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The effects of therapy on spasticity utilizing a motorized exercise-cycle

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F-wave amplitudes have been used to demonstrate changes of motor neuron excitability in patients receiving pharmacological antispastic therapy as well as in those having physiotherapy. In this study it is shown that F-wave amplitudes can also be used to document changes of motor neuron excitability as an effect of the therapy with a motorized exercise-cycle, which moves the legs of paraplegic patients in a way similar to cycling. Ten F-waves were recorded immediately before and after the therapy with a motorized exercise-cycle in 70 legs of 35 patients with spastic paraparesis. Mean F-wave amplitude, mean F-wave/M-response ratio and maximum F-wave/M-response ratio were significantly lower after therapy than before. Conclusion: The antispastic effect of the therapy with a motorized exercise-cycle may be documented by a decrease of F-wave-amplitude parameters.

Keywords: spastic paraplegia; physical therapy; exercise-cycle; electrophysiology; F-waves

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Three-month endurance training improves functional fitness and knee muscle performance of patients with end stage renal disease (ESRD)

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Received 16 February 2016 Accepted 27 March 2016

Abstract

BACKGROUND: Patients with end-stage renal disease (ESRD) have poor physical performance and reduced exercise capacity due to frequent haemodialysis treatments.

OBJECTIVE: The aim of the study was to determine the effectiveness of a three-month endurance training programme in patients with ESRD.

METHODS: In order to improve both functional fitness and skeletal muscle properties, movement therapy-cycle ergometer, was applied in eligible ESRD patients during dialysis. The study included 40 dialysis patients, but only 27 patients completed the full three-month training during each haemodialysis treatment. Before and after training, all patients underwent observations according to the established protocol: functional capacity – Six-Min Walk Test, agility – Timed Up and Go test, and muscle strength testing under isokinetic conditions at 60, 180 and 300°/s.

RESULTS: Patients covered significantly longer distances in the 6MWT with a higher gait intensity after the 3 months training programme: the 6MWT increased from 360.8 to 390.2 m and metabolic equivalent from 2.74 to 2.85. The TUG significantly decreased in both women and men: from 9.07 to 7.51 s, and from 9.64 s to 7.4 s, respectively. The knee extension peak moment at 60 and 180°/s was significantly higher in women than in men following training. In addition, the women demonstrated more significant changes in flexor muscles at all angular velocities.

CONCLUSIONS: Three-month endurance training was effective in patients with ESRD in improving both functional fitness and skeletal muscle properties.

Keywords: End-stage renal disease (ESRD), 6MWT, muscle moment, physical training

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$\begin{tabular}{ll} MOTOmed_{\odot} \\ un movimiento diferente \\ \end{tabular}$

Cycling Induced by Electrical Stimulation Improves Motor Recovery in Postacute Hemiparetic Patients

A Randomized Controlled Trial

Emilia Ambrosini, MS; Simona Ferrante, PhD; Alessandra Pedrocchi, PhD; Giancarlo Ferrigno, PhD; Franco Molteni, MD

Background and Purpose—This study assessed whether cycling induced by functional electrical stimulation (FES) was more effective than passive cycling with placebo stimulation in promoting motor recovery and walking ability in postacute hemiparetic patients.

Methods—In a double-blind, randomized, controlled trial, 35 patients were included and randomized to receive FES-induced cycling training or placebo FES cycling. The 4-week treatment consisted of 20 sessions lasting 25 minutes each. Primary outcome measures included the leg subscale of the Motricity Index and gait speed during a 50-meter walking test. Secondary outcomes were the Trunk Control Test, the Upright Motor Control Test, the mean work produced by the paretic leg, and the unbalance in mechanical work between paretic and nonparetic legs during voluntary pedaling. Participants were evaluated before training, after training, and at 3- to 5-month follow-up visits.

pedaling. Participants were evaluated before training, after training, and at 3- to 5-month follow-up visits.

Results—No significant differences were found between groups at baseline. Repeated-measures ANOVA (P<0.05) revealed significant increases in Motricity Index. Trunk Control Test, Upright Motor Control Test, gait speed, and mean work of the paretic leg after training and at follow-up assessments for FES-treated patients. No outcome measures demonstrated significant improvements after training in the placebo group. Both groups showed no significant differences between assessments after training and at follow-up. A main effect favoring FES-treated patients was demonstrated by repeated-measures ANCOVA for Motricity Index (P<0.001), Trunk Control Test (P=0.001), Upright Motor Control Test (P=0.005), and pedaling unbalance (P=0.038).

Conclusions—The study demonstrated that 20 sessions of FES cycling training significantly improved lower extremity motor functions and accelerated the recovery of overground locomotion in postacute hemiparetic patients. Improvements were maintained at follow-up. (Stroke, 2011;42:1068-1073.)

Key Words: functional electrical stimulation ■ hemiparesis ■ motor relearning ■ randomized controlled trials ■ rehabilitation

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PNEUMOLOGIA

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REVIEW

Physiotherapy in critically ill patients

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Received 3 May 2011; accepted 6 June 2011 Available online 22 July 2011

KEYWORDS Rehabilitation; Mechanical ventilation; Physiotherapy; Weaning

Abstract Prolonged stay in Intensive Care Unit (ICU) can cause muscle weakness, physical deconditioning, recurrent symptoms, mood attenations and poor quality of life. Physiotherapy is probably the only treatment likely to increase in the short- and long-term

Physiotherapy is probably the only treatment likely to increase in the short- and long-term care of the patients admitted to these units. Recovery of physical and respiratory functions, coming off mechanical ventilation, prevention of the effects of bed-rest and improvement in the health status are the clinical objectives of a physiotherapy program in medical and surgical areas. To manage these patients, integrated programs dealing with both whole-body physical therapy and pulmonary care are needed.

therapy and pulmonary care are needed.

There is still limited scientific evidence to support such a comprehensive approach to all critically ill patients; therefore we need randomised studies with solid clinical short- and long-term pulsone measures.

term outcome measures.

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Open Access

BMJ Open A structured exercise programme during haemodialysis for patients with chronic kidney disease: clinical benefit and long-term adherence

Kirsten Anding, ^{1,2} Thomas Bär, ¹ Joanna Trojniak-Hennig, ¹ Simone Kuchinke, ¹ Rolfdieter Krause, ² Jan M Rost, ^{3,4} Martin Halle ^{5,6,7}

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ARSTRACT

Objective: Long-term studies regarding the effect of a structured physical exercise programme (SPEP) during haemodialysis (HD) assessing compliance and clinical benefit are scarce

Study design: A single-centre clinical trial, non-randomised, investigating 46 patients with HD (63.2 ±16.3 years, male/female 24/22, dialysis vintage 4.4 years) performing an SPEP over 5 years. The SPEP (twice/week for 60 min during haemodialysis) consisted of a combined resistance (8 muscle groups) and endurance (supine bicycle ergometry) training. Exercise intensity was continuously adjusted to improvements of performance testing. Changes in endurance and resistance capacity, physical functioning and quality of life (QoL) were analysed over 1 year in addition to long-term adherence and economics of the programme over 5 years. Average power per training session, maximal strength tests (maximal exercise repetitions/min), three performance-based tests for physical function, SF36 for QoL were assessed in the beginning and every 6 months thereafter.

Strengths and limitations of this study

- This study shows for the first time that a structured, individual combined cardiovascular and resistance exercise programme during dialysis, suitable also for older and frail patients, can be permanently integrated into the dialysis routine of a standard dialysis unit.
- or a sandard days to mit.
 With patients' adherence maintained at the 80% level, the improvement of strength and endurance as well as quality of life over 1 year was significant and largest in very weak patients.
 With declining health status and sample size enduration due to death or transplantation, the
- reduction due to death or transplantation, the size of the cohort was too small for quantitative
- analysis after 5 years.

 Owing to its study design with patient motivation being a key element, this single centre study did not allow for randomisation and a control group.

INTRODUCTION

Feature Articles

Early exercise in critically ill patients enhances short-term functional recovery*

Chris Burtin, PT, MSc; Beatrix Clerckx, PT; Christophe Robbeets, PT; Patrick Ferdinande, MD, PhD; Daniel Langer, PT, MSc; Thierry Troosters, PT, PhD; Greet Hermans, MD; Marc Decramer, MD, PhD; Rik Gosselink, PT, PhD

Objectives: To investigate whether a daily exercise session, using a bedside cycle ergometer, is a safe and effective intervention in preventing or attenuating the decrease in functional exercise capacity, functional status, and quadriceps force that is associated with prolonged intensive care unit stay. A prolonged stay in the intensive care unit is associated with muscle dysfunction, which may contribute to an impaired functional status up to 1 yr after hospital discharge. No evidence is available concerning the effectiveness of an early exercise training intervention to prevent these detrimental complications.

Design: Randomized controlled trial.

Setting: Medical and surgical intensive care unit at University Hospital Gasthuisberg.

Patients: Ninety critically ill patients were included as soon as their cardiorespiratory condition allowed bedside cycling exercise (starting from day 5), given they still had an expected prolonged intensive care unit stay of at least 7 more days.

Interventions: Both groups received respiratory physiotherapy and a daily standardized passive or active motion session of upper and lower limbs. In addition, the treatment group performed a passive or active exercise training session for 20 mins/day,

using a bedside ergometer.

Measurements and Main Results: All outcome data are reflective for survivors. Quadriceps force and functional status were assessed at intensive care unit discharge and hospital discharge. Six-minute walking distance was measured at hospital discharge. No adverse events were identified during and immediately after the exercise training. At intensive care unit discharge, quadriceps force and functional status were not different between groups. At hospital discharge, 6-min walking distance, isometric quadriceps force, and the subjective feeling of functional well-being (as measured with "Physical Functioning" item of the Short Form 36 Health Survey questionnaire) were significantly higher in the treatment group (p < .05).

Conclusions: Early exercise training in critically ill intensive care unit survivors enhanced recovery of functional exercise capacity, self-perceived functional status, and muscle force at hospital discharge. (Crit Care Med 2009; 37:2499-2505)

KEY WORDS: exercise therapy; physiotherapy; critical illness; intensive care; muscle weakness; bed rest





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The effect of repetitive arm cycling on post stroke spasticity and motor control Repetitive arm cycling and spasticity

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Abstract

This study's aims were (1) to test whether training on an arm ergometer improves motor performance, and (2) to develop a technique to quantify individual muscle spasticity. Nine patients with a stabilized hemisyndrome (in average 22 months after ischemic stroke in the territory of middle cerebral artery) underwent a 3-week training on an arm ergometer, 5 days/week. The patients were tested one week before training, at training enset, at the end of training and 2 weeks after training. Spasticity was quantified by (1) the Ashworth Scale of the elbow flexors and extensors, (2) the maximum active extension of the biceps, and (3) the minimum torque on the lesioned side during arm cycling. The data were standardized, pooled and a 2-way ANOVA revealed a decrease of the spasticity by tentining (p=0.076). Similarly muscle force was evaluated by the Rivermead Motorik Assessment, the Motricity Index and the cycling force, and the range of active movement as the sum of the angles at a maximum shoulder flexion, shoulder abduction, elbow flexion and elbow extension. The training increased the force (p=0.01) and also the range of motion (p=0.05) significantly. The patients confirmed the clinical relevance of the results. The spasticity index – the relation between the muscle activity modulation on the normal and lesioned side – was shown to be a useful tool in quantifying individual muscle spasticity. It was concluded that cycling on an arm ergometer is a useful tool for rehabilitation.

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Original Paper

The Level of Anxiety and Depression in Dialysis Patients Undertaking Regular Physical Exercise Training – a Preliminary Study

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Key Words

Anxiety • BDI • Chronic kidney disease • Depression • Regular physical exercise • STAI

Abstract

Background/Aims: The aim of the study was to evaluate the effects of a six-month physical training undertaken by haemodialysis (HD) patients, on the depression and anxiety. Methods: Patients with end stage renal disease (ESRD) were recruited from the dialysis station at the Department of Nephrology and Transplantation Medicine in Wroclaw. Physical training took place at the beginning of the first 4-hours of dialysis, three times a week for six months. A personal questionnaire, Beck Depression Inventory (BDI) and State-Trait Anxiety Inventory (STAI) were used in the study. Results: A total of 28 patients completed the study: 20 were randomised to endurance training and 8 were randomised to resistance training. Statistical analysis of depression and anxiety at the initial (t₁) and final examination (t₂) indicated a significant reduction in depression and anxiety, particularly anxiety as a trait (X2) in the whole study group. The change in anxiety as a state correlated with the disease duration, duration of dialysis and the initial level of anxiety as a state (t₁X1). The change in anxiety as a trait significantly correlated with age and the initial level of anxiety (t₁X2). Conclusions: Undertaking physical training during dialysis by patients with ESRD is beneficial in reducing their levels of anxiety and depression. Both resistance and endurance training improves mood, but only endurance training additionally results in anxiety reduction.



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Spiroergometrie bei bettlägerigen Patienten mit schwergradiger COB

W. Galetke W. Randerath M. Pfeiffer F. Feldmeyer K.-H. Rühle

Spiroergometry in Patients with Severe Chronic Obstructive Pulmonary
Disease Confined to Bed

Zusamme

Zusammentassun

Abstract

Hintergrund: Körperliches Training wird für Patienten mit einer chronisch-obstruktiven Bronchitis (COB) zur Steigerung der Belastbarkeit empfohlen. Wir untersuchten bei bettlägerigen Patienten mit schwergradiger COB den Einfluss einer Spiroergome trie im Bett auf atemphysiologische Parameter. Methode: Bei neun bettlägerigen Patienten mit schwergradiger COB (FEV1.0 0,94 ± 0,18 l, IVC 2,3 ± 0,8 l, Raw 0,91 ± 0,13 kPa/l/s) wurden in Ruhe, bei passiver Bewegung mit 30 U/min, zusätzlicher aktiver Tretarbeit sowie unter maximal möglicher Umdrehungszahl die Parameter Sauerstoffaufnahme VO2, Atemfrequenz BF und Atemminutenvolumen VE gemessen. Als Vergleichskollektiv dienten sechs Gesunde, bei denen die Werte in Ruhe und unter passiver Bewegung bestimmt wurden. Ergebnisse: Die COB-Patienten erreichten bei maximaler Tretarbeit ein VO2 peak von 618 ± 177 ml/min, eine BF von 26 ± 7,2/min und ein VE max von 24,1 ±5 l/min. In Ruhe betrug die VO2 311 ±56 ml/min (53% des VO2 peak), die BF 17,6±3,1/min und das VE 13,3±2,7 ml/min (55% des VE max). Unter passiver Bewegung mit 30 U/min zeigte sich eine Steigerung der VO2 auf 369±88 (62% VO2 peak), der BF auf 19 ± 5,3 und des VE auf 16,4 ± 4,1 (68% VE max). Die Gesunden lagen in Ruhe mit ihrer VO2 bei 377,5 ± 38, mit der BF bei 14 ± 2.1 und mit dem VE bei 11.1 ± 1.3; unter Passiv-Bewegung fielen VO2 auf 336±27, BF auf 12±2,4 und VE auf 9,1±1 ab. Schlussfolgerungen: Eine Bettergometrie steigert bei bettlägerigen COB-Patienten sowohl bei rein passiver als auch zusätzlicher aktiver Bewegung Sauerstoffaufnahme, Atemfrequenz und Atemminutenvolumen. Damit kann bei diesen Patienten ein körperliches Training im Bett durchgeführt werden

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±0,181, IVC 2,3±0,81, Raw 0.91 ± 0.13 kPa/l/s) we measured oxygen uptake $\dot{V}O_{2}$, breathing frequency BF and minute ventilation VE 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 VO2 peak reached 618 ± 177 ml/min. BE 26 ± 7.2/min and VE max 24.1 ± 5 l/min. In rest VO2 was 311 ± 56 ml/min (53% VO2 peak), BF 17,6 ± 3,1/min and VE 13,3 ± 2,7 ml/min (55 % VE max), while during passive movement VO2 was increased to 369±88 (62% VO2 peak), BF to 19 ± 5.3 and VE to 16.4 ± 4.1 (68% VE max). In contrast VO, in control subjects dropped from 377,5 ±38 in rest to 336 ±27 ml/ min during passive action, BF from 14±2,1 to 12±2,4/min and VE from 11,1 ± 1,3 to 9,1 ± 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.

OPEN

Impact of Very Early Physical Therapy During Septic Shock on Skeletal Muscle: A Randomized Controlled Trial

Cheryl E. Hickmann, PT, PhD¹; Diego Castanares-Zapatero, MD, PhD¹; Louise Deldicque, PhD²; Peter Van den Bergh, MD, PhD³; Gilles Caty, MD, PhD⁴; Annie Robert, PhD⁵; Jean Roeseler, PT, PhD¹; Marc Françaux, PhD²; Pierre-François Laterre, MD¹

Objectives: As the catabolic state induced by septic shock together with the physical inactivity of patients lead to the rapid loss of muscle mass and impaired function, the purpose of this study was to test Conclusions: Early physical therapy during the first week of septic shock is safe and preserves muscle fiber cross-sectional area. (Cnt Care Med 2018; 46:1436–1443)

Key Words: autophagy; catabolism; critically ill; early mobilization; muscle atrophy; septic shock whether an early physical therapy during the onset of septic shock regulates catabolic signals and preserves skeletal muscle mass.

Design: Randomized controlled trial.





ORIGINAL

Efectos del entrenamiento en bicicleta con retroalimentación visual sobre la marcha en pacientes con esclerosis múltiple*

A. Hochsprunga, A. Granja Domínguezb.*, E. Magnic, S. Escudero Uribeb y A. Moreno Garcíab

KEYWORDS Multiple sclerosis;

Multiple sclerosis; Lower extremity; Cycling training; Gait assessment; Biofeedback Effect of visual biofeedback cycling training on gait in patients with multiple sclerosis

Abstract
Introduction: Gait alterations are present in a high percentage of patients with multiple sclerosis (MS). They appear from early stages of the disease and can limit patients' capacity to perform basic activities of daily living, affecting their quality of life. Visual biofeedback cycling training appears to be a useful tool in treating these impairments. This study aims to evaluate the short-term effect of visual biofeedback cycling training on gait in patients with MS.

Material and methods: A total of 61 patients with mild to moderate MS were randomly assigned to a control group and an intervention group. The intervention group received visual biofeedback cycling training (MoTOmed vix2 system) once per week for 3 months, and a home exercise program. The control group only received the home exercise program. Both groups were evaluated using the GAITRite' Walkway gait assessment system before the intervention, during the first month of the programme, and after the intervention.

Results: In the intervention group, the analysis revealed statistically significant differences between Functional Ambulation Profile (FAP) scores before and during the intervention (P=.001+), and before and after the intervention group between pre- and post-intervention scores (P=.001) and between first-month and post-intervention scores (P=.001). Scores (P=.001+), such as observed in step length in the intervention group between pre- and post-intervention scores (P=.001). Scores to be a therapeutic option for gait retraining in patients with MS.

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RESEARCHARTICLE

Effects of Physical Activity Training in Patients with Alzheimer's Dementia: Results of a Pilot RCT Study

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Citation: Holthoff VA, Marschner K, Scharf M, Stading J, Mayer S, Koch R, et al. (2015) Effeds of Physical Activity Training in Patients with Aizheimer's Dementia: Results of a Pilot RCT Study, PLoS GNE 10(4): e0121478. doi:10.1371/journal.pone.0121478

Abstract

Background

There is evidence that physical activity (PA) is of cognitive benefit to the ageing brain, but little is known on the effect in patients with Alzheimer's disease (AD). The present pilot study assessed the effect of a home-based PA training on clinical symptoms, functional abilities, and caregiver burden after 12 and 24 weeks.







NEUROLOGÍA



ORIGINAL

Efectos del entrenamiento en bicicleta con retroalimentación visual sobre la marcha en pacientes con esclerosis múltiple*

A. Hochsprung^a, A. Granja Domínguez^{b,*}, E. Magni^c, S. Escudero Uribe^b y A. Moreno Garciab

KEYWORDS

Multiple sclerosis; Lower extremity; Cycling training; Gait assessment; Biofeedback

Effect of visual biofeedback cycling training on gait in patients with multiple sclerosis

Abstract Introduction: Gait alterations are present in a high percentage of patients with multiple sclerosis (MS). They appear from early stages of the disease and can limit patients' capacity to perform basic activities of daily living, affecting their quality of life. Visual biofeedback cycling training appears to be a useful tool in treating these impairments. This study aims to evaluate the short-term effect of visual biofeedback cycling training on gait in patients with MS. Material and methods: A total of 61 patients with mild to moderate MS were randomly assign Material and methods: A total of a patients with mild to moderate Ms were randomly assigned to a control group and an intervention group. The intervention group received visual biofeedback cycling training (MOTOmed viva2 system) once per week for 3 months, and a home exercise program. The control group only received the home exercise program. Both groups were evaluated using the GAITRite "Malkway galt assessment system before the intervention, during the first month of the programme, and after the intervention. Results: In the intervention group, the analysis revealed statistically significant differences between Functional Ambulation Profile (FAP) scores before and during the intervention (P=.014), and before and after the intervention ($P^{-}.002$). A statistically significant improvement was observed in step length in the intervention group between pre- and post-intervention scores (P=.001) and between first-month and post-intervention scores (P=.004). Conclusions: Visual biofeedback cycling training improved specific gait parameters in the short

term and appears to be a therapeutic option for gait retraining in patients with MS. © 2017 Sociedad Española de Neurologia. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (http://creativecomm



RESEARCH ARTICLE

Effects of Physical Activity Training in Patients with Alzheimer's Dementia: Results of a Pilot RCT Study

Vjera A. Holthoff^{1,2*}, Kira Marschner², Maria Scharf², Julius Steding¹, Shirin Meyer¹, Rainer Koch¹, Markus Donix^{1,2}

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Citation: Hollhoff VA. Marschner K. Schaff M. Steding J, Meyer S, Koch R, et al. (2015) Effects of Physical Activity Training in Patients with Alzheimer's Dementia: Results of a Pilot RCT Study, PLoS ONE 10(4): e0121478. doi:10.1371/journal.pone.0121478

Abstract

Background

There is evidence that physical activity (PA) is of cognitive benefit to the ageing brain, but little is known on the effect in patients with Alzheimer's disease (AD). The present pilot study assessed the effect of a home-based PA training on clinical symptoms, functional abilities, and caregiver burden after 12 and 24 weeks.



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Feasibility and safety of in-bed cycling for physical rehabilitation in the intensive care unit*,**



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ARTICLE INFO

Krywords reywords: Cycle ergometry Critical illness Intensive care units Respiration Artificial Muscle

Purpose: The purpose was to evaluate the feasibility and safety of in-bed cycle ergometry as part of routine inten sive care unit (ICU) physical therapist (PT) practice. Materials and methods: Between July 1, 2010, and December 31, 2011, we prospectively identified all patients ad-

mitted to a 16-bed medical EU receiving cycling by a PT, prospectively collected at a control different potential safety events, and retrospectively conducted a chart review to obtain specific details of each cycling session. Results: Six hundred eighty-eight patients received PT interventions, and 181 (26%) received a total of 541 cycling sessions (median [interquartilerange {IQR}] cycling sessions per patient, 2 [1-4]). Patients' mean (SD) age was 57 (17) years, and 103 (57%) were male. The median (IQR) time from medical ICU admission to first PT intervention and first cycling session was 2 (1-4) and 4 (2-6) days, respectively, with a median (IQR) cycling session duration of 25 (18-30) minutes. On cycling days, the proportion of patients receiving mechanical ventilation, vasopressor infusions, and continuous renal replacement therapy was 80%, 8%, and 7%, respectively. A single safety event ocinfusions, and continuous renal replacement therapy was out, on, must recommend to the curred, yielding a 0.2% event rate (95% upper confidence limit, 1.0%).

Conclusions: Use of in-bed cycling as part of routine PT interventions in ICU patients is feasible and appears safe. Further study of the potential benefits of early in-bed cycling is needed.

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Originalarbeit

FES-Cycling bei Menschen mit Querschnittlähmung – Auswirkung auf subjektives Empfinden und Aktivitäten des täglichen Lebens

FES-Cycling in Persons with Spinal Cord Injury – Impact on Subjective Perception and Activities of Daily Living

- Berufsgenossenschaftliche Kliniken Halle/Saale, Klinik für Physikalische und Rehabilitative Medizin
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- Querschnittlähmung
 funktionelle
- Elektrostimulation • FES-Cycling
- Schmerz
- gesundheitsbezogene Lebensquafität

Key words

- o spinal cord injury o functional
- electrical stimulation
- FES-cycling
- health-related quality of life

Zusammenfassung

Hintergrund: Bei rückläufiger stationärer Aufenthaltsdauer von Patienten bestehen die Notwendigkeit einer bestmöglichen Unterstützung und damit Effektivierung der funktionsorientierten Physiotherapie. Insbesondere bei Menschen mit Querschnittlähmung könnten Therapiehilfsmittel die Behandlung sinnvoll ergänzen und sollten daher wissenschaftlich spezifiziert und weiterführend evaluiert werden. Die funktionelle Elektrostimulation (FES) wäre eine solche Ergän-zung; bisherige Studien untersuchten jedoch nur primär messbare Effekte. Da die subjektive Patientenwahrnehmung für die Nutzung von Therapiegeräten im nachstationären Zeitraum von fundamentaler Bedeutung ist, sollte sie ebenfalls erfasst werden.

Ziel: Diese prospektive Kohortenstudie unter suchte die Auswirkungen von FES auf funktionelle Fähigkeiten und Leistungsparameter sowie das

Background: An increasingly shorter inpatient stay accents the need for the best possible support and consequently the effectiveness of function-oriented physiotherapy. Predominantly in patients with spinal cord injury therapy devices may complement the intervention and therefore should be scientifically specified and further evaluated. Functional electrical stimulation could be such a complement; however, previous studies investigated only primarily measurable effects. As the patient's subjective perception is of fundamental importance for the use of therapy devices during the post-inpatient period it should also be recorded.

Objective: This prospective cohort study evaluated the FES-cycling's impact on functional abilities and performance parameters as well as the subjective pain and health perception of patients with spinal cord injury.



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Clinical Rehabilitation 2008: 22: 125-133

A pilot randomized controlled trial to evaluate the benefit of the cardiac rehabilitation paradigm for the non-acute ischaemic stroke population

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Received 22nd December 2006; returned for revisions 25th February 2007; revised manuscript accepted 18th April 2007.

Objective: To evaluate risk factor reduction and health-related quality of life following a 10-week cardiac rehabilitation programme in non-acute ischaemic stroke subjects. Design: Single-blinded randomized control trial.

Setting: Outpatient rehabilitation.

Subjects: Forty-eight community-dwelling ischaemic stroke patients (38 independently mobile, 9 requiring assistance, 1 non-ambulatory) were randomly assigned to intercepting or control groups by corposaled ellocation.

intervention or control groups by concealed allocation.

Intervention: The trial consisted of a 10-week schedule with measures taken at weeks 1 and 10. Both groups continued usual care (excluding aerobic exercise); intervention subjects attended 16 cycle ergometry sessions of aerobic-training integrity and two stress-proponement classes.

intensity and two stress-management classes.

Main outcome measures: Cardiac risk score (CRS); VO₂ (mL O₂/kg per minute) and Borg Rate of Perceived Exertion (RPE) assessed during a standardized ergometry test; hospital Anxiety and Depression Scale (HADS); Frenchay Activity Index; Fasting Linid Profiles and Restring Rhord Pressure.

Lipid Profiles and Resting Blood Pressure. Results: Group comparison with independent Etests showed significantly greater improvement at follow-up by intervention subjects than controls in VO_2 (intervention 10.6 ± 1.6 to 12.0 ± 2.2 , control 11.1 ± 1.8 to 11.1 ± 1.9 t=4.734, P<0.001) and CRS (intervention 13.4 ± 10.1 to 12.4 ± 10.5 , control 9.4 ± 6.7 to 15.0 ± 6.1 t=-2.537, P<0.05). RPE rating decreased in intervention subjects $(13.4\pm12.2$ to 12.4 ± 2.0) and increased in controls $(13.8\pm1.8$ to 14.4 ± 1.6); Mann–Whitney U(U=173.6, P<0.05). Within-group comparison showed significant decrease in the HADS depression subscale in the intervention group alone $(5.1\pm3.4$ to 3.0 ± 2.8) (Wilcoxon signed ranks test Z=-3.278, P<0.001).

Conclusion: Preliminary findings suggest non-acute ischaemic stroke patients can improve their cardiovascular fitness and reduce their CRS with a cardiac rehabilitation programme. The intervention was associated with improvement in self-reported decression.

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ORIGINAL ARTICLE

Satoshi Muraki · Yoshito Ehara · Masahiro Yamasaki

Cardiovascular responses at the onset of passive leg cycle exercise in paraplegics with spinal cord injury

Abstract The purpose of this study was to examine the cardiovascular responses at the onset of passive leg cycle exercise (PLCE) in paraplegics with spinal cord injury (PSCI) to investigate the increase in venous return from the paralyzed lower limbs during PLCE. Six male PSCI having lesions at levels ranging from T8 to L1 and five male able-bodied subjects (ABS) participated in this study. The subjects performed PLCE at pedalling frequencies of 40 rpm for 6 min. Cardiae output (Q_c), stroke volume (SV) and heart rate (f_c) were measured before and during PLCE. In the steady state (4th and 5th min) of PLCE, both PSCI and ABS showed a significant increase in Q_c . At the onset of PLCE, however, clear differences in the cardiovascular response were found between PSCI and ABS. The ABS showed a rapid and marked increase in f_c and consequently Q_c within 20 s of the onset of PLCE. On the other hand, in PSCI, the Q_c increased more slowly, compared with that in ABS, because of a smaller increase in f_c and a delayed increase in SV. The observed delay in the increases of Q_c and SV at the onset of PLCE in PSCI was presumably due to the absence of afferent reflexes from the lower limbs, and to the additional time needed for venous return to arrive at the heart from the passively moved muscles.

Key words Spinal cord injury · Passive exercise Cardiovascular response · Venous return · Paralyzed lower limbs



Technology to enhance physical rehabilitation of critically ill patients

Dale M. Needham, MD, PhD; Alex D. Truong, MD, MPH; Eddy Fan, MD

Background: Neuromuscular complications after critical illness are common and can be severe and persistent. To ameliorate complications, there is growing interest in starting physical medicine and rehabilitation therapy immediately after physiologic stabilization. The introduction of physical medicine and rehabilitation-related technology into the intensive care unit may help

acilitate delivery of this therapy.

Discussion: Neuromuscular electrical stimulation therapy creates passive contraction of muscles through low-voltage electrical impulses delivered through skin electrodes placed over target muscles. Although neuromuscular electrical stimulation has not been studied in patients with acute critical illness, published guidelines based on available evidence suggest that neuromuscular electrical stimulation may be considered in intensive care unit patients who are at high risk of developing muscle weakness. Bedside cycle ergometry can provide range of motion and muscle strength training for intensive care unit patients who are either sedated or awake, and may help preserve muscle architecture and improve strength and function. Finally, custom-designed technological aids to assist with ambulating mechanically venti-lated patients may reduce the human resource requirements and improve the safety and effectiveness of early mobilization in the intensive care unit.

Conclusion: Physical medicine and rehabilitation-related technologies may play an important role in preventing and treating intensive care unit-acquired neuromuscular complications. Future studies are needed to evaluate their efficacy in intensive care unit patients. (Crit Care Med 2009; 37[Suppl.]:\$436-\$441)

KEY Words: electric stimulation therapy; ergometry; physical therapy modalities; physical medicine; rehabilitation; early ambulation; exercise therapy; muscle weakness; respiration, artificial; critical care; intensive care units

Zyklisches apparatives Bewegungstraining versus konventionelles Gangtraining in der Rehabilitation des hemiparetischen Ganges nach Schlaganfall: **Eine Pilotstudie**

Cyclic Movement Training versus Conventional Physiotherapy for Rehabilitation of Hemiparetic Gait after Stroke:

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- Zusammenfassung
- Schlüsselwörter
- GangstörungPhysiotherapie
- Bewegungstraining
- Schlaganfall

- physiotherapy
- o motor training O stroke

Keywords O gait disorder

Hintergrund: Die motorische Funktionserholung nach einem Schlaganfall ist trotz Rehabilitation meist inkomplett. 6 Monate nach dem akuten Ereignis leiden bis zu 60% der Betroffenen weiterhin an einer alltagsrelevanten motorischen Behinderung, insbesondere einer hemiparetischen Gangstörung. Es besteht somit ein relevanter Bedarf an neuen, innovativen Therapiestrategien, um die hemiparetische Gangstörung nach Schlaganfall zu verbessern.

Abstract

nd: Recovery of impaired motor functions following stroke is commonly incomplete in spite of intensive rehabilitation programmes. At 6 months following a stroke up to 60% of affected individuals still suffer from permanent motor deficits, in particular hemiparetic gait, that are relevant for daily life. Novel innovative therapeutic strategies are needed to enhance the recovery of impaired gait function following stroke.

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Forced, Not Voluntary, Exercise Improves Motor Function in Parkinson's Disease Patients

Angela L. Ridgel, PhD, Jerrold L. Vitek, MD, PhD, and Jay L. Alberts, PhD

Background. Animal studies indicate forced exercise (FE) improves overall motor function in Parkinsonian rodents. Global improvements in motor function following voluntary exercise (VE) are not widely reported in human Parkinson's disease (PD) patients. Objective The aim of this study was to compare the effects of VE and FE on PD symptoms, motor function, and bimanual desterity. Methods. Ten patients with mild to moderate PD were randomly assigned to complete 8 weeks of FE or VE. With the assistance of a trainer, patients in the FE group pedaled at a rate 30% greater than their preferred voluntary rate, whereas patients in the VE group pedaled at their preferred rate. Aerobic intensity for both groups was identical, 60% to 80% of their individualized training heart rate. Results. Aerobic fitness improved for both groups. Following FE, Unified Parkinson's Disease Rating Scale (UPDRS) motor scores improved 35%, whereas patients completing VE did not exhibit any improvement. The control and coordination of grasping forces during the performance of a functional bimanual dexterity task improved significantly for patients in the FE group, whereas no changes in motor performance were observed following VE. Improvements in clinical measures of rigidity and bradykinesia and biomechanical measures of bimanual dexterity were maintained 4 weeks after FE cessation. Conclusions. Aerobic fitness can be improved in PD patients following both VE and FE interventions. However, only FE results in significant improvements in motor function and bimanual dexterity. Biomechanical data indicate that FE leads to a shift in motor control strategy, from feedback to a greater reliance on feedforward processes, which suggests FE may be altering central motor control processes.

Key Words: Parkinson's disease; Exercise; Manual dexterity; Motor control; Grasping forces; Movement disorder



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Changes in Executive Function After Acute Bouts of Passive Cycling in Parkinson's Disease

Angela L. Ridgel, Chul-Ho Kim, Emily J. Fickes, Matthew D. Muller, and Jay L. Alberts

Individuals with Parkinson's disease (PD) often experience cognitive declines. Although pharmacologic therapies are helpful in treating motor deficits in PD, they do not appear to be effective for cognitive complications. Acute bouts of moderate aerobic exercise have been shown to improve cognitive function in healthy adults. However, individuals with PD often have difficulty with exercise. This study examined the effects of passive leg cycling on executive function in PD. Executive function was assessed with Trail-Making Test (TMT) A and B before and after passive leg cycling. Significant improvements on the TMT-B test occurred after passive leg cycling. Furthermore, the difference between times to complete the TMT-B and TMT-A significantly decreased from precycling to postcycling. Improved executive function after passive cycling may be a result of increases in cerebral blood flow. These findings suggest that passive exercise could be a concurrent therapy for cognitive decline in PD.

Keywords: exercise, rehabilitation, cognition, movement disorders

ORIGINAL ARTICLE

Active-Assisted Cycling Improves Tremor and Bradykinesia in Parkinson's Disease

Angela L. Ridgel, PhD, Corey A. Peacock, MS, Emily J. Fickes, PhD, Chul-Ho Kim, PhD

ABSTRACT. Ridgel AL, Peacock CA, Fickes EJ, Kim C-H. Active-assisted cycling improves tremor and bradykinesia in Parkinson's disease. Arch Phys Med Rehabil 2012;93:2049-54.

Objectives: To develop a rapid cadence cycling intervention (active-assisted cycling [AAC]) using a motorized bike and to examine physiological perimeters during these sessions in individuals with Parkinson's disease (PD). A secondary goal was to examine whether a single session of AAC at a high cadence would promote improvements in tremor and bradykinesia similar to the on medication state.

Conclusions: This paradigm could be used to examine changes in motor function in individuals with PD after bouts of high-intensity exercise. Key Words: Cycling; Exercise; Movement disorders; Re-

Rey Florida .

Abbilitation Tremor.

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Early, goal-directed mobilisation in the surgical intensive care unit: a randomised controlled trial



Stefan J Schaller, Matthew Anstey, Manfred Blobner, Thomas Edrich, Stephanie D Grabitz, Ilse Gradwohl-Matis, Markus Heim, Timothy Houle, Tobias Kurth, Nicola Latronico, Jarone Lee, Matthew J Meyer, Thomas Peponis, Daniel Talmor, George C Velmahas, Karen Waak, J Matthias Walz, $Ross Za fonte, Matthias Eikermann, for the International Early SOMS-guided Mobilization Research Initiative {\it Matthias Eikermann}. The Company of the Com$

Summary

Background Immobilisation predicts adverse outcomes in patients in the surgical intensive care unit (SICU). Attempts to mobilise critically ill patients early after surgery are frequently restricted, but we tested whether early mobilisation leads to improved mobility, decreased SICU length of stay, and increased functional independence of patients at hospital discharge.



3 Rehabil Med 2017; 49: 78-83

ORIGINAL REPORT



INFLUENCE OF ARM CRANK ERGOMETRY ON DEVELOPMENT OF LYMPHOEDEMA IN BREAST CANCER PATIENTS AFTER AXILLARY DISSECTION: A RANDOMIZED CONTROLLED TRAIL

Thorsten SCHMIDT, PhD¹, Jette BERNER², Walter JONAT, MD, PhD², Burkhard WEISSER, MD, PhD³, Christoph RÖCKEN, MD, PhD¹, Marion VAN MACKELENBERGH, MD² and Christoph MUNDHENKE, MD, PhD²

From the "Comprehensive Cancer Center North, ²OB/GYN, University Hospital for Women, and ³Institute of Sport Science, University Hospital For Women, and ³Institute of Sport Science, University

Objective: To investigate the safety and efficacy of Conclusion: These results confirm the feasibility of arm crank ergometry in breast cancer patients af-ter axillary lymph node dissection, with regard to changes in bioelectrical impedance analysis, arm circumference, muscular strength, quality of life and

Design: Randomized controlled clinical intervention

arm crank ergometer training after axillary lymph node dissection and highlight improvements in strength, quality of life and reduced arm symptoms with this training.

Current Approaches to Restoring Walking in Patients during the Acute Phase of Cerebral Stroke

V. I. Skvortsova, G. E. Ivanova, N. A. Rumyantseva, A. N. Staritsyn, E. A. Kovrazhkina, and A. Yu. Suvorov

Translated from Zhurnal Nevrologii i Psikhiatrii imeni S. S. Korsakova, Vol. 110, No. 4, pp. 25-30, April,

The aim of this study was to create a complex program for restoring walking in stroke patients using motor-assisted walking trainers. The study included patients (mean age 59 ± 10.4 years) in the acute phase of stroke who were unable to walk independently; 53 patients were in the study group and 25 in the control group. The mean time from onset to treatment using motor-assisted trainers was 14 ± 1.6 days and was defined on the basis of adequate test results. The rehabilitation program included daily 30-min sessions of physical therapy. Patients of the study group but not controls also received 20-min sessions using Motomed Viva 2 and Gait Trainer 1 (GT1) motor-assisted trainers accompanied by continuous monitoring of arterial blood pressure and heart rate. Patients received 5-12 (mean 7 ± 1) sessions on t GT1. After complex rehabilitation treatment, patients of the study group, as compared with control showed significant (p < 0.01) improvements in dynamics on the standing stability, walking functionality, and the Berg and Bartel scales; all patients of this group became able to walk with a support or completely independently. In the study group there were significant (p < 0.05) decreases in the proportions of patients with impaired proprioception (from 37.7% to 9.4%) and lower limb ataxia (from 37% to 11.3%); no such changes occurred in the control group. These results lead to the conclusion that the complex use of reflex kinesiotherapy and robot-driven mechanotherapy in patients during the acute phase of stroke produces improvements in functional activity and increases the level of independence by discharge from hospital.

KEY WORDS: cerebral stroke, mechanotherapy, motor-assisted trainers, complex walking restoration program.

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Active assistive forced exercise provides long-term improvement to gait velocity and stride length in patients bilaterally affected by Parkinson's disease

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ABSTRACT

Forced exercise training presents a valid method of improving symptoms of Parkinson's disease such as rigor, dyskinesia and gait dysfunctions. Brain imaging data suggest that use of active assistive forced exercise could improve Parkinsonian symptoms more effectively than passive assistive forced exercise. However, the long-term effects of active versus passive forced exercise on the symptoms of Parkinson's disease are unknown.

Here, 24 patients showing bilateral effects of Parkinson's disease underwent a 12 week intervention of either passive or active assistive forced exercise. We analyzed tremor scores, gait patterns, and scores on the Unified Parkinson's Diesae Rating Scale-III from three timepoints—before beginning the intervention, upon completion of the intervention, and twelve weeks after completion of the intervention. Participation in both passive and active assistive forced exercise increased gait velocity (0.5 km/h), swing Participation in only passive and active assistive incree exercise increase gait revicuity (U.S. Mn/ii), swing phase (2%), monopedal stance phase (2%), dengated stride length (11 cm) and decreased double stance phase (4%). However, with participation in active assistive forced exercise, postural and kinetic tremor were also reduced and gait velocity and stride length were increased long-term. Given these findings, we conclude that future treatment for patients bilaterally affected by Parkinson's disease should carefully consider the type of assistive forced exercise intervention to be







Physiotherapy 92 (2006) 83-87

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 programm

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

The cardiovascular effects of upper-limb aerobic exercise in hypertensive patients

Timm H. Westhoff^a, Sven Schmidt^a, Viola Gross^a, Marian Joppke^a, Walter Zideka, Markus van der Gieta,* and Fernando Dimeob,

Background Aerobic exercise is broadly recommended as a helpful adjunct to obtain blood pressure control in hypertension. Several hypertensive patients, however, are limited by musculoskeletal complaints or vascular occlusive disease from lower-limb exercise such as jogging or cycling. In the present randomized-controlled study, we evaluate whether an aerobic arm-cycling program provides a measurable cardiovascular benefit.

Methods Twenty-four probands were randomly assigned to sedentary activity or a heart rate controlled 12 week exercise program, consisting of arm-cycling at target lactate concentrations of 2.0 \pm 0.5 mmol/l. Endothelial function was assessed by flow-mediated dilation of the brachial artery. Augmentation index and large/small artery compliance (C₁ and C₂) were measured by computerized pulse-wave analysis of the radial artery.

Results The exercise program led to a significant reduction in systolic (134.0 ± 20.0 to 127.0 ± 16.4 mmHg; P = 0.03) and diastolic blood pressure (73.0 \pm 21.6 to 67.1 \pm 8.2 mmHg; P = 0.02) accompanied by a significant improvement in C_2 (3.5 ± 1.6 to 4.8 ± 2.0 ml/mmHg × 100; P = 0.004). Flow-mediated dilation, augmentation index, and C₂ were not significantly affected (P>0.05). Physical performance as derived from lactate and heart rate curves of lower-limb stress tests was unchanged, whereas maximal workload in an upper-limb ergometry significantly increased (P = 0.005). Blood pressure and vascular parameters remained unchanged in the control group.