The effect of a virtual training with BTs- Nirvana in post-stroke aphasia: a case study

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Objective/Hypothesis

Cognitive impairment occurs frequently in post-stroke patients. The aim of this study is to determine the effects of a virtual reality training (VRT) with BTs-Nirvana (BTsN) on recovery of cognitive functions in a stroke patient, using the Interactive-Semi-Immersive Program (I-SIP).

Materials and methods

A 32 year-old woman, affected by post stroke non fluent aphasia, participated in the study. The rehabilitation treatment was organized in two phases: firstly she performed conventional language rehabilitation training, secondly she completed the Virtual interactive training with BTs-Nirvana (BTsN) in addition to conventional language rehabilitation training. Both trainings were structured in sessions of 45 minutes three times a week, for a total of 24 sessions. The patient was evaluated before (T0) and after (T1) the conventional treatment and before (T2) and after (T3) Virtual interactive training with Bts Nirvana by using a specific psychometric battery.

Results

We have observed a difference between performances at T0 and T1 and between performances at T2 and T3. The patient showed an improvement at T1 compared to T0 and at T3 compared to T2. In particular, we observed the greatest improvement in cognitive and linguistic performances at T3, i.e. at the end of BTs-Nirvana training.

Discussion

Only after Bts-Nirvana training we have observed an important improvement in specific cognitive domains, in particular in the attention processes, and in language abilities such as comprehension, denomination, repetition, reading, as well as a stabilization of mood. Since VRT has been introduced, it has been considered a promising rehabilitation tool. In general, VRT consists of techniques that allow sensory experience through the interaction between patients and informatics technology. The results of this case show that Bts-Nirvana could be a promising cognitive rehabilitation tool, in addition to conventional treatment.

Conclusion

The training with BTs-Nirvana may be a valuable tool in improving either communication or cognitive skills in subjects with non fluent aphasia.

PSYCHOLOGICAL AND COGNITIVE STATUS		APPROACH STANDARD		APPROACH COMBINED	
Domain	*Psychometric test*	T0	T1	T2	T3
Attention	ATTENTIONAL MATRICES	24,75	28,75	32,75	38.75
	Trial (TMT A)	160	120	99	93
	Trial (TMT B)	287	270	264	260
	Trial (TMT A – TMT B)	160	128	104	100
Comprension	Token Test	8,5	12,5	16,5	24,5
Apraxia	Apraxia ideomotor	17	18	19	20
Apraxia	Apraxia constructive	9,5	10,5	10,5	12,5
Language	E.N.P.A.				
	NAMING				
	Writing - Common Names	0	0,6	1,6	2,6
	Writing – Verbs/actions	0	0,6	1,6	2,6
	Oral - Colours	4	5	5	5
	Oral – Common Names	5	7	8	10
	Oral – Verbs/Actions	6,5	7,5	8,5	9,5
	COMPREHENTION				
	Visual compr. - Words	12,3	14,3	16,3	18,3
	Heard compr. - Words	15,4	18,4	18,4	19,4
	Visual compr. - Phrases	8,6	10,6	10,6	12,6
	Heard compr. - Phrases	8,5	10,5	10,5	13,5
	WRITTEN ABILITIES				
	Phrases Dictation	0	0		
	Words Composition	5,4	7,4	7,4	8,4
	Non-Words Composition	0	0	1,3	2,3
	Numbers Dictation	0	0	1,2	3,2
	OPERATION				
	Addition	0	0	1,8	2,8
	Subtraction	0	0	1,8	2,8
	Multiplication	0	0	1,4	2,4
	REPETITION				
	Words	5,8	7,8	7,8	8,8
	Non- Words	2,5	3,5	3,5	4,5
	Phrases	2	3	3	3
	READING				
	Words	0	0,3	1,3	2,3
	Non- Words	0	1	1	2
	Phrases	0	0	0.9	1,9

References

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