

SEMI-IMMERSIVE VIRTUAL TRAINING (S-IVT) IN NEGLECT POST-STROKE: CLINICAL AND ELECTROPHYSIOLOGICAL OUTCOMES IN A CASE-REPORT.

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INTRODUCTION. Unilateral spatial neglect (USN) is a highly prevalent post-stroke deficit. There is a limited number of high quality studies suggesting that conventional USN treatments are effective in improving functional outcomes and reducing disability. Virtual reality (VR) provides enhanced methods for USN assessment and treatment. Recently, there is limited evidences that VR is more effective than conventional therapy in improving USN symptoms in patients with stroke. Aim of this study is to evaluate the psychometric and electrophysiology outcomes in a post - stroke subject after an intensive rehabilitative cycle with a combined therapeutic approach, i.e. standard cognitive training (SCT) in addition to Semi-immersive Virtual Training (S-IVT) with Bts-Nirvana System.

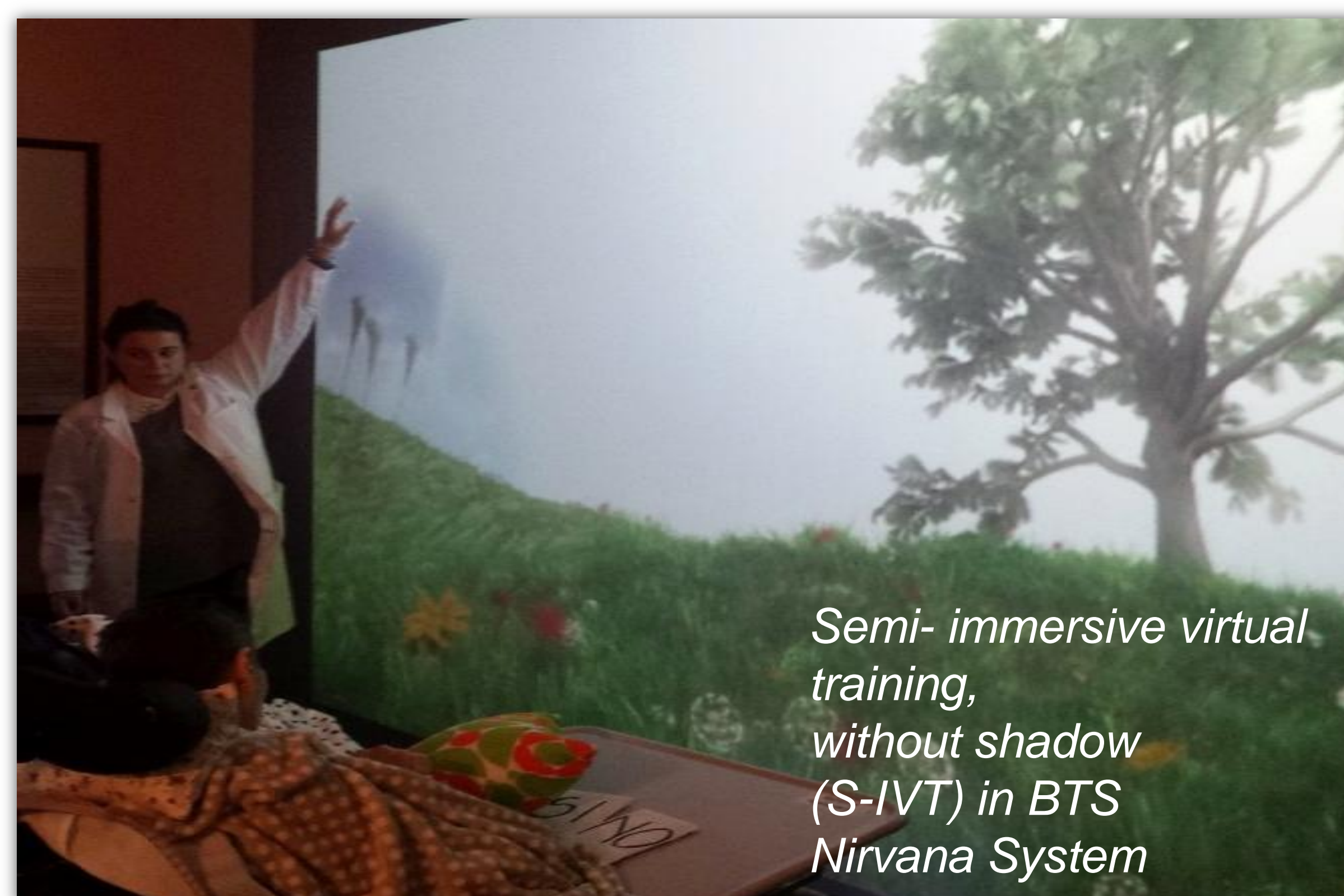
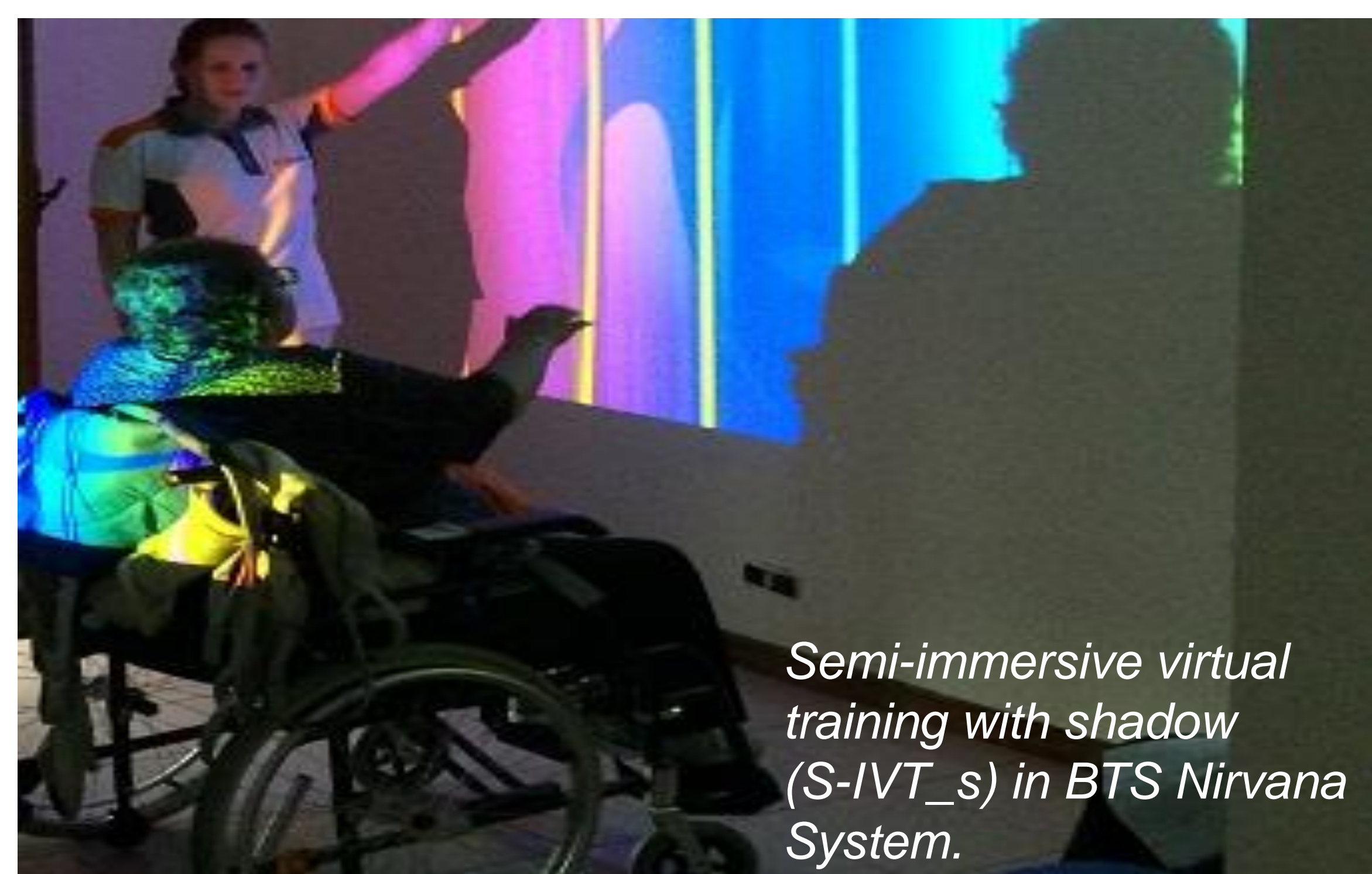
CASE-STUDY. A 57-year-old woman, with a 5 years of education, affected by subarachnoid hemorrhage in the parietal-fronto-temporal region, in the right hemisphere. She presented a left hemiparesis and was total dependent in the activity of daily life. She had an important impairment in cognitive and behavioral status, with a temporal and spatial disorientation, a reduction of attention and memory process, slowing ideation, neglect (USN) in left extracorporeal space, anosognosia and a severe depression of mood. She underwent two different rehabilitation trainings, including either standard cognitive training (SCT) in addition to Semi-immersive virtual training with her shadow (S-IVT_s) or SCT in addition to a Semi- immersive virtual training, without her shadow (S-IVT). The use of Bts Nirvana System was different: in the first combine treatment there was the avatar of patient (i.e. her shadow) whereas in the second treatment the patient doesn't see her shadow, with a better sensorial video-audio immersion. We evaluated her cognitive and neurophysiology profile in two separate sessions: before and after the two different trainings, by using a proper psychometric battery and Behavioral Inattention Test (BIT) to assess cognitive-behavioral state and the [event related potential](#), P300.

RESULTS. Only at the end of the use of the S-IVT, in addition to standard cognitive approach, we observed an significant improvement in motor (Control of Trunk) and cognitive domains, with a positive impact on mood and on the electrophysiological parameters. In particular, between T0 and T3, there was an improvement in attention, visual search, scanning and spatial cognition (Table 1). Also, we observed a recovery of anosognosia.

CONCLUSION. After experiencing a stroke in the right hemisphere, almost 50% of patients showed Unilateral Spatial Neglect (USN). Virtual Reality technologies offer impressive opportunities both for the rehabilitation and assessment of different cognitive deficits, including USN. Thus, virtual reality therapy can be considered a potential rehabilitation program for patients with USN. The combined rehabilitative treatment of SCT in addition to S-IVT with **Bts- Nirvana System** (see image n.1) may be a promising approach in improving attention process, spatial cognition, mood and electrophysiological parameters in a patient with a neglect post - stroke.

Table 1. Unilateral spatial neglect improvement after cognitive rehabilitation.

Conventional Subtest	T0	T1	T2	T3
Line crossing	25	29	29	32
Letter cancellation	6	17	17	29
Star cancellation	14	17	17	25
Figure and shape copying	0	0	0	1
Line bisection	0	0	0	6
Representational drawing	1	1	1	1
Behavioral Subtest	T0	T1	T2	T3
Pre-scanning	0	0	2	5
Phone dialing	4	6	6	8
Menu reading	0	0	1	6
Article reading	0	0	1	5
Telling and setting the time	7	7	7	9
Coin sorting	2	3	3	5
Address and sentence copying	0	2	2	4
Map navigation	0	1	1	6
Card sorting	1	2	2	6



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