pt
ZEITSCHRIFT FÜR PHYSIO THERAPEUTEN

72nd year
May 2020

THERAPY AT EYE LEVEL

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THOR IMPRINT

THEY **PULL WELL.**

Upcoming focal points in 2020

ZEITSCHRIFT FÜR PHYSIO THERAPEUTEN

JUNE
Return to ...

JULY
Therapy 4.0?

AUGUST
Chaos in the body

"Hands off!"

Dear readers,

Over a year ago, we in the pt team developed the focus areas for 2020. For the current May issue, the choice fell on an important core idea in therapy: "Hands off!"

Our main focus was on the discussion about hands-on and hands-off. Communication, assessments, activating therapies and strengthening the personal responsibility of each patient are important keywords here and therefore the subject of many articles in this issue.

This time, the title article deals with the key question in every therapy: who actually solves the problem? We therapists are often in the role of "eliminating discomfort and pain" - and we are very well trained for this. However, if the patient needs skills to solve the problem, further skills are required. And activating therapies are not only a priority in the area of musculoskeletal complaints. In neurology, too, patients need to take responsibility for themselves. Therapists are the professional guides here, providing advice and drawing up individual training plans. Our experts show how this can work for patients with multiple sclerosis, for example, in the article starting on page 41.

And now, in the midst of the coronavirus crisis, these issues are more important than ever. Wherever possible, the focus is currently on "social distancing". This is leading to enormous cuts in our usual practice setting. In the article starting on page 16, we provide you with an overview of the course of the crisis up to mid-April and the associated developments in physiotherapy. This situation is threatening, but it also offers opportunities to develop new forms of services and use new technologies for yourself and your practice. And not at some point when there is time, but now.

Please stay healthy!

Dr. Tanja Bossmann, pt editor-in-chief
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For reasons of gender equality the masculine and feminine

For the sake of readability, we have refrained from using both genders in this document. Nevertheless, all persons are referred to as all genders.

ITHOR IMPRINT

P POLITICS

D DIALOGUE

T THERAPY

N NEWS & PEOPLE

ERP POINT
de away!"

THOR IMPRINT

F RESEARCH & EVIDENCE

L TEACHING

S SERVICE

Training in therapy and everyday life with multiple sclerosis

A contribution by Renata Horst and Thorsten Böing

Patients with MS often complain of blurred vision, double vision, motor disturbances when walking, sensory disturbances (tingling, painful sensations, numbness), unsteadiness when grasping, "slurred" speech, imperative urge to urinate as well as bladder emptying disorders and even incontinence. Other aspects include abnormal, premature exhaustion (known as fatigue), cognitive disorders, impaired attention, memory and concentration, depressive moods and depression, pain, dizziness and sexual dysfunction. As the disease progresses, it can also lead to spastic paralysis, particularly in the legs.

Currently, around 12,600 new patients are diagnosed with multiple sclerosis in Germany every year, with a total incidence of around 224,000 patients (1). The significant increase in incidence and prevalence with a simultaneous increase in "disa
bility-Adjusted-Life-Years" (DALY) leads to an increased demand for therapy, but in particular also to an increase in health economic costs, which increase disproportionately depending on the degree of illness (2, 3).

Women are significantly more frequently affected by MS
than men (4), although an exact determination of causes and progression is still not clear (5).

A proven special feature of multiple sclerosis is the high degree of inter- and intra-individual variability in the course of the disease. The MS registry of the German Multiple Sclerosis Society shows in a recent survey (6)

following picture:

- 74.7 percent of the MS patients surveyed in Germany had a relapsing-remitting course at the time of the last report for the MS registry.
- 15.6 percent had a secondary progressive and 6.0 percent a primary progressive course.
- 2.0 percent had clinically isolated syndrome (CIS).
- 1.7 percent could not be clearly classi
identified.
- Patients with relapsing-remitting course disease had an average severity of 2.0 (median) according to the EDSS classification (7).
- Patients with a secondary pro
course (SPMS) with an average of 6.0.

In view of this complexity, a comprehensive, multidisciplinary rehabilitation approach is required in addition to drug treatment (8). For example, in a study with 590 MS patients, the added value of multimodal rehabilitation was demonstrated.

rehabilitation and the resulting management of the disease or coping with the disease (9). have been impressively demonstrated (9). Furthermore
can be structured, multi disciplinary rehabilitation programs with targeted content on movement and physical activity have been proven to improve mobility, muscle strength, aerobic capacity and quality of life, such as
in a recent Cochrane re
view (10). The pas-
training forms with the respective mobility-related outcomes.
can be read in detail in the revised and recently published S2e guideline of the DGNR in collaboration with Physio Deutschland (11). The most important recommendations:

- Priority should be given to regular, therapeutically guided gait training.
- This should be supported by systematic endurance training using a treadmill, ergometer, walking and targeted strength training for foot lifts, hip flexors, calf muscles and quadriceps.
- For severely affected patients (EDSS>6), robot-assisted gait training should be used.
- Regular physiotherapy should always be functional, goal-oriented and geared towards everyday life and the existing impairments (ICF: International Classification of Functioning, Disability and Health).

those in a hu

The course of the disease in patients with multiple sclerosis is variable. The majority of those affected suffer from a relapsing course. An important cornerstone of therapy is multi-modal rehabilitation, which primarily includes activating measures such as professionally guided gait training as well as strength and endurance training. To improve performance in everyday life
are sufficiently intensive
Training stimuli necessary.

One ADL-specific goal is regular physical activity in everyday life, the duration and intensity of which is based on the "National Exercise Recommendations" (150 min/week moderate intensity or 75 min/week high intensity), taking into account the patient-specific impairment (12).

Walking training in everyday life

In ADL-specific training, for example, orthoses can make a significant contribution to improving gait safety and quality of life (13), although information on use and handling as well as aesthetic aspects offer considerable potential for improvement (14). So-called
"Passive or Powered Ankle-Foot Orthoses (PRAFO) do not appear to provide any clear added value (15). In addition to orthoses, functional electrical stimulation (FES) is now an established treatment option. In patients with multiple sclerosis in particular, a significant reduction in perceived exertion when walking and an improvement in quality of life have been demonstrated (16-18). It is also important to assess the aid from the patient's perspective in terms of its suitability for everyday use and in the context of the ICF domain "participation". The FES has advantages in this respect and may offer suitable patients added value compared to the standard of care with orthoses (19).

In addition to the Orthoses represent the functional electrical stimulation is an established option.

If several large muscle groups of the lower extremity are affected, the patient's safety when walking is at risk. The mobility of these patients with guaranteed safety can often only be achieved with knee-spanning orthoses, so-called KAFOs (Knee Ankle Foot Orthosis). However, due to the complete stiffening of the leg, such fittings are associated with biomechanical and metabolic disadvantages. These include additional strain on the musculoskeletal system and high metabolic energy consumption (20, 21). Stance control orthoses (SCO) have been available for a number of years,

Through orthodontists the patient wins security.

that reduce these disadvantages (22). In the SCO systems, a switching mechanism ensures that the knee joint is only fully locked under load and then allows a free swing phase in the sense of a pendulum motion. However, the fact that there is no damped knee flexion under load is a functional limitation.

With the latest generation of orthoses, the so-called SSCO, patients now have an aid at their disposal with which they can also manage stairs and slopes in everyday life: A microprocessor-controlled hydraulic unit provides the patient with optimized movement resistance for flexion and extension of the knee joint for all everyday movements. A further functional gain results from the microprocessor-controlled swing phase, i.e. the movement phase without ground contact. Here, the knee movement is adapted naturally even at variable walking speeds, allowing the patient to move flexibly and
can move more "inconspicuously". Another benefit for the patient is the high safety potential. In the event of unforeseen situations, such as tripping, the sensor-based control system ensures that flexion resistance is fully available and a fall is avoided. Overall, the use of an SSCO leads to greater safety, more ADL-relevant functions and greater mobility (23). The Patient Reported Outcome (PRO) also shows a significant advantage in almost all ADL-relevant items (24), which ultimately leads to improved compliance and adherence to aids. Whether and to what extent these care solutions are suitable for MS patients always remains subject to individual screening.

Wheelchair supply

If fitting with orthoses, FES or wheelchairs is no longer indicated due to the patient's specific impairment, appropriate wheelchair fitting should be considered. Here, "the degree of independence

Table 1 Causes of the patient's gait strategy

	Explanation
	Loss of sensitivity and/or depth sensitivity.
	Vestibular deficits and impairment of vestibulospinal reflexes.
	Weakness of dorsal extensors of the foot, plantar flexors of the upper ankle joint, toes, knee flexors (ischii) as well as flexors and extensors, abductors and external rotators of the hip.
	Restricted joint mobility: dorsiflexion of the upper ankle joint and metatarsophalangeal joints, knee flexion, hip flexion, caused by stiffness and/or hypertonicity of the plantar flexors and quadriceps muscle.
	Impaired cardiopulmonary performance.

In the case of mobility, it is of great importance for the practicalrealization of self-determination during the movement

participation, so that the drive system (for the example, an electrically powered wheelchair) is an important aspect of wheelchair provision" (25). Furthermore, the German Rehabilitation Association (DVfR) explicitly defines recommendations for improving the care process and demands for changes to the care system in this statement.

Case study

Pathology, main symptoms and primary deficit at activity/participation level

At the age of 56, Mr. B. (now 71 years old) was diagnosed with multiple sclerosis. The course of his disease is primarily chronically progressive. He walks at home without aids and outside with a walking stick. He has not worked since the age of 58. He was a lecturer in computer science. Standing for long periods at the blackboard and writing and speaking at the same time caused him increasing difficulties. He then provided technical support for companies, but he has not worked in this field for a year now. Mr. B. travels a lot and is kept busy by his grandchildren.

Gait analysis

Mr. B. can walk ten meters with a walking stick until he needs a break. He gets out of breath quickly and feels exhausted. According to his own statements, he often trips over his left foot. When he wears his lower leg orthosis, this problem is less of a problem. Nevertheless, Mr. B. does not like wearing the aid because it makes it even more difficult for him to lift his leg when walking and to step over obstacles. Getting into the car is particularly problematic and he has less feeling when accelerating and braking due to the rigid sole.

The walking distance remains the same, regardless of whether he is wearing an orthosis or not. In However, he feels he is without Orthes

as he has to concentrate on not getting stuck. This prevents him from speaking and/or orienting himself at the same time. In the mid-leg phase, his lower left joint is in eversion and he has hyperextension (gait type 1B according to the N.A.P. gait class). (26). His greatest difficulty is in the transition from the standing leg phase the leg phase. Mr. B. is unable to push off with his toes. In the

e more insecure with his foot, but visually in the lower stance he jumps his knee assification), but remains in the play- ken foot, before r consequence

hisknee stiff and to get his foot off the ground. the pelvis rotates in the sagittal plane.

.

level dorsally. He tilts his head extremely dorsally, rows his left arm and lifts his shoulder girdle to gain momentum for his leg. The stiff gait is extremely uneconomical and has an unfavorable effect on fatigue (rapid fatigue). Table 1 shows the hypotheses and parameters at body structure and body function level.

Testing the hypotheses

Hypotheses 1 and 2

The first two hypotheses were not confirmed by the further examinations. With his eyes closed, Mr. B. can localize touch and describe the position of his extremities. He can maintain his balance on both stable and unstable support surfaces with his eyes open and closed (Clinical Test for Sensory Interaction in Balance = CTSIB). This gives him great potential.

Hypothesis 3

The Motricity Index (MI) is often used to assess strength in neurological patients (27). This only assesses flexor energy in the seated position. The extensor synergy is completely disregarded here as well as that of all eccentric muscle functions that are relevant for the ability to automatically hold oneself upright against gravity, i.e. postural control.

In order to determine which body structures do not function sufficiently to carry out everyday activities, these must be assessed in different contexts relevant to everyday life. Mr. B. can only lift his left leg slightly with great difficulty when standing in a side-to-side comparison. This makes it difficult to climb over obstacles and into

his shower and car. This also makes it difficult to get dressed and he has to sit down and use his hands to lift his leg. Getting into bed is also difficult as he cannot bend his left leg at the hip and knee against gravity. When lying down, he also finds it very difficult to put his left leg up. Lifting his buttocks to slide to the edge of the bed is also problematic. It is not possible to stand on his left toe and when standing, Mr. B. cannot lift his heel towards his buttocks with his hips extended. This results in compensatory lifting of the pelvis in order to take backward steps. Sitting up on the edge of the bed is also done with his legs fully extended, so that Mr. B. has to use a lot of energy to

- The patient's stiff gait is uneconomical and has an unfavorable effect on fatigue.

- The activities must be assessed in contexts relevant to everyday life.

to straighten the hull. This shows that its rump extensions are very strong.

This confirmed the muscular weakness of the flexion synergy and especially the extensor synergy of his left lower extremity.

Hypothesis 4

Various manual therapy concepts describe the testing of active and passive joint mobility in lying positions. However, this can lead to incorrect assessments, as the starting position has an influence on the muscle tone. The resting position of the upper ankle joint in the supine position is approximately twenty degrees of plantar flexion. When a passive force (from the examiner) is applied to the Achilles tendon from the plantar sole, there is a physiological increase in the muscle spindle reflex. The gammatonus then generates a counter-tension of the calf muscles to protect the non-contractile structure and thus restore the original state of tension and the original tendon length. If mobility is assessed in a standing position, a completely different measure can be determined, because in this position the calf muscles have to work eccentrically to prevent the body from "falling" (Figs. 1 and 2).

In the long run it can secondary muscle stiffness come.

Testing of joint mobility during everyday activities showed that all joints of the lower extremities were freely movable. This meant that both muscular stiffness and hypertonus could be ruled out. The standard method for assessing muscle tone is the Modified Ashworth Scale (MAS) is used. This test is also carried out passively by the therapist with a decrease in gravity (lying or sitting). The parameter is the resistance to passive joint movement felt by the therapist (28). A comparison of joint mobility - even in healthy individuals - between passive mobility and mobility within an activity (standing up, sitting down, climbing stairs) usually shows a different result. The MAS is unsuitable as a progression parameter for assessing spasticity (29).

Conclusion

If the body weight is not shifted over the forefoot when walking and the upper ankle joint remains stiff in plantar flexion, it cannot necessarily be assumed that the tone of the calf muscles is increased. It is more likely that muscular weakness, for example of the peroneal muscles and the intrinsic foot muscles, leads to compensatory strains. In the long term, and especially if no measures are taken to promote elasticity, secondary muscle stiffness occurs, which is often accompanied by a loss of the sarcomeres (30-32). As a result, there is a lack of pretension in the calf muscles, which is required for explosive forward propulsion of the body. The toes also do not push off and the knee remains stiff. The patient uses his strong trunk muscles to propel his leg forward. Mr. B. has to concentrate on every step and is therefore severely restricted in his participation because he cannot focus his attention on his environment. Last but not least

Table 2 Overview of treatment goals

Level	Goals
Body structure/body function level	• Training of strength endurance of the hip extensor synergy, forefoot stabilizers (peroneals) and intrinsic foot muscles; the aim is to reduce the genu recurvatum in the stance leg phase. • Promoting the elasticity of the long back extensor and short neck extensor as well as promoting the gliding ability of the dorsal non-contractile structures (fascia thoracolumbalis and dura mater); the aim is to be able to lift the leg more easily. • Training of strength endurance of the hip and knee flexors as well as foot lifts; the aim is to be able to lift the leg more easily. - The aim is to make the rejection phase easier to automate. The aim is to maintain elasticity of the toe flexors and hip flexors as well as knee extensors; to enable toe activity and subsequently knee flexion so that the free leg can be initiated. - Increase in cardiop ulmonary performance.
	- In larger people quantities safely. - A walking distance of ze hn meters with less effort and at a faster pace. en stairs with handrails alternating and - In public buildings without handrails with a step to follow safely can increase. - Facilitation of the initial The patient can get into the car and into the shower with the weaker - Facilitation of the initial left leg, get into bed and sit down from a lying position.

Fig. 1 Examination of dorsiflexion mobility in the upper ankle joint

Fig. 2 At the activity level, a mobility of approx. 15° dorsiflexion is shown

Fig. 3 Raising the pelvis

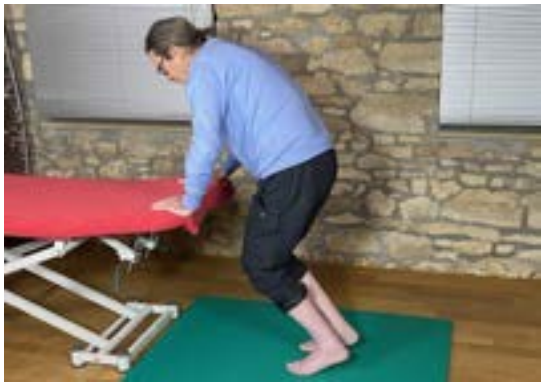

Fig. 4 Transition from standing to kneeling

Fig. 5 Lying down on the couch

Fig. 6a Heel seat

Fig. 6b Kneeling position

Fig. 7 Stairs backwards

Photos: Renata Horst

cardiopulmonary performance decreases as a result of this exertion. Table 2 shows an overview of the therapeutic goals.

Therapeutic approach

The following exercises are used both to assess muscle function and for training. The therapist should check whether there is sufficient potential in the foot area to automatically initiate the free leg phase. If the toe flexors are not elastic enough and cannot generate sufficient speed for the push-off, it is important to train the knee and hip flexors in order to get the foot off the ground and thus minimize the risk of falling.

A moderate Exercise five times a week for 30 minutes improves oxygen saturation in the blood.

First exercise: In the supine position, the therapist asks the patient to put both feet up (concentric function of the hip and knee flexors and the peroneal muscles). Mr B. should then try to lift the buttocks (concentric stabilizing function of the peroneal muscles) in order to slide to the edge of the bed or bench (Fig. 3).

Second exercise: The patient slowly lowers themselves to the floor on their knees while standing with their hands or forearms supported on a table (eccentric function of the planatar flexors, knee extensors and hip extensors, gliding ability of the dura mater). Shortly before lowering, the therapist asks the patient to come up again (concentric function of the planatar flexors, knee extensors and hip extensors) (Fig. 4).

Third exercise: Mr. B. should move from the supine position via the side support to the seat on the edge of the bed or bench (concentric function of the trunk flexors, hip and knee flexors and foot lifters). The patient should then lie back down on the bed or couch (eccentric function of the trunk flexors, hip and knee flexors and foot lifters) (Fig. 5).

Fourth exercise: The patient sits on his heels. The back of the foot is placed on the floor (eccentric function of the tibialis anterior and quadriceps muscles) and the patient is asked to straighten up to a kneeling position (concentric stabilization).
function is not of the peronae). To maintain
important to balance, Mr. B. holds on to the
the patient or chair with one end. When kneeling,
both the put his leg forward. Hold on tightly
patient has a at the same time. The shortening
may he himself cycle of the tibialis ant. nsors is
Stretching-Ver used to lift the back of the foot
and toe texts Fig. 6). Mr. B. stands on the right
and the toe side of the stairs with his right foot
Fifth exercise: backwards
land and climb
down (eccentric function of the extensor synergy of his left leg) and immediately up again without stopping (concentric function of the extensor synergy of his left leg) (Fig. 7).

Dosage and number of repetitions

It is still often assumed that pushing oneself to the limits of performance has an unfavorable effect on the course of the disease. This is certainly true for the performance of everyday activities. However, at the level of body structure and body function, appropriate training stimuli must ensure that there is an increase in performance in everyday life.

As early as the beginning of this millennium, studies showed that moderate exercise (40 to 50 percent of maximum exertion) five times a week for a duration of 30 minutes led to a thirteen percent improvement in blood oxygen saturation. ADLs, such as climbing stairs and dressing, improved by seventeen percent as a result. The subjective improvement in vitality was forty-six percent and social interaction ability thirty-six percent (33). More recent studies have compared these training loads with high-intensity interval training (H.I.I.T.) (34). Intervals of three minutes with maximum load followed by one-minute intervals with moderate load were performed alternately. The total duration was twenty minutes three times a week.

The course was positive

Mr. B. carried out the exercises under the verbal instruction of a therapist on three days within a week according to the H.I.I.T. principles. On the first day, he needed 0.33 m/s for the ten-meter walk test before training. After the three training sessions and one day off, the value at the same time of day was 0.75 m/s. It can therefore be assumed that Mr. B. will be able to increase his walking distance through regular training.

Mr. B. could also do the exercises alone at home. However, most people lack the motivation to do this. In a small group together with other patients and in the form of circuit training, they may be easier to implement. Equipment-based training in an appropriate facility can also be motivating and provide variety. As Mr. B. does not have any vestibular deficits, he can also train on the treadmill without any concerns. Orthotic support to promote activity in everyday life (including outdoors) is also important. –

Circuit training in small groups can motivate.

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THE TOP TOPICS IN JUNE

Hamstring Injury - one of the most common sports injuries of all

A contribution by Hauke Mommsen

Physiotherapy guideline for the management of patients with COVID-19 in hospital

A contribution by Tobias Braun and Anis Hamila

Patellar dislocation in Thai boxing Case report on rehabilitation after MPFL plastic surgery and cartilage cell transplantation

A contribution from Stefan Liebsch

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