

MovementTherapy for patients confined to bed in  
Intensive Care Units, Dialysis and Heart Disease Departments



# MOTomed<sup>®</sup> letto

Scientific information, experience reports, references :

MOTomed Therapy

Motorized, software-controlled therapy machines for rehabilitation and physiotherapy

# Spiroergometry in Patients with Severe Chronic Obstructive Pulmonary

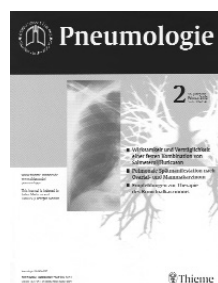
## Disease Confined to Bed

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### Abstract

**Background:** Exercise training is recommended for patients with severe chronic obstructive pulmonary disease (COPD) to improve the endurance capacity. While many patients confined to bed are not able to run exercise training, we investigated the influence of a bedside passive-ergometry on ventilation in patients with severe COPD. **Methods:** In nine patients with severe COPD confined to bed (FEV1.0  $0,94 \pm 0,18$  l, IVC  $2,3 \pm 0,8$  l, Raw  $0,91 \pm 0,13$  kPa/l/s) we measured oxygen uptake  $\dot{V}O_2$ , breathing frequency BF and minute ventilation  $\dot{V}E$  during rest, passive movement (30 revolutions per minute), additional active movement and maximal exercise. As a control group six healthy men were investigated during rest and passive movement. **Results:** During maximal exercise in COPD patients  $\dot{V}O_2$  peak reached  $618 \pm 177$  ml/min, BF  $26 \pm 7,2$ /min and  $\dot{V}E$  max  $24,1 \pm 5$  l/min. In rest  $\dot{V}O_2$  was  $311 \pm 56$  ml/min (53%  $\dot{V}O_2$  peak), BF  $17,6 \pm 3,1$ /min and  $\dot{V}E$   $13,3 \pm 2,7$  ml/min (55%  $\dot{V}E$  max), while during passive movement  $\dot{V}O_2$  was increased to  $369 \pm 88$  (62%  $\dot{V}O_2$  peak), BF to  $19 \pm 5,3$  and  $\dot{V}E$  to  $16,4 \pm 4,1$  (68%  $\dot{V}E$  max). In contrast  $\dot{V}O_2$  in control subjects dropped from  $377,5 \pm 38$  in rest to  $336 \pm 27$  ml/min during passive action, BF from  $14 \pm 2,1$  to  $12 \pm 2,4$ /min and  $\dot{V}E$  from  $11,1 \pm 1,3$  to  $9,1 \pm 1$  ml/min. **Conclusions:** In patients with severe COPD oxygen uptake, breathing frequency and minute ventilation increased not only during active, but even during passive movement of a bedside ergometer. With this method an exercise training is possible even in COPD patients confined to bed.

If you are interested in the complete study please send an Email to [contact@motomed.com](mailto:contact@motomed.com) with your complete post mail address or give us a call (phone: +49 (0)73 74-1885).



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#### Bibliografie

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## Uptake of and adherence to exercise during hospital haemodialysis

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### Abstract

**Objectives** To determine the uptake of and adherence to exercise during hospital haemodialysis.

**Design** Eight-week intradialytic cycling programme, supervised by a physiotherapist.

**Participants** Forty-nine patients who were being treated by hospital haemodialysis in Dumfries at the start of July 2003.

**Main outcome measure** The percentage of patients who were still exercising at the end of the 8-week programme.

**Results** Three patients were ineligible: one died, one moved to another centre and one transferred to peritoneal dialysis. Eight (17%) patients were not interested in taking part in the study and 16 (35%) had medical problems that prevented them from taking part. Twenty-two of the remaining 46 (48%) patients began the programme. Those who exercised were younger (58 versus 67 years) and had fewer comorbidities (1.3 versus 2.1) than patients who did not exercise. Seventeen patients (77% of those who started exercising and 38% of those eligible to exercise) were still cycling at the end of the 8-week period. Sixteen of the 22 patients felt that they had benefited from the programme, and all 22 patients said that the programme should continue.

**Conclusions** Around 40% of haemodialysis patients may be suitable for and able to complete an 8-week intradialytic cycling programme. This is a higher rate of adherence to exercise than reported in the literature. Our experience of haemodialysis patients in south-west Scotland suggests that uptake and adherence may be maximised by the presence of a physiotherapist during each dialysis session, and by targeting patients for exercise during dialysis rather than in an outpatient setting.

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*Keywords:* Exercise; Rehabilitation; Hospital haemodialysis; Chronic kidney disease

### Introduction

Renal dialysis patients have some of the highest death rates from cardiovascular disease recorded in the literature [1]. The role of exercise in preventing cardiovascular disease through modification of risk factors such as obesity, hypertension and raised blood cholesterol [2] is well accepted. Exercise has also been shown to provide some protection against other chronic illnesses such as osteoporosis, type 2 diabetes and depression [2]. While exercise is commonly recommended in the treatment of cardiac and pulmonary disease, it is not yet widely used in patients with end-stage renal disease (ESRD) [3].

Dialysis patients have reduced exercise capacity [4], are less active [5] and have greater muscle atrophy [5] compared

with sedentary age- and sex-matched people from the general population. The cause of reduced exercise capacity is multifactorial including anaemia, uraemic myopathy and neuropathy, disuse atrophy, impaired muscle metabolism, autonomic dysfunction, malnutrition and associated comorbidities [6]. Recombinant erythropoietin increases haemoglobin and has been shown to improve but not normalise exercise capacity [7], suggesting that anaemia is not solely responsible for poor performance [8].

A growing body of evidence, mainly from America, shows that patients with ESRD will benefit from exercise. Exercise during dialysis [9], on non-dialysis days [10] and lifestyle approaches [11] have all shown improvements in exercise capacity and quality of life. There is also evidence that exercise during dialysis can help to reduce solute rebound, leading to more effective dialysis [12]. However, few authors have considered the likely uptake of and adherence to exercise.

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## Experience report concerning the MOTomed letto in heart surgery

Dear Mr. Derrer,  
Dear Mrs. Weggenmann

Thank you very much for loaning us the MOTomed letto temporarily. Our experiences refer to a treatment period of more than 8 weeks. During that time we used the machine in addition to physiotherapy in the postoperative early stage after heart surgeries on intensive care units of children and adults cardiology.

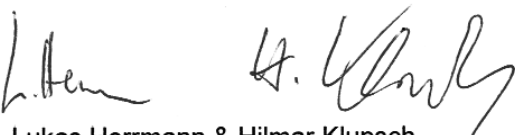
We successfully used the machine with patients with the following indications :

- with sedated, relaxed long-term patients for prevention of contractures and thrombosis as well as for building up muscles of the lower extremities
- stabilization and training of circulation
- stimulation of metabolism and bowel movement, especially with long-term patients
- with neurological concomitant diseases like postoperative hemiplegias, especially for reduction of spasticity and prevention of contractures
- for building up/keeping muscles with cardiomyopathy patients with extra-corporal circulation systems (e. g. Berlin Heart)

Thanks to the simple use, the clear, the display and the introduction of Mr. Derrer, the work with the MOTomed letto is a child's play. After the few tests, the machine could be set up and used quickly, safely and uncomplicatedly with the patient. The simple handling, the analysis of the training as well as the success in treatment of the patients and their positive feedback persuaded us to integrate the MOTomed letto as a fully developed training machine for patients confined to bed, sedated patients and also artificially respired long-term patients. We have been using the MOTomed letto since one year now. In this period of time, the experiences have been confirmed and also our senior consultants absolutely desire it for assisted physiotherapy.

On behalf of our department we want to thank for the pleasant cooperation with the RECK company and Mr. Derrer.

With best regards

  
Lukas Herrmann & Hilmar Klupsch



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Dear Mrs. Schmidberger,

we are currently using two MOTomed letto bed devices in the heart and diabetes center NRW, Bad Oeynhausen. After having the MOTomed letto on trial, we decided to purchase it as we have around 60 intensive care unit beds. We subjectively noticed that mainly patients, who are confined to bed due to neurological problems or i.e. due to hemofiltration/dialysis profit from this movement therapy carried out in addition to the normal physical therapy.

In the meantime these devices are already being used in our facility since many years. For us this means a relief of strain and an additional therapeutic gain of time for our patients. Not least the time extensive mobilization of patients with artificial hearts and of patients after heart transplantations is complemented usefully.

At the moment there are unfortunately only subjective aspects of the therapy to report. A wish which I already expressed some time ago for objectification is the possibility of documentation the trainings' watt and calories and the possibility to digitally record or print out the training course.

Then there would be the possibility to record objective criterions in the course of a study or a normal documentation. Following present points of view only therapy forms where an evidence of effectiveness is provided are assessed as beneficial.

We as physical therapy department are still very satisfied with the devices and are using them daily.

Best regards,

Andreas Fründ

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## 0411

### EFFECTIVENESS OF EARLY EXERCISE IN CRITICALLY ILL PATIENTS: PRELIMINARY RESULTS

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**INTRODUCTION.** Critically ill patients often have a prolonged ICU and hospital stay, associated with deconditioning and muscle weakness. This prospective trial examined whether an early daily cycling session program while still bed-bound could reduce the level of deconditioning and thus reduce hospital stay.

**METHODS.** Stable patients, ventilatory supported for at least 5 days, were randomized into an experimental and a control group. Both groups received identical medical treatment and daily sessions of chest physiotherapy, standardized mobilizations and functional rehabilitation. In addition, the exercise group was treated with active or passive cycling sessions for 20 minutes per day using a bedside ergometer. Functional status was assessed using item 1 of the Berg Balance Scale (BBS), Functional Ambulation Categories (FAC) and the Physical Functioning item of the SF36 Health Questionnaire. Six-minute walking distance (6MWD) at hospital discharge and length of hospital stay (LOS) were registered.

**RESULTS.** Results are reported in Table 1. We included 37 patients (mean age 55±18; 68% male). There was no difference in APACHE II score (13.2±5.5) between groups. The experimental group had a statistically significant better functional outcome at hospital discharge as measured with PF SF36. At ICU discharge there was no significant difference.

**TABLE 1.**

	control (n=19) ICU discharge	experimental (n=18) ICU discharge	control (n=15) hospital discharge	experimental (n=8) hospital discharge
<b>BBS (score)</b>	2.3±1.9	1.6±1.6	4.1±1.2	4.8±0.5
<b>FAC (score)</b>	1.5±1.8	0.8±1.6	3.4±1.3	4.0±0.9
<b>PF SF36 (score)</b>			15.9±4.3	19.9±4.2*
<b>LOS (days)</b>			33.2±13.1	28.7±10.4
<b>6 MWD (% pred)</b>			36±19	43±15

\*  $p < 0.05$  vs control group; results are means +/-SD

**CONCLUSION.** Interim analysis indicates that early exercise in critically ill patients improves subjective functional status at hospital discharge, but we could not demonstrate a beneficial effect at ICU discharge.

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Bernkastel-Kues, 06.01.1999

Your letter of 21st December 1998

Dear Mr. Schelkle,

thank you very much for your letter of 21st December 1998.

Gladly I will fulfill your request to write a short experience report about the use of the MOTomed letto in the dialysis.

I started with ergometric training during the hemodialysis treatment upon recommendation of Assistant Professor Dr. Daul.

Our patients mainly suffer from occlusive arterial disease, circulation disorders and neuropathy. The experiences of my colleague went towards circulation training, improvement of the patients' mobility, improvement of the general training conditions.

I wanted to confirm these experiences with the ergometer training as the patients are on the dialysis for 4-6 hour tree times a week.

My experiences are mainly positive. The ergometer training was carried out from 30 % of my patients following a strict timetable with increased exertion phases and with increased exertion times.

The experiences show an improvement of the personal performance, then tested in daily life. The patients report about an increased mobility and an enlarged range of motion after 4 weeks of training.

We also used the device for passive mobilization with patients having spinal canal stenosis. The patient should learn at least to use their legs for standing again. Even in the shortness of observation time we saw a first success here as welll.

In my opinion a training program or given training plans with individual eligible goals would be useful.

Useful would be also be to document of the performances in a notebook.

We would like to thank you again for letting us trial the device and remain

with best regards,

Dr. med. B. Oser

