ventilation (MV). Several uncontrolled trials of inspiratory muscle strength training (IMST) have been published, but no controlled trials of IMST have been conducted.

Methods: We conducted a single blind, randomized trial of IMST and SHAM training in FTW patients. IMST consisted of 4 sets of 6-10 breaths through a threshold IMST device at the highest pressure setting the patients could tolerate. The SHAM treatment consisted of inspiring through a modified resistive inspiratory muscle training device that provided minimal strength training stimulus. IMST and SHAM training were conducted 5 days/wk. All patients also participated in progressively lengthening spontaneous (no MV support) breathing trials (SBT) 7 days/wk. Subjects were treated for up to 28 days. The weaning criterion was 72 consecutive hours of spontaneous breathing without MV support.

Results: Upon assignment, groups were similar with respect to age, gender, cause of respiratory failure, smoking history, SAPSII score, MV settings, arterial blood gases when receiving full MV support, PaO₂/FiO₂, prealbumin, duration of SBT tolerated (IMST 2.4±7.3 hours vs SHAM 2.2±3.5, p = .84) and maximal volitional negative inspiratory pressure. The IMST and SHAM groups had received 41±29 and 50±40 (p =.39) days of MV support before starting intervention. 16 of 21 (76%) pts assigned to the IMST treatment were weaned, while 6 of 17 (35%) SHAM subjects were weaned, p= 0.01.

Conclusions: This interim analysis found that IMST plus SBT led to improved weaning outcome when compared to SHAM plus SBT. Supported by NIH R01HD42705 to ADM.

E2205

Effects and possible predicting factors of exercise training in lung fibrosis patients

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Introduction: Exercise training in pulmonary rehabilitation for patients with lung fibrosis (LF) is not well documented. No data is available for the benefit of patients with LF receiving exercise training.

Purpose: The aim of this retrospective study was to measure any improvement in exercise capacity and to find any predictive parameters such as lung function and oxygen saturation that may correlate with the gain in 6 minute walk distance (g-6MWD).

Methods: Data of 120 patients were evaluated from the pulmonary rehabilitation program at the Klinikum Berchtesgadener Land, regarding age, sex, body mass index (BMI), inspiratory vital capacity (VCin), capillary oxygen saturation (PaO₂), dyspnoea (Borg-scale) and diffusion capacity. All available values were retrospectively analysed using Microsoft Excel add-in-program Winstat for correlation with 6MWD before and after inpatient rehabilitation program, mean of 58 days.

Results: Statistical results revealed a highly significant increase in 6MWD (+46,45m, p>0,01, n = 119). A positive correlation, r = 0,31 (p = 0,024; n = 41) between DLCO vs. gain in 6MWD and a highly positive correlation between PaO₂ vs. DLCO r = 0,72 (p>0,01; n = 30) could be seen. No significant correlation could be shown for VCin, Borg-scale at admission, BMI, age and sex compared to g-6MWD.

Conclusion: To our knowledge this is the largest group of LF patients that showed significant improvement in 6MWD after a multidisciplinary rehabilitation program. We could also show that DLCO, but not VCin, might be a useful predicting parameter for improvement of endurance capacity. Further investigations still need to be done to elucidate the proposed thesis mentioned above.

E2206

Who is the ideal candidate for telepneumology (TP) in chronic respiratory failure and MV? An European survey

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TP has been proposed in pilot studies in different respiratory conditions, but the best field of its application is not clear. To identify the possible "ideal candidate"

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of a multicentre TP trial and to evaluate the real sample size, we conducted a survey in 8 expert centres from Italy and Spain among chronic respiratory failure (CRF) patients under home MV. The following table shows main data. According to patient centered criteria for TP (distance from center, mobility problems and ventilation > 12 hours/day) we have found more than 30% of possible candidates. According to health resources consumed criteria, unstable COPD patients (24% of the whole sample) could be optimal candidates for TP. Great variability was found among centers in particular for COPD group.

	neuromuscular	Chest wall	COPD	TOT
No. home ventilated pts	344	352	253	949
No. pts necessitating > 12 h MV	136	18	94	248
No. tracheostomy	83	10	57	150
No. Hospitalisations/y	0.54	0.78	1.37	0.91
Length of stay/pt/y	5.08	3.76	13.14	7.5
No. out-patients visits/y	1.61	2.26	2.55	2.82
No. ER access/y	0.17	0.23	0.74	0.48
No. home visits/y	8.27	4.53	4.53	5.16
No. home visits/y	136	124	80	340
No. pts with mobility dependency	206	62	82	350
No. phone calls/y	2.27	1	2.5	2.77
No. of unstable COPD *	/	/	226	226

* uncontrolled clinical and CRF stability with at least 1 admission/y.

In conclusion 1. one third of home MV patients could be enrolled in a TP 2 further studies would demonstrate if TP program had to be proposed continuously or occasionally.

E2207

Contribution of peripheral muscle strength to the exercise capacity and dyspnoea in patients with hypercapnic respiratory failure due to kyphoscoliosis

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Objective. To study the influence of peripheral muscle strength on exercise capacity and dyspnoea indexes in a group of patients with hypercapnic respiratory failure due to kyphoscoliosis.

Methods. A group of 27 patients receiving home mechanical ventilation for hypercapnic respiratory failure due to kyphoscoliosis and clinically stable (age: 61 [55-67] yr.; FVC: 32.6 [28.7-38.9]%; pCO₂: 48 [42.9-51.6] mmHg) were included in a rehabilitation program. Previous functional studies included arterial blood gas analysis, spirometry, plethysmography, maximal respiratory pressures, and peripheral muscle strength (IRM test). Exercise capacity was evaluated by means of a maximal and submaximal cycle ergometer test and shuttle walking test (SWT). Dyspnoea was evaluated with a modified medical research council scale.

Results. A positive correlation between meters at the submaximal test and the upper and lower limb peripheral muscle strength was observed (IRM chest pull: $r = 0.430$, $p < 0.05$; IRM butterfly: $r = 0.586$, $p < 0.05$; IRM neck press: $r = 0.686$, $p < 0.01$; IRM leg extension: $r = 0.487$, $p < 0.05$). A correlation between time employed to achieve that distance and upper and lower limb peripheral strength was also observed (IRM butterfly: $r = 0.508$, $p < 0.05$; IRM neck press: $r = 0.534$, $p < 0.01$). Similarly, dyspnoea was also correlated with peripheral strength (IRM neck press: $r = -0.618$, $p < 0.01$; IRM leg extension: $r = -0.436$, $p < 0.050$).

Conclusions. 1. Peripheral muscle strength in upper and lower limbs influences submaximal exercise capacity but not SWT. 2. Muscular strength also influences dyspnoea perception in daily life tasks.

E2208

Effect of physical training in advanced chronic heart failure on oscillatory and inefficient ventilation

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Exertional oscillatory ventilation (EOV), defined as cyclic fluctuations in minute ventilation, has been described in patients with chronic heart failure and was associated with worse prognosis, cardiac function, and exercise capacity. We analyzed the respiratory function before and after a successful 3-week period of training in water (Cardio-hydrokinesitherapy, Cardio-HKT) in 17 patients (61±10 yrs) with advanced chronic heart failure (mean left ventricle ejection fraction, 27±6%), as demonstrated by improvements in V'O₂ peak (from 13.7±2.6 to 14.9±3.1 ml/kg/min, $p=0.02$) and in 6-min walking test distance (from 453±172 to 571±120 m, $p=0.01$). Patients were characterized by mild reduction of CO lung diffusion (73±14, %) with a near normal TLC (89±13, %) and FEV₁/VC ratio (73±8). After the 3-week training period, EOV (n=14) and V'E/V'CO₂ slope decreased, while the at resting-ratio V'max₃₀ to V'part₃₀ (M/P, n=9) increased. Although the origin of EOV is not yet been clarified, its reduction after a relative short period of Cardio-HKT, associated with a less steep V'E/V'CO₂ slope, suggests a stabilization of the respiratory system ventilatory control or

	At baseline	After 3-week HKT	
V'E, l/min	67±15	68±15	P=0.86
BF, breaths/min	35±8	37±6	P=0.11
V'E/V'CO ₂ slope	38±9	35±7	P=0.01
EOV, % of mean value	26±7	20±9	P<0.01
Expiratory Flow Reserve, l/s	0.66±1.12	0.63±1.08	P=0.15
M/P at resting, V'max30/ V'part30	1.18±0.20	0.99±0.06	P=0.01

better diffusion-perfusion matching, rather than hemodynamic modifications. The inversion of M/P ratio could reflect a reduction in pulmonary stiffness.

E2209

Comparison between breathing exercises and aerobic conditioning on symptoms, quality of life and exhaled nitric oxide in asthmatic adults

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Objective: The aim of the present study was to compare the effect of breathing exercise (BE) and aerobic conditioning (AC) in asthmatic patients.

Methods: Third nine patients with moderate and severe asthma (37.1±8.2 years old; FEV₁=78.5±12.9% predicted) presenting ≤50% in physical functioning domain in quality of life were studied. Subjects were randomly divided in breathing exercise (BE) (educational program + breathing exercises; n=20) and aerobic conditioning (AC) groups (BE + aerobic training, 70% maximal VO₂peak; n=19) and followed during 3 months, twice a week. Aerobic capacity (VO₂peak), quality of life and pulmonary function were evaluated before and after treatment. Noex and symptoms were evaluated monthly.

Results: After treatment, AC group presented a decrease on physical limitation domain (58.4±16.4 vs 34.3±9.5; $p<0.001$) and an improvement on VO₂peak (20.6±2.1 vs 25.3±3.4 mlO₂/kg/min; $p<0.001$) when compared with BE group. AC but not BE group presented a decrease in symptoms after 1st (7.6±1.3 vs 3.1±0.5; $p=0.001$), 2nd (6.8±1.5 vs 2.3±0.5; $p=0.001$) and 3rd month (6.8±1.6 vs 1.7±0.6; $p=0.001$). Noex was also decreased 1st (40.7±15.2 vs 30.2±12.3 ppb; $p<0.05$), 2nd (37.9±11.4 vs 27.3±8.3 ppb; $p=0.001$) and 3rd month (40.0±11.1 vs 23.5±8.2 ppb; $p=0.001$) after aerobic training. No change in lung function was observed between both groups.

Conclusions: Our results suggest that aerobic conditioning improve quality of life and decrease symptoms and exhaled nitric oxide in asthmatic patients reinforcing its importance on asthma treatment.

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E2210

Home ventilation for chronic respiratory failure in children

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Advances in ventilatory technology for home care increased the possibilities for discharging chronically ventilated children from intensive care units. The aim of this study was to review clinical condition and outcome of children who were discharged from the hospital on home respiratory support. Twenty two patients with a mean age of 5.9±4.8 years were discharged home with ventilatory support (50% male). Ventilatory support (VS) was started at a mean age of 4.9±4.1 years. Causes for respiratory failure were central control disorders (n=4), chronic lung disease and/or airway problems (n=15) and neuromuscular disorders (n=3). Patients received home ventilation for 13±14.1 months. Seven patients received invasive mechanical ventilation via tracheostomy and fifteen patients received non-invasive ventilation via nasal or face mask (nasal n=10, face mask n=5). Two patients were decannulated and are currently receiving non-invasive ventilation. Eighteen % of patients received support for 24 hours while the rest only received ventilatory support during overnight sleep. Fourteen % of the patients had malnutrition (weight z scores <-2 SD). Patients were routinely evaluated every 3 months and their tracheostomy, effectiveness of ventilation and oxygenation were evaluated every 6 months/yearly. Fourteen patients also received supplemental O₂. Eight patients died during follow up due to their underlying disease. None of the patients had life threatening complications of tracheostomy or ventilators. In conclusion, home ventilation can be safely applied in selected children with chronic respiratory failure with close monitorization and proper follow up.

E2211

Home mechanical ventilation (HMV) in patients with neuromuscular diseases. Long-term survival and prognosis factors

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HMV is a good option for treating chronic respiratory failure due to neurosmu-

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lar disease. However their use in amyotrophic lateral sclerosis (ALS) remains controversial.

Aim To analyze long-term survival and prognosis factors in patients on HMV due to neuromuscular disease.

Method: Observational study of patients included in a HMV program along 12 years, with a diagnosis of neuromuscular disease. Ventilation was indicated according to established criteria, including the existence of chronic hypercapnia. In ALS extreme dyspnoea was also considered a criterion for ventilation. Data were prospectively recorded. For the purpose of analysis 2 groups were considered: patients with slowly progressive disease (SPD) and patients with ALS.

Results: We analyzed 71 patients (41F, 30M) who fulfilled the criteria. When HMV was started patients shown moderate or severe ventilatory restriction (FEV1: 43(20)% FVC 44(19)%; FEV1/FVC 82%) hypercapnia (PaCO₂ 59.3(18) mmHg and hypoxemia (PaO₂ 60(14) mmHg). Patients with SPD were younger and had a ventilatory impairment and a PaCO₂ higher than patients with ALS (p<0,01). Survival at 1, 3 and 5 years was 79, 64 y 61% respectively. Patients with ALS had significantly worse results than patients with SPD. Univariate analysis shown that age and ALS were mortality risk factors while PaCO₂ had protective value. In multivariate analysis only a diagnosis of ALS was associated to a higher mortality. (RR 5.34 IC95% 1,8-15,4, p:0,002)

Conclusions: Our results confirm HMV as a highly effective treatment for patients with chronic hypercapnia due to SPD. In patients with ALS results are very poor, independently of the age or the initial functional impairment.

E2212

Outcome measures in pediatric pulmonary rehabilitation (PR)

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Pediatric Pulmonary Rehabilitation (PR) has been evolving through these years and yet limited studies have been reported in medical literature. The objective of this study is to determine short term effects of PR in pediatric patients.

Sixteen subjects were enrolled at a tertiary hospital from Jan 2000 to Aug 2005. Eleven subjects completed it but only 9 had data available for analysis. Mean age was 13.7 yrs (± 2.21) with BMI of 16.9 kg/m² (± 0.97). The population was mostly male (81.8%). No significant difference between baseline and post-rehabilitation spirometric studies were noted. Six-minute walk test showed increase in distance attained after PR with improvement in functional status.

PFT, 6-minute walk test, modified borg scale

	Pre-Rehabilitation	Post-Rehabilitation	P value
FEV1	44 (± 28.68)	47 (± 31.08)	0.40
FVC	46 (± 30.36)	50 (± 32.33)	0.163
FEV1/FVC	1 (± 1)	0.472 (± 0.503)	0.521
Distance (m)	298.64 (± 112.87)	358.36 (± 124.91)	
Treadmill workload (mph)	2.71 (± 0.565)	2.94 (± 0.167)	0.225
Treadmill workload, % elevation	5.11 (5.395)	11.56 (7.126)	0.009
Perceived breathlessness	2.67 (± 1.225)	1.61 (± 0.93)	0.0277
Perceived fatigue	2.14 (± 0.58)	1.44 (± 1.20)	0.1380

The effectiveness of PR dealing with COPD is well established, however, there is very little experience in programs dealing with pediatric patients. This study showed positive impact on exercise capacity, endurance, reduction of shortness of breathlessness and fatigue and increased knowledge of pediatric patients and relatives regarding their disease.

E2213

Study of sexuality in patients with lung diseases: "need to bridge psychosocial barriers in patient rehabilitation"

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Issues: patients of respiratory diseases suffer anxiety/depression. We studied lung cancer population for this co-relation.

Aims: [1] study sexual behavior in lung-cancer/asthmatics/asbestosis patients [2] Evaluate effects of drug treatment [3] study impact of Lung Cancer diagnosis on couples quality of life.

Study Protocol: 127 couples diagnosed lung-cancer/asthmatics/asbestosis who returned to villages after therapy in Cities. 64% chronic COPD. 22% on chemotherapy. Responses by NGO volunteers on evaluation questionnaire quality of life [Evaluation Performa available at munich-congress]. Treatment outcome in relation to availability-cost-acceptance of drugs studied.

Results: 73% of couples suffered depression/anxiety/fear. 11% couples described total impotency/frigididity in sexual relations immediately after Diagnosis. When remission longer incident came down 4%. 84% respondents claimed behavioral change to psychological impact of Lung-cancer-Diagnosis while 16% attributed to fear of death. 82% acknowledged guilt/stigma. In patients of respiratory-cancer 86% had undergone surgical therapy while rest 14% were on Chemo/Radio therapy. Coping with mental agony was responded with different patterns.

Conclusion: Sexual dysfunction is common in subjects with stress of chronic respiratory illnesses. Etiological roots lead to trauma & guilt of sufferer especially in tobacco induced ailments. By developing well-knit group of counselors, physiotherapists & family back-up we can work-out ideal approach to deal with this sensitive issue Respiratory-Aliments. With limited set-up of NGO we made affected couples to express their trauma & guided them overcoming it.

E2214

Clinical benefits of a combined hospital and home-based exercise program in patients with interstitial lung disease

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The benefit of pulmonary rehabilitation (PRH) in patients with COPD has been well documented. However, little is known about PRH in patients with other chronic pulmonary diseases, especially in pts with interstitial lung diseases (ILD).

Aim of the study is to examine results of a combined hospital and home-based exercise program in patients with ILD.

Material and methods. The study comprised 32 pts with ILD (23 with idiopathic interstitial pneumonia, 4 allergic alveolitis, 4 collagenosis, 2 silicosis, 1 LAM). Each patient underwent an intensive (every day for 30 min.) inpatient PRH program with an average length of stay 4 wk, which consist of respiratory muscle training (RMT) and bicycle riding (BR) to the patient's tolerance. RMT and BR patients provide at home for next 8 weeks under supervision of medical students. Dyspnoea (MRC, OCD, BDI and Borg scale), quality of life (SF-36, SGRQ), exercise tolerance (6 MWT, CPET) and pulmonary function tests (FVC, FEV1, TLC, DLCO) were performed at both the time of admission and discharge.

Results: After 12 weeks of PRH, we observed improvement in Borg scale (2.9 vs 2.1), quality of life in SF-36 (Role-Physical 40,6 vs 60,1) and SGRQ (activity: 52 vs 45, impact 47 vs 40 and total 47 vs 42) in comparison to the initial results. A significant improvement in 6 MW distance (from 499 to 593 m) was observed too. No significant changes were observed in results of pulmonary function tests and CPET although we observed improvement in work ability in CPET (from 98 W to 102 W). We **conclude** that 12 weeks of combined inpatient and home based PRH programme improve quality of life and sensation of dyspnoea in patients with ILD.

E2215

Home care for patients with chronic respiratory disorders: one year experience in a Sicily Province

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Introduction: Patients with chronic respiratory failure (CRF) are increasing all over the world. Patients that require long-term oxygen therapy and/or mechanical ventilation (invasive or not invasive) are ideal candidates to access home care services (HCS).

Material and methods: 16 patient with CRF (6 on long term oxygen therapy, 7 on long term non invasive mechanical ventilation and 3 on invasive mechanical ventilation via tracheostomy) from Messina's (Sicily) province were enrolled in a one-year respiratory home care service. Home care team are composed by general practitioners, respiratory nurses and therapists coordinated by one pneumologist. An integrated system of telemedicine was started to monitoring patient at home. All stored data were available by all staff members in a web-designed software with individual access password system.

Results: one year program was characterized by 171 pneumologist home visits, 124 home spirometry and gas-analysis, 258 telemedicine transmissions. Patients quality of life measured by Saint George Respiratory Questionnaire demonstrated a significant improvement (symptoms, activity, impact and total score) just after 3 month of beginning program and these results was maintained until the study conclusion. An health and economic analysis were positive due to reduction of hospital and emergency room admissions and hospital length of stay with estimated individual cost saving per year of about 10.000 €.

Conclusions: This is the first organized home care service for patients with chronic respiratory failure carry out in a Sicily province that demonstrated roles of telemedicine systems and cost-effectiveness benefits of HCS.

E2216

Recovery from pulmonary contusion after blunt chest trauma

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Background: Blunt chest trauma can cause severe acute pulmonary dysfunction due to hydro/pneumothorax, fractures of ribs and lung contusion.

Aim: To study long term lung function after severe chest trauma.

Methods: 13 patients with severe blunt chest trauma and lung contusion enrolled the study. There were 9 men and 4 women, their average age was 44.6±13.

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10 underwent motor vehicle accidents and 3 fell from height. In addition to lung contusion most of them had fractures of more than 3 ribs and hydro/pneumothorax, 8 patients were treated with chest drains. Mean ICU stay was 11 days (0-90), and mechanical ventilation 19 (0-60) days. 10 patients had also other concomitant injuries. After 3-48 months pulmonary function tests and cardiopulmonary exercise test were performed

Results: Mean FEV₁ was 81.2%±15.3 (mean FVC 85%±13, RV 134%±33.4, TLC 100.8%±13.6, DLCO 86.53±23.6), post exercise oxygen saturation was normal in all patients (97±1.5), mean VO₂ max/kg was 17.63±4.3 ml/kg/min (60.2±15%). FEV₁ was significantly lower among smokers (71.1±12.2 vs. 89.2±13.6 p=0.017), but there was only a non-significant tendency towards lower FEV₁ among patients that underwent mechanical ventilation.

Conclusions: Late after severe trauma involving lung contusion substantial recovery is demonstrated with good pulmonary function tests. These results encourage maximal intensive care in these patients. Further larger studies are requested to investigate different factors affecting prognosis.

E2217

The effect of exercise in the patients with the diagnosis of interstitial lung fibrosis

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Aim: To investigate the effect of the exercise program practiced as house program in the cases of interstitial lung fibrosis by interpreting the clinical and functional symptoms of the patients.

Material & Method: The exercise program of eleven patients (7F, 4M, average age. 66.82±13.07, average FEV₁ 2.00±0.41) with the diagnosis of interstitial lung fibrosis, which contained mostly the breathing exercise, posture exercise with breath control and walking education, was offered to done five times a week as a house program and it was evaluated after twelve weeks. We used clinical history research, the six-minute walking test, SF-36 life quality survey for life quality, effort and resting dyspnea severity during the walking test, Modified Borg Scala for leg fatigue severity, Medical Research Council dyspnea scale (MRC) for dyspnea severity of daily life activities and spirometric values for lung functions as evaluation parameters.

Symptoms: After twelve weeks, in the %72.7 of the patients who had done the exercises, physical examination findings and symptoms recovered in a significant level (p<0.05); but there is no statistical significant increase at lung volumes, walking distances, life qualities and decrease in dyspnea severity, neither. (p>0.05).

Result: The results show that the home exercise program is not proper for this patients, the observations have to be more often and/or the patients can protect their clinical and physical stabilizations during this time by using right way of observation, true medical treatment and correct way of exercise.

E2218

Home mechanical ventilation: experience of a specialised unit for neuromuscular patients (NMP)

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We reviewed the neuromuscular patients studied in our Home Mechanical Ventilation Unit (HMV) (1998-2005). 28 M (57%) and 21 W, age 53±14, BMI 25±6, neck 38±5. 22 ALS (45%), 13 Steinert (27%), 3 M. Gravis (6%), 2 Duchenne (4%) and others 9 (18%). Mean symptom time and diagnosis time were 119±119 and 101±102 m. 23 (44%) had bulbar dysfunction. High scores were obtained in the functional scales *MIRS* (≥ 4: 76%), *FLMS* (≥ 7: 45%), and *Charlson*: 1±1.5 (0-5). 32 (65%) had orthopnea and 34 (69%) desaturation on supine. Sleep study (SS) was performed in 42 (86%). HMV was unnecessary in only 1, the remaining used HMV nightly in 23 (47%), part-time 15 (31%), and 24 hours 2 (4%). 6 were waiting for the SS to initiate HMV as needed. The majority were ventilated non-invasively (40, 82%) and 2 invasively (4%), during 13±20 m. HMV modalities: bi-level 26 (62%), 8 (19%) A/C volume and 8 CPAP, 28 with nasal mask (65%), 11 oro-nasal (26%) and 4 mouthpiece (9%). HMV tolerance was good in 21 (54%), moderate in 12 (31%) and bad in 6 (15%). Assisted cough techniques (ACT) were used for 8 (16%) (manual) and mechanical in 7 (14%). 4 (8%) had PEG. In 28 (57%) the caregiver was a close relative. The median follow-up was 7 m (0.2-90), and 5 pt were lost for follow-up (3 Steinert). In the last 2 years 37 new cases were studied (76%), vs 12 in the 5 previous years (24%) (p<0.001). Before starting HMV and ACT a mean of 1±4 (0-28) admissions due to respiratory infection (RI) occurred, vs 0.3±0.6 (0-2) after that. 8 bulbar ALS (17%) died, 3 due to RI and 5 for disease progression. We conclude that the start of a HMV incremented the submits. HMV compliance was good. NMP have high functional limitations, been necessary HMV.

E2219

Effect of rehabilitation exercise on the extremity function and lung function in patients with Duchenne's muscular dystrophy

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Objective: To investigate the effect of rehabilitation exercise on the extremity function and lung function in patients with Duchenne's Muscular Dystrophy (DMD).

Method: Two groups of DMD patients were investigated. One group insisted on long-term rehabilitation exercise (Group A). The other group nearly never had any rehabilitation exercise (Group B). Each group had eight patients. We obtained the measured data of the spine, extremities and recorded the function of neck, upper extremities and hands of the two groups, as well as their pulmonary ventilation function.

Results: There was no significant difference in age and medical history between the two groups (P>0.05). Although Group A relied on wheels, no obvious spinal deformity and extremity atrophy was found in this group, and the function of neck, upper extremities and hands was maintained. In Group B, 6 in 8 patients had significant spinal deformity and extremity atrophy. There was significant difference in FVC, FEV₁, MVV, FVC%, FEV₁%, MVV% in the two groups, but not in FEV₁/FVC. The mean value of FEV₁/FVC in the two groups was 96% and 98% respectively, suggesting the similar trend of restrictive ventilatory disorder.

Conclusion: Rehabilitation exercise is important for DMD patients in delaying the progression of spinal deformity, extremity atrophy and deterioration of pulmonary function. The phenomenon of slower deterioration of pulmonary function than spinal and extremity function is probably due to the unconscious exercise by respiratory movement. DMD patients should insist on rehabilitation exercise, not only on extremities, but also on respiratory muscles.

E2220

Exercise and respiratory training improve exercise capacity and quality of life in patients with severe chronic pulmonary hypertension

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Background: Pulmonary hypertension (PH) is associated with restricted physical capacity, limited quality of life, and a poor prognosis due to right heart failure. This is the first, prospective, randomized study to evaluate the effects of exercise and respiratory training in patients with severe symptomatic PH.

Methods: Thirty patients with PH (21 female, mean age 50 ± 13 years, mean pulmonary artery pressure 50 ± 15 mmHg, mean WHO-class 2.9 ± 0.5, pulmonary arterial hypertension n = 23, chronic-thromboembolic PH n = 7) on stable disease-targeted medication were randomly assigned to a control (n = 15) and an exercise-training group (n = 15). Medication remained unchanged during the study period. Primary end points were the changes from baseline to week 15 in the distance walked in six minutes and in scores of the SF-36 quality of life questionnaire. Changes in WHO functional class, Borg scale, and parameters of echocardiography and gas exchange were also assessed.

Results: At week 15, patients in the exercise-training group had an improved six-minute walking distance; the mean difference between the control and the exercise-training group was 111 m (95 percent confidence interval, 65 – 139 m; p<0.001). Exercise training was well tolerated and also improved scores of quality of life, WHO functional class, peak oxygen consumption, oxygen consumption at the anaerobic threshold, and the achieved workload.

Conclusion: This study indicates that respiratory and physical training could be a promising adjunct to medical treatment in severe PH. The effects add to the beneficial results of modern medical treatment.

E2221

Psychic and physical rehabilitation for patients with asthma

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Background: it's well-known that patients with asthma have changes in psychic status and reducing of physical tolerance, but usually convenient therapy doesn't provide anything to improve physical and psycho-emotional status.

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Aim: to estimate influence of group's physical exercises upon physical and psycho-emotional status of patients with asthma.

Materials: 28 patients with mild-to-moderate asthma were randomized into 2 groups: all of them got basic therapy (beta-2-agonists, inhaled corticosteroids) but the 1st group's patients twice per week had done complex of physical exercises.

Methods: before, every month and after investigation we estimated psycho-emotional status (anxiety and depression scales), physical tolerance (6 minutes walking) and self-rating of patients general condition.

Results:

	Before			After		
	1 group	2 group	p	1 group	2 group	p
Depression (points)	14,41±7,04	14,47±10,3	0,99	8,77±6,7	15,82±10,03	0,02
Anxiety (points)	18,06±10,5	21,94±10,2	0,28	12,35±9,6	22,06±10,6	0,01
6 min. walking distance (m)	560,8±61,5	556,7±96,7	0,67	620,6±53,24	550,9±120,7	0,02
Self-rating of general condition (points)	62,24±16,7	77,88±18,5	0,12	80,0±11,3	69,59±18,7	0,06

Conclusions: physical exercises demonstrated positive effect upon physical and psycho-emotional status of patients with mild-to-moderate asthma.

E2222

Increased survival using home mechanical ventilation versus long-term oxygen therapy in patients with chest wall deformity due to tuberculosis

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Patients with tuberculosis (TB) induced thoracic deformity, such as gibbus or thoracoplasty, often develop chronic respiratory failure. This is characterised by hypercapnea due to underventilation, but also often by hypoxia because of sequels of pulmonary TB or other concomitant respiratory disorders. Therefore, both home-mechanical ventilation (HMV) and long-term oxygen therapy (LTOT) are justified options of treatment.

We aimed to study whether survival is different in patients with chest wall deformity due to TB, when receiving HMV or LTOT.

We prospectively included all patients with chest wall deformity due to TB who started HMV (n=70), LTOT (n=103) or both (BOTH)(n=15) in Sweden between 1996-2005. The National Cause of Death Register provided vital status and dates of death.

Multivariate analysis showed that treatment mode was the only significant determinant of survival (relative risk of death for LTOT 3.32 (95%CI 1.43-7.69), for HMV 0.83 (95%CI 0.41-2.52) and for BOTH 1,00 (reference)), after adjustment for age, sex, concomitant pulmonary disorders, age at therapy onset, arterial blood-gases, FEV₁, VC and alveoloarterial gradient.

Conclusion: Patients with chest wall deformity due to tuberculosis had a better survival when treated with home mechanical ventilation than with long-term oxygen therapy. We suggest that home mechanical ventilation should be the primary therapy for such patients.

E2223

Effect of physical rehabilitation on functional status of Chernobyl patients

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Exercise intolerance due to dyspnea is a common problem in Chernobyl patients. We assessed effect of physical rehabilitation on exercise performance, respiratory muscles and lung function in Chernobyl patients with chronic respiratory pathology.

Twelve Chernobyl patients were involved in 2-wk program of physical rehabilitation including treadmill and dumb-bell exercises, and diaphragmatic breathing (the 1st group) and 10 ones were not trained (the 2nd group). Apart this, both the groups equally received inhaled therapy with anticholinergics, β_2 -agonists, steroids.

Lung function parameters (LFP), 6 minute walk distance (6MWD), Borg's dyspnea scoring were monitored. We also studied maximal expiratory (PEmax) and inspiratory (PImax) pressures reflecting the respiratory muscle strength and energy needed to overcome respiratory resistive load which is respiratory endurance measure (Micro Medical, UK).

The patients' age was 52.1±7.2 yrs (M±SD) in the 1st group and 53.7±5.9 yrs in the 2nd group. The groups were equal for LFP (FEV1/FVC, 66.6±14.1 and 64.7±12.8% correspondingly).

Physical rehabilitation program resulted in the increase in 6MWD by 27,3 m vs reduction by 17 m in the 2nd group. The respiratory muscle endurance increased from 43.1±23.6 to 114.2±90.6 J vs decrease from 22.3±13.8 to 11.8±4.1 J. The 1st group improved the heart rate from 84 to 75 min⁻¹ (p<0.05) and SaO₂ from 96.5 to 97.5% (p<0.05). LFP, PImax, PEmax and dyspnea did not change significantly in both the groups.

Therefore, the general physical training improves physical status but does not effect the respiratory muscles which probably contribute to dyspnea and require special training.