Persistent improvement in quality of life and pain severity up to one year following virtual walking therapy in a patient with neuropathic pain after spinal cord injury: A case report.

[1]Ottiger-Boettger K, [2]Roger Abächerli, [1]Ernst M, [1]Ljutow A, [1]Landmann G

[1]Centre for Pain Medicine, Swiss Paraplegic Centre, Nottwil, Switzerland

[2]Lucerne University of Applied Sciences and Arts (HSLU), Horw, Switzerland

Aims

Virtual walking (VW) is a novel therapy based on Graded Motor Imagery (GMI) using a third-person perspective, semi-immersive illusory walking training program to treat chronic neuropathic pain after spinal cord injury (SCIP). The aim was to evaluate the efficacy of VW and long term effects up to one year.

Methods

A 31-year old man with complete sensori-motor paraplegia L1, AIS A was monitored. VW was applied over six weeks: two weeks with five, two weeks with three and finally two weeks with two therapy sessions per week. The treatment setting was developed in cooperation with HSLU, for technical details see ***figure 1***.

Methods *cont.*

Demographic and clinical data were collected prior therapy. Psycho-social questionnaires were applied prior, three and twelve months after VW. Pain diary was kept up to three months after VW. Pain was assessed using an 11-point numeric rating scale. Pain severity was assessed by Chronic Pain Grade questionnaire (CPGQ). Pain interference with daily activities, mood and sleep was obtained. Psychological status was assessed using the Depression, Anxiety and Stress Scale (DASS), the Pain Catastrophizing Scale (PCS) and the "Marburger Fragebogen zum habituellen Wohlbefinden" (MFHW) to estimate habitual well-being. Health-related quality of life was evaluated by WHO-QoL-3 questionnaires.

Figure 1: Clinical setting of virtual walking: The imagination of walking is realized by projecting the upper body of the patient merged on «walking legs» by computer technique. The wheelchair used in this setting provides an alternating side to side tilting to simulate the movement of the pelvis for a more authentic walking impression.

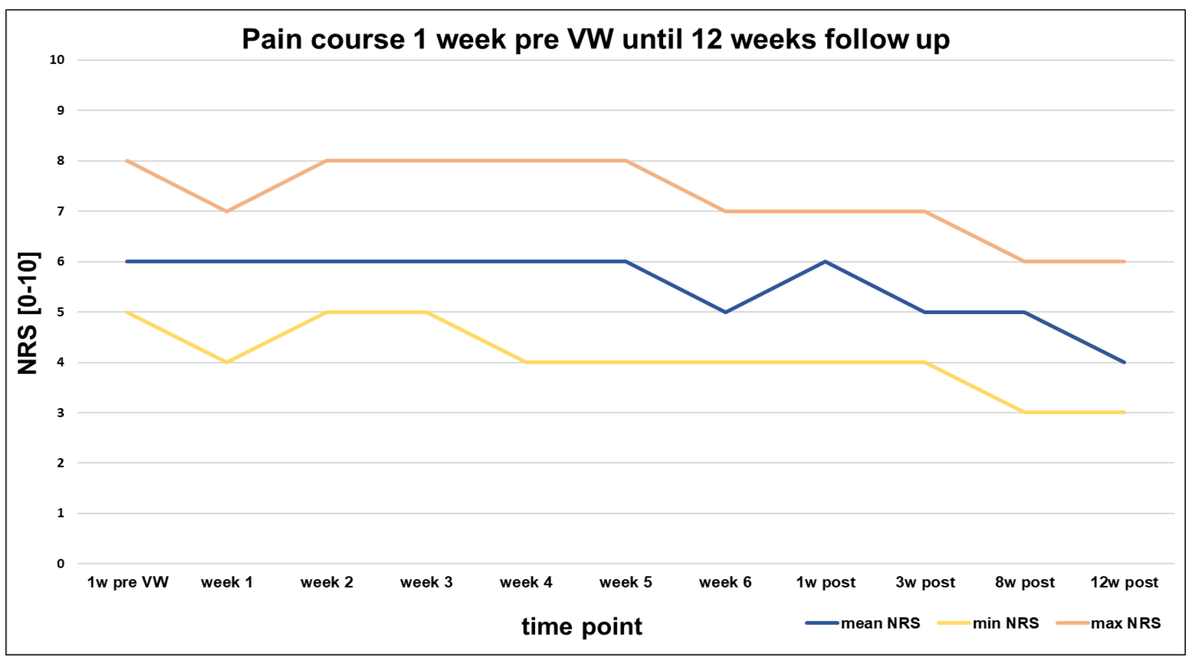

Figure 2: Pain diary at different time points before (pre), during and after (post) VW therapy showing minimum, mean and maximum pain scores (numeric rating scale NRS 0-10; 0 indicates "no pain", 10 indicates "maximal imaginable pain").

Questionnaire	Baseline	3 Month	12 Month
CPGQ (von Korff)			
- Pain intensity	63.33	43.33	50.00
- Disability points	3	0	2
- Severity grade	3	1	2
DASS			
- Anxiety	0	2	1
- Depression	9	3	8
- Stress	7	4	7
FW7 / MFHW	14	26	21
PCS	22	8	17
Pain interference			
- Daily activities	4	4	n.a.
- Sleep	4	3	n.a.
- Mood	4	3	n.a.
QoL	Life, Body, Mood/Feelings	Life, Body, Mood/Feelings	
- WHO-QoL-3 (0-10)	2 4 4	8 9 9	n.a.

Table 1: Overview Questionnaires. CPGS: Chronic Pain Grading System; DASS: Depression Anxiety and Stress Scale; FW7/MFHW: Fragebogen zum habituellen Wohlbefinden; PCS: Pain Catastrophizing Scale; QoL: Quality of Life questionnaire; n.a.: not available.

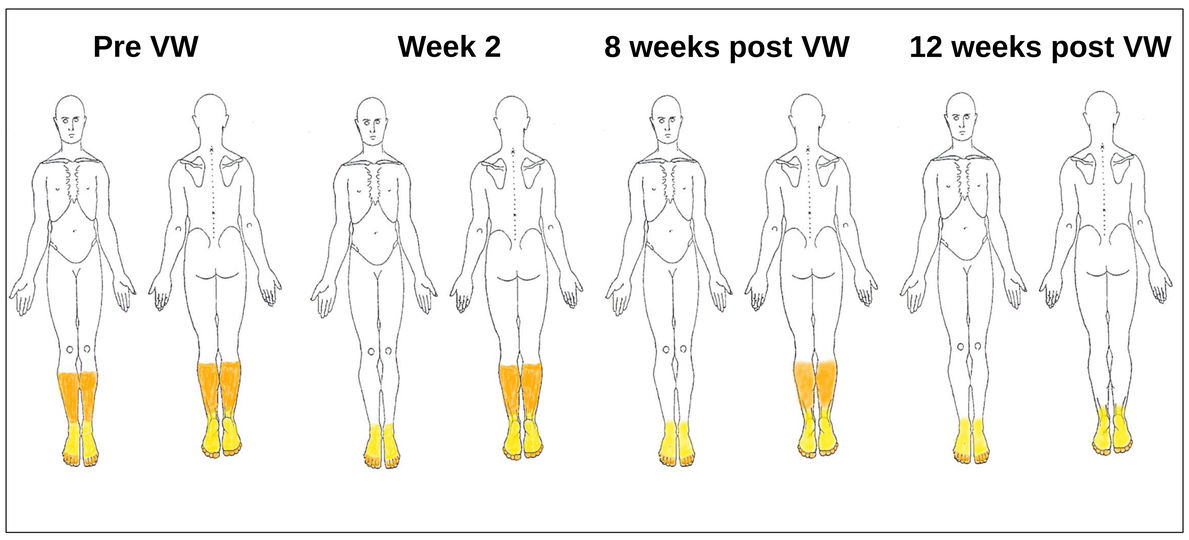

Figure 3: Pain drawings at different time points pre, during and after VW therapy. The patient was asked to indicate in which body parts he felt what kind of pain. Yellow: persistent pain. Orange: peak pain, sharp sudden pain attacks.

Results

Three months after VW there was an improvement in pain intensity ***(figure 2)***, a reduced pain area ***(figure 3)***, an improvement of CPGQ severity grades, pain interference for sleep and mood as well as and pain catastrophizing. DASS depicted a decrease of depression and stress symptoms and there was an amelioration of habitual well-being illustrated by MFHW. WHO-QoL-3 showed an amelioration in all domains ***(table 1)***. After 12 months, the scores from most questionnaires returned almost to the level of pre-treatment. However, habitual well-being and pain catastrophizing still indicated an amelioration. In addition, CPGQ continued with lower pain intensity and severity grade ***(table 1)***.

Conclusion

The results indicate that VW is an alternative treatment option in patients with neuropathic SCIP, which can lead to pain amelioration, improvement of pain severity, psychological variables, habitual well-being, pain interference and quality of life in short term.

Long-lasting improvements could also be shown for pain intensity, pain severity and habitual well-being

More data from SCI patients are needed to evidence the effectiveness and therapeutic benefit of this novel therapy.

Corresponding author: gunther.landmann@paraplegie.ch