Case Study – VR Vitalis® Pro

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From a Paralyzed Arm to a Chainsaw and Via Ferratas: How VR Helped After a Severe Brachial Plexus Injury

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Quick Summary

A 55-year-old man sustained severe damage to the nerve plexus of the shoulder (brachial plexus palsy) in an accident. Loss of mobility, pronounced muscle weakness and unbearable neuropathic pain followed. Thanks to his perseverance and to VR Vitalis® virtual reality being built into his occupational therapy plan, it was possible not only to objectively activate the key shoulder muscles, but above all to give the patient back a full and active life.

Baseline: The Accident, an Orthosis and Severe Pain

In April 2020, the 55-year-old patient had an accident that resulted in compression of the nerve plexus (brachial plexus) on the right side. The arm was largely non-functional, the patient had to wear a special orthosis and suffered from severe neuropathic pain.

The personal goals the patient set himself at the start of rehabilitation sounded almost unattainable at first:

- To get rid of the unbearable pain.
- To wash, dress and prepare a meal on his own.
- To raise a toast with his family at Christmas.
- To walk more than 3 km, start swimming again and return to the mountains.

Therapy with VR Vitalis®: From 3 Minutes to Two-Handed Tasks

In February 2023, occupational therapist Marcela Dabrowská, Ph.D. added exercises with the VR Vitalis® system to the comprehensive treatment plan.

Rehabilitation in virtual reality followed a clear progression:

- The beginning (February 2023): The patient could exercise for 3 to 5 minutes at most. He performed simple one-handed tasks (2D and 3D tracing, free painting in VR).
- Progress in therapy (May 2023): The patient gradually moved on to two-handed tasks - in the virtual world he hung out laundry, assembled jigsaw puzzles and handled mugs.
- Self-directed therapy at home: Three months of self-directed therapy in the home environment followed, extending his tolerance for VR exercise to as much as 18 minutes.

Regular exercise in a controlled immersive environment stimulated the neuroplasticity of the brain, provided immediate feedback and gave the patient enormous motivation to push beyond his own limits.

Video here.

Measurable Data and Remarkable Human Results

Both clinical measurements and the patient's own perception confirmed a major breakthrough:

- Resolution of neuropathic pain: The debilitating neuropathic pain gradually subsided.
- Objective muscle activity (EMG): Surface electromyography confirmed a marked increase in the activation of the key muscles of the shoulder and arm (*m. biceps brachii, m. infraspinatus and m. deltoideus*) with no unwanted compensatory patterns.
- A step change in quality of life (WHODAS 2.0): The overall level of disability in the quality-of-life questionnaire fell from an initial 50.5% to just 10.6%.

In the patient's own words:

"I am not yet able to climb a demanding via ferrata or play tennis, but I can swim a full 1 km in 32 minutes doing breaststroke, walk 20 km, work with a chainsaw, chop wood and cook. After 5 years I got back on a bike and overcame my fear of falling! The neuropathic pain has stopped and my arm is far more dependable."

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