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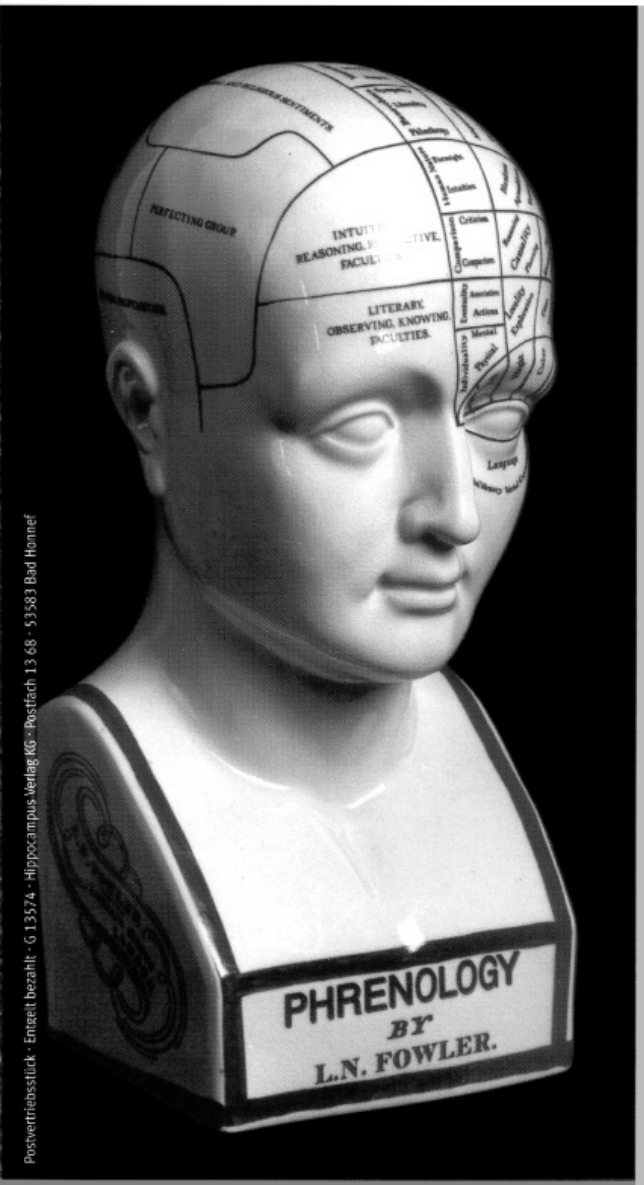

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Sonderthema:

Evidence-Based Medicine in Neurorehabilitation

30th September – 2nd October 2004
Zurich, Switzerland

3rd Joint Congress of the

Swiss Society of Neurorehabilitation
Austrian Society of Neurorehabilitation
German Society for Neurological Rehabilitation

and 1st Regional Meeting of the World Federation for NeuroRehabilitation (WFNR) in association with the German Speaking Medical Society for Paraplegia (DMGP)

HIPPOCAMPUS VERLAG

We have recently shown that fish possess the evolutionary conserved C-terminus of the rtn4 genes. All identified isoforms share the evolutionarily conserved reticulon homology domain (RHD), a motif of all reticulon protein family members (RTN 1–4). However, Nogo-A, -B, -C are absent in the teleost genome (*Klinger* et al., subm., *Oertle* et al., 2003). This correlates with the success of axon regeneration in fish.

Failure of axon regeneration in the frog spinal cord seems to correlate with the presence of two independent rtn4 orthologs (rtn4.1 and rtn4.2) and the alternative transcripts nogo-A, -B, -C. Xenopus Nogo-A/RTN4-A is predominantly expressed in the nervous system and detected by specific antisera in myelinated fiber tracts of the spinal cord, hindbrain, optic nerve, tectum opticum and in isolated oligodendrocytes. To test its function we have used the most inhibitory region of rat nogo-A (aa 544–725) and the corresponding peptide of Xenopus RTN4.1-A and RTN4.2-A in in vitro assays with fish retinal axons. Our present set of data shows that axon growth is inhibited by the rat and the two Xenopus peptides. These results suggest similar functions for Nogo-A of rat and Xenopus, and show the sensitivity of fish axons for both.

Supported by the DFG (TR SFB 11).

P65 SPASTICITY | C

QUANTITATIVE EVALUATION OF THE EFFECT ON POST STROKE SPASTICITY AND MOTOR CONTROL OF REPETITIVE TRAINING WITH AN ARM-TRAINER

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Background: The quantification of motor control and spasticity after training is controversial and the effect of repetitive movement on spasticity using an arm-trainer is poorly studied. We designed a special arm-trainer (cyclo-ergometer) for the measurements and trained the patients on a commercial motorized arm- and leg-trainer (MOTOmed Viva from Reck).

Aim: The purpose of this study is to evaluate quantitatively the spasticity and motor control of patients with hemisyndrome after stroke following daily training on an arm-trainer.

Methods: We studied 9 patients with a stabilised hemisyndrome after stroke (mean range: 22.7 months) in an ABA protocol (1 week base line (A), 3 weeks training period (B), 2 weeks baseline (A)). The patients underwent arm-training on a motorized arm-leg-trainer (MOTOmed Viva from Reck) 15 minutes daily during 5 days over a period of 3 weeks. Four quantitative measurements (at the beginning and end of each period of the ABA protocol) were performed on the other arm-trainer (cyclo-ergometer) with the specially constructed pedals in order to measure the pedal force and position separately on both sides. The recorded data was analysed in order to obtain the average position, speed and force during a cycle.

In addition, 6 clinical tests were performed at each assessment: (1) Range of motion and (2) modified Asworth scale to quantify spasticity, (3) muscular testing (M0-5 scale), and (4) Rivermead Motor test to evaluate motor control, (5) EVA ("Evaluation Visuelle Analogique") for pain evaluation, and (6) life quality questionnaire. Conventional statistical tests were applied to evaluate the significance of differences between pre- and post-training results.

Results: Baseline (T0/T1) showed stability of the assessment of all the 9 patients. After 3 weeks of training on the arm-trainer (T2), 56% of the patients showed significant improvement of the Rivermead Motor Test (Wilcoxon p=0.027), of the testing of the motor force of upper-arm flexors (Wilcoxon p=0,028); and 67% of the motor force of upper-arm extensors (Wilcoxon p=0,016); and 56% of the motor force as measured by the arm-trainer (cyclo-ergometer) (Wilcoxon: p=0,028). Spasticity evaluated by the Range of Motion (ROM) showed an improvement of the extension of the arm, measured by the increase of ROM (Wilcoxon p=0.047). These results were confirmed by the patients' subjective satisfaction as evaluated by the life quality questionnaire and the motivation of all patients to continue this training on their own.

Conclusion: Repetitive training using an arm-trainer can improve motor power, functional gain and diminish spasticity. In addition to conventional physiotherapy, such training can be achieved by the patient himself, and apart from budget constraints, can be conducted daily at home. Further studies are planned in order to investigate if repetitive movement can prolong the efficiency of Botox.

P66 SPASTICITY | C

USE OF THE VOICE HANDICAP INDEX (VHI) TO QUANTIFY LONG-TERM PATIENT RESPONSE TO A BOTULINUM TOXIN PROGRAM FOR ADDUCTOR SPASMODIC DYSPHONIA

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Adductor Spasmodic Dysphonia (AddSD) is a focal laryngeal dystonia characterized by a strained-strangled voice quality. It is defined as a chronic neurologic disorder of motor processing, resulting in action-induced spasms of the vocal folds. It usually does not respond to traditional voice therapy techniques.

Since 1999, a multidisciplinary team consisting of an otolaryngologist, a neurologist, a speech-language pathologist, and a voice scientist has evaluated and monitored patients receiving injections of botulinum toxin type A into the thyroarytenoid muscles for symptomatic treatment of AddSD. Clinical evaluations, perceptual measures of voice quality and spectrographic analyses were complemented by patient self-assessment of the psychosocial impact of AddSD and its treatment. The psychometrically validated Voice Handicap Index (VHI) has been used over the years to objectively quantify and monitor patient perceptions of their quality of life pre- and post injection.

Significantly lower VHI scores after an injection indicate a remarkable improvement in the quality of life of all patients, in particular as it relates to their social interactions and emotional state of mind. The majority of patients, independent of the initial severity of their symptoms, reported consistent and lasting improvements for up to three months following each treatment. Moreover, despite the temporary nature and at times variable outcome of each treatment, positive patient perceptions have not diminished four years after enrolling in the program. The use of the VHI has helped the team and our patients to foster realistic expectations regarding quality of life adjustments for people living with a chronic neurologic voice disorder.

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BEURTEILUNG AMBULANTER PHYSIOTHERAPIE BEI HEREDITÄTER SPASTISCHER SPINALPARALYSE (HSP) AUS DER SICHT BETROFFENER

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Bei der HSP steht die progrediente Gangverschlechterung im Vordergrund steht. Da eine ursächliche Therapie nicht zur Verfügung steht, kommt u. a. der Physiotherapie (PT) eine besondere Bedeutung zu. Bisher ist jedoch nicht bekannt, welche physiotherapeutischen Konzepte und Methoden sich am günstigsten auf den Erhalt motorischer Funktionen auswirken und aus Sicht Betroffener beurteilt werden.

Movement therapy for stroke patients

How may a patient participate in the progress of therapy?

Each year 2.7 % of men and 2.1 % of women suffer a stroke. Apoplexy is a syndrome showing great dependence on life age. The age group under 45 years shows a frequency of 0.3 %, whereas the representation of more than 65 year olds is higher-than-average. But, in the past years, the age limit seems to become lower and more and more younger people are affected.

Stroke mortality is amounting to 10 % in the Federal Republic of Germany and has gone down by approximately 45 % since 1970. Because of the high decrease of mortality there is a growing number of patients in need of care and intensive rehabilitation.

With apoplexy very often the pyramidal axons of the motor cortex are affected. During the early stage after a stroke a flabby paralysis of the co-lateral side occurs.
Only during the further course of the disease spasticity is developed. This is why therapy is divided up into two different phases.

The physiotherapeutic therapy approach lies in the compensation of the neglect syndrome during the early stage.
During the transitional phase and the late phase physiotherapy is working on

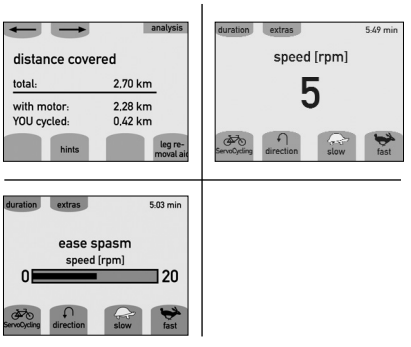
- The improvement of head and upper body control by proprioceptive stimulation.
- tone reduction of the spastic muscles
- Activation of the inactive non-spastic muscles – building up of the normal muscle strength
- Improvement of walking ability
- pain reduction in the shoulder by moving it passively
- Improvement of the motor activity of face, tongue and mouth for achievement of highest possible independence

A great deal of these goals of therapy may sufficiently be supported through the motorized and software controlled MOTOmed MovementTherapySystems of the company RECK Medizintechnik. They allow the patient to independently and actively contribute to the success of the treatment also after the time of therapy.

MOTOmed therapy in the early and late phase of rehabilitation

In the early phase of therapy the MOTOmed may be used to recover the sense of movement in the affected side by the passive moving of the legs and by the activation of the proprioceptive system.

When there is a hemiparesis of the leg muscles, slightest residual muscle strength can be activated through the power assisted movement with the function "ServoCycling" and an initiation and activation of the proprioceptive system can be achieved.
The function 'SymmetryTraining' gives the patient a visual feedback on the percentage of the movement of both legs and enables an active perception of the affected side.



In the last phase it is possible to work as well on the reduction of the muscle tone through the smooth drive of the motor.
This therapy goal will be supported by the functions 'MOTOmed MovementProtector' and the 'SmoothDriveSystem'.
An activation of the non-spastic muscles can herewith again be achieved by the function 'ServoCycling'.
A passive moving of the shoulder area for pain relief and improvement of mobility can be achieved through the extension of an arm/upper body trainer.

Daily movement may be recommended by medical professionals!

The MOTOmed represents an aid to enable stroke survivors (affected by paralysis and spasticity) to contribute actively to the success of therapy from a chair or a wheelchair. Furthermore it offers the doctor respectively the therapist a great support in achieving an optimum goal of treatment.

Sport scientist Jörn Schramm, Bünde

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Phone: ++49-7374-18 85, www.motomed.com
for further information about the MOTOmed.

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