



TECHNOLOGY & DEVELOPMENT

Getting back on your feet through play

Effective balance training during rehabilitation is highly important for recovering maximum independence and mobility in day-to-day life (see THERAPY issue 1, 2017). Modern software technology enables treatment paths to be structured from the clinic through to the home environment. This means that patients actually learn to get back on their feet through “play”.



The clock is ticking. The pirate on the screen rapidly dashes across the island to return the last remaining coins to the treasure chest – points are awarded for this. Mr Weber is concentrating hard and, with his last ounce of strength, shifts his bodyweight forwards once more.

A mobile harness frame supports his movements and prevents him from losing his balance. Sensors transmit the movement data directly to a computer. This makes it possible to intuitively control the pilot on the screen by transferring weight. It's a balancing act. Maintaining his balance is a major challenge for the patient, who is in his mid-sixties. Three months ago, he suffered a stroke and is only slowly regaining control of the right side of his body.

He goes to physiotherapy several times a week to actively train his ability to stand and further improve his balance. He claims that without the help of the dynamic standing frame, this would

be unthinkable. The training device provides him with the confidence necessary to once again reach the limits of instability.

The faster and more precisely he carries out the movement orders, the greater his chances of success. According to Ms Zierau, his physiotherapist, this applies not only to the game but also to relearning movements. As with sport, therapy following a stroke must aim for the limits of the individual's capabilities. Only then are the stimuli required for improvement sent to the body.

This follows the principles of motor learning. With this procedure, it is not only the stressed muscles that are trained, but above all the brain. With the correct training intensity and frequent repetition of movement processes, new nerve connections are created that are then responsible for movement control.

The proverb "You can't teach an old dog new tricks" has long become obsolete. Knowledge of the nervous system's powers of reorganisation have led to a change in thinking regarding therapy. Exercise that closely mirrors day-to-day functions is becoming more and more common. The ability to stand is practised by standing and the ability to walk by walking. Ms Zierau explains that this is particularly effective, thereby echoing one of the pioneers of neuroscience and an "innovative clinical maverick", Prof. Stefan Hesse, who has strongly influenced modern neurorehabilitation over the last decade.

Therapists have become braver in this respect. A few years ago, there was disagreement over how early patients could be mobilised in bed after a stroke. Current studies make this very clear: as early as possible. Initial attempts to stand and walk are therefore now made on the acute patient ward in the hospital.

But improvements can still be achieved years after a stroke through the plasticity of the nervous system. Intensive exercise is an essential requirement for this, however. Mr Weber should therefore also receive a dynamic standing frame for exercising at home. He is due to leave the clinic soon and must ideally continue training without interruption.

In the case of Mr Weber, the costs of the device used for therapy are borne by his health insurance provider. However, this is not always the case. This kind of equipment is often subsequently



rejected by health insurance providers. For Ms Zierau, this is difficult to understand. This way, patients often take enormous steps backwards after rehabilitation. This is something she knows from personal experience, as besides her activities in the clinic, she provides outpatient care to stroke patients in a clinic.

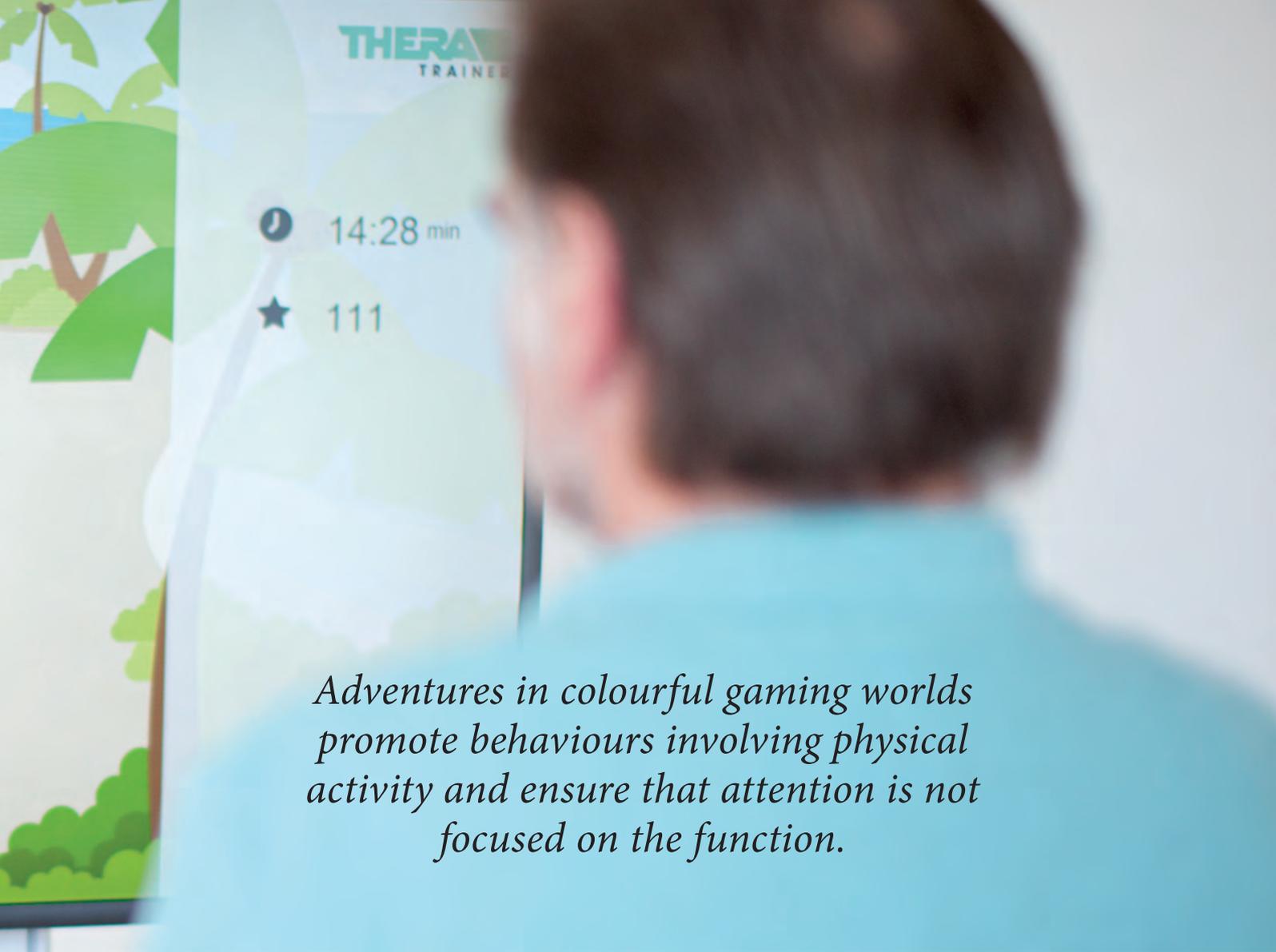
When it comes to stationary rehabilitation, patients generally only receive physiotherapy once or twice a week. At just 30 minutes per session, this is simply not enough. This is also why self-training plays such an important role.

Mr Weber is currently learning exactly what he must look out for when training at home to ensure that no mistakes creep in. He takes his training programme home with him on a USB stick. The values are established at the start of therapy

and only have to be adjusted after that. He does this completely independently. At the start of the therapy session, he selects a training programme on the computer and enters the difficulty to suit how he feels on a given day.

The results are automatically saved and can be evaluated after the session. To do this, Ms Zierau opens the results from the first and last training sessions and makes a before/after comparison. The graphical evaluation makes it instantly visible that weight transfer has significantly improved on Mr Weber's affected side.

It is hard to imagine modern physiotherapy without the use of therapy devices. In recent years, many new possibilities have opened up for therapy, particularly through the support of computer technology. Besides the precise motion analysis



Adventures in colourful gaming worlds promote behaviours involving physical activity and ensure that attention is not focused on the function.

and training management, the playful elements are of particular importance to patients.

Adventures in colourful gaming worlds promote behaviours involving physical activity and ensure that attention is focused not on the function but on the task. Hunting for treasure as a pirate is also a welcome change for the older generation and far more motivational than simply shifting the body's centre of mass over the support surface by rote.

Martin Huber explains the importance of being able to balance in the everyday lives of stroke patients. He is a lecturer on the bachelor's programme for physiotherapy at the ZHAW in Winterthur and an advisor on the neurorehabilitation and neurotherapy for post-graduate students.

As a specialist, he talks about the functions of postural control in combination with balance

control for stroke patients. He explains that the ability to balance the body's centre of gravity over the support surface is an integral part of many everyday activities.

Postural control is an essential factor for participation in an active lifestyle. From this perspective, postural control and quality of life are closely linked. Mr Weber feels this too. Initially, he was very anxious about facing the challenges of everyday life again.

But through balance training, he has regained his confidence. He knows his personal limits and has noted that through active exercise he can change aspects of his condition himself.