

# The use of hypnosis in severe brain injury rehabilitation: a case report

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## Introduction

Rehabilitation in patients with severe brain injury remains a complex and challenging task. Published data about neurorehabilitative treatments are still insufficient to make clear recommendations. This report presents the case of a patient with severe brain injury for whom hypnosis was proposed as part of his rehabilitation treatment program.

## Case report

A 50-year-old man suffered a severe cerebral hemorrhage. He showed a Glasgow Coma Scale (GCS [1]) score of 8 (E4VtM3) at the emergency department. Brain CT scan showed left capsule-lenticular hemorrhage. Electroencephalogram showed slowing of basic rhythms with left lateralization. The patient was tracheotomized, received

gastric feeding, and a shunt was placed to relieve secondary hydrocephaly. After 22 days, he left the intensive care unit with a GCS of 10 (E4VtM5). Two months post-injury, the patient was transferred to a rehabilitation center with the observation of “spontaneous eyes opening and arousal.” Seven months post-injury, the patient was able to sit in an adapted wheel chair. Medical team have concluded to the presence of a communication but considered that the “yes”–“no” patient’s responses were not reliable.

One year and 9 months post-injury, a neuropsychological report concluded spatiotemporal disorientation, attentional, memory, and praxis deficits and the patient returned home. One year and 11 months post-injury, the family reported that the patient’s condition was no longer improving and that his medical team opined that he would not recover further. The family asked whether it was possible to integrate hypnosis into the patient’s care. We proposed 3 monthly intervals hypnosis exercises in which the patient was asked to imagine memories related to motor, perceptual, and language imagery. These recorded exercises were listened by the patient every morning before beginning rehabilitation exercise. After 1 year of this treatment, the family reported increased attention, ability to realize small manual tasks, and better capacity for grooming and washing. The hypnosis treatment lasted 3 years and was marked by improvement in language comprehension, verbalizations, reading, and mobility. Neuropsychological testing conducted 8 years post-injury highlighted a Coma Recovery Scale-Revised (CRS-R [2]) total score of 22 with functional communication and attention, accurate spatiotemporal orientation (Mini Mental State Examination: 10/10), good learning (3/3), attentional and mental calculation (5/5), recalling (3/3), language (5/8), and praxia abilities (1/1). The patient was able to drink and feed normally.

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## Discussion

To the best of our knowledge, this is the first study reporting on the integration of hypnosis as part of rehabilitation treatment of severe brain injury patients. Evaluating the efficacy of hypnosis in the recovery outcome achieved by the patient presents a number of difficulties since we cannot make clear distinctions between the effects of spontaneous recovery, the effects of other treatments or events over which we have no control, and the effects of hypnosis by itself. Existing literature about hypnosis and cognitive function improvement has led us to propose several hypotheses. The recovery of such patients implies that they must re-learn abilities lost after brain injury. Human learning relies upon neuronal systems related to separable brain structures: explicit (mediated by frontal and medial temporal lobe) and implicit/procedural learning (mediated by striatum and prefrontal areas) [3]. Subjects under hypnosis show disruption in internal (prefrontal and precuneal areas), external (lateral frontoparietal regions) brain networks, and sub-cortical areas [4]. Studies have shown enhancement of learning performance associated with the use of hypnosis in healthy subjects that could be attributed to the disruption of attentional control and the executive system involved in learning processing [3]. This modification of the attentional system can facilitate processing to encode and process new information. We can hypothesize that the addition of hypnosis to the daily routine of the patient modified his attentional system by improving his concentration abilities and permitted him to be more receptive to stimulations during rehabilitation therapy.

Hypnosis exercises were focused on motor and language skills. After 3 years of hypnosis, the patient was able to stand up and walk and to interact with his family by using pictogram on a computer device, as well as pronunciation of few words in a functional way. Studies have shown that mental imagery is an effective alternative strategy to revalidation treatment in learning and training. Results of studies support the use of mental imagery for motor rehabilitation in stroke patients. Studies on motor imagery and hypnosis suggest that hypnosis can mediate the control of movements by internal representations enhanced by self-imagery [5]. Initiate hypnosis in patients with severe brain injury can be considered as challenging since several cognitive functions are requested (attention, language comprehension, and long-term memory). According to our

clinical experience, patients who are able to respond to verbal command (minimally conscious plus [6]) should be able to do hypnosis exercises (the length of a hypnotic session can be adapted to their attentional abilities). In addition, cognitive abilities required to actively realize hypnosis exercise are similar to abilities required during active paradigms proposed with different neuroimaging techniques (e.g., [7]).

In conclusion, this case report shed light on the feasibility of the integration of hypnosis in the daily management of DOC patients. Future controlled studies are needed to establish the effect of hypnosis on cognitive rehabilitation in severe brain injury patients. Neuroimaging should be integrated to highlight the potential neural modifications induced by hypnosis as compared to a classical rehabilitation treatment program.

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**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical standard** The study was approved by the Ethics Committee of the Medical School of the University of Liège.

## References

- Jennett B, Bond M (1975) Assessment of outcome after severe brain damage. *Lancet* 1:480–484
- Giacino JT, Kalmar K, Whyte J (2004) The JFK Coma Recovery Scale-Revised: measurement characteristics and diagnostic utility. *Arch Phys Med Rehabil* 85(12):2020–2029
- Nemeth D, Janacsek K, Polner B, Kovacs ZA (2013) Boosting human learning by hypnosis. *Cereb Cortex* 23(4):801–805
- Vanhaudenhuyse A, Laureys S, Faymonville M-E (2014) Neurophysiology of hypnosis. *Clinical Neurophysiol* 44(4):343–353
- Muller K, Bacht K, Schramm S, Seitz R (2012) The facilitating effect of clinical hypnosis on motor imagery: an fMRI study. *Behav Brain Res* 231(1):164–169
- Bruno MA, Vanhaudenhuyse A, Thibaut A, Moonen G, Laureys S (2011) From unresponsive wakefulness to minimally conscious PLUS and functional locked-in syndromes: recent advances in our understanding of disorders of consciousness. *J Neurol* 258(7):1373–1384
- Monti MM, Vanhaudenhuyse A, Coleman MR, Boly M, Pickard JD, Tshibanda L, Owen AM, Laureys S (2010) Willful modulation of brain activity in disorders of consciousness. *N Engl J Med* 362(7):579–589