TECHNOLOGY TOUCHING LIVES

CHRISTOPHER WYNNE ON HOW TECHNOLOGY CAN HELP INTENSIVE NEUROLOGICAL REHABILITATION

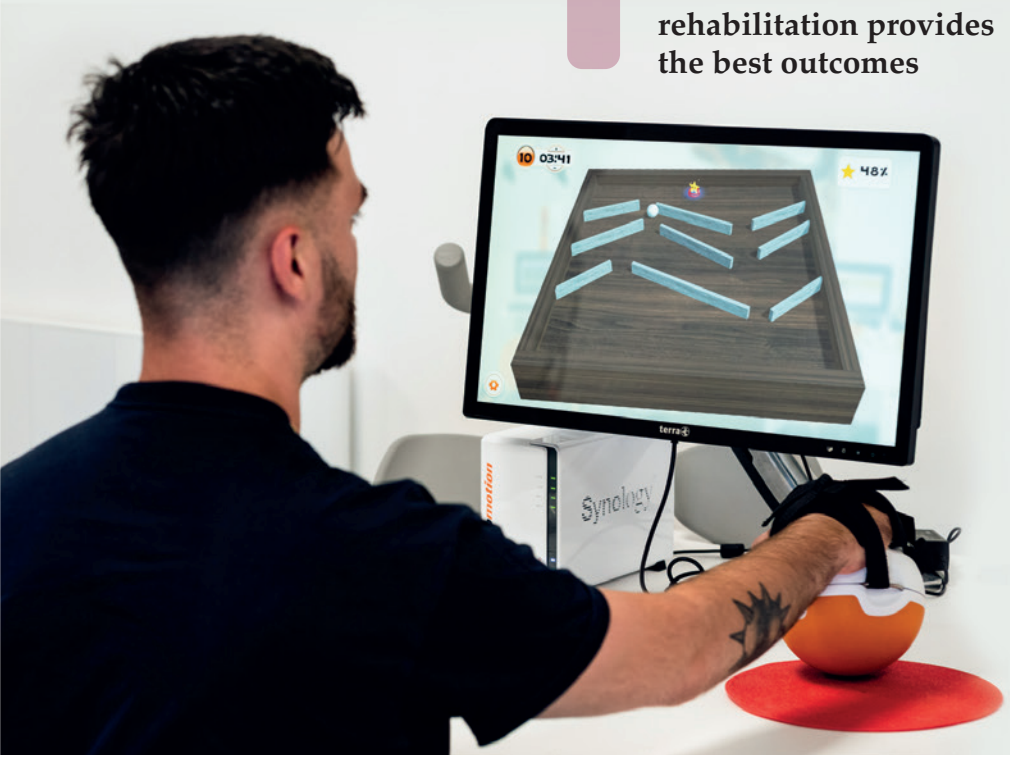
Neurological physiotherapy acknowledges a simple fact: the human body is an amazing thing with the ability to adapt to the changes we put upon it. With the right physiotherapy skills, technology and techniques, patients with a range of neurological conditions affecting upper and lower limb function - such as spinal cord injury, stroke, brain injury and cerebral palsy - can achieve restored function, independence and improved quality of life.

How does intensive rehabilitation work?

For neurological rehabilitation to be effective, the patient needs to experience enough of the right movements for physiological changes to occur. These changes to the nervous system are known as neuroplasticity, and when the rehabilitation is both frequent and often, they result in the generation of new brain cells and nerve pathways.

The latest research indicates that at least 80 hours of intensive rehabilitation (ie. thousands of repetitions per hour over hundreds of hours) not only provides the best outcomes to patients with neurological conditions and catastrophic injuries; but also leads to improvements that are more likely to last.

Achieving this level of intensity in rehabilitation is difficult using conventional physiotherapy techniques and equipment, due to limited resources (ie. physiotherapists, time, equipment and cost) and the practicalities of achieving thousands of repetitions.



The benefits of intensive rehabilitation

With robotics and virtual reality (VR), some of the barriers to accessing the intensity of treatment required are removed, and patients are often able to harness previously undiscovered rehabilitation potential - and in some cases, surpass their original expectations.

Intensive rehabilitation allows the patient to:

Increase the volume of practice
Physiotherapy works if the quality is repeatable. To get the best results, a patient needs to achieve sufficient hours of specialist practice and place the appropriate level of demand on their body. Robotics and VR have opened up new opportunities for patients by enabling intensive treatment programmes to be delivered at a level previously not possible.

> **The latest research indicates that at least 80 hours of intensive rehabilitation provides the best outcomes**

Increasing the quality (and consistency) of therapy
The use of robotics enables safe and effective practice in ways unachievable in a traditional one-on-one physiotherapy session. It reduces the need for many hands to support therapy, enabling more effective treatments to be carried out and repeated. Built in sensors measure the strength of function and active range of motion to ensure targeted repetitive therapy. Also, parameters can be more accurately adjusted with robotics, enabling consistent progression of treatment.

Achieving better outcomes and more sustainable improvements
Combined with sophisticated software, robotic technology is designed to challenge and encourage the patient by providing the right mix of motivation and fun during rehabilitation. This means that patients with a range of neurological conditions often experience visible improvements sooner than with traditional physiotherapy techniques.

As the rate of advancement in technology gathers pace, robotics and virtual reality need to be recognised as the future in physiotherapy. The neurological physiotherapist will always be needed to ensure quality delivery and application, but the ability of robotics to deliver treatment for a wide range of conditions more intensely, accurately and effectively creates exciting opportunities that should be embraced.

It is hoped that mainstream application and support will facilitate further research studies which will shape this evolving landscape.

Christopher Wynne is clinical director at The Rehab Physio

Christopher will be speaking on 'intensity and robotics in neurological physiotherapy' at the APIL advanced brain and spinal cord injury conference, 17 - 19 May.

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