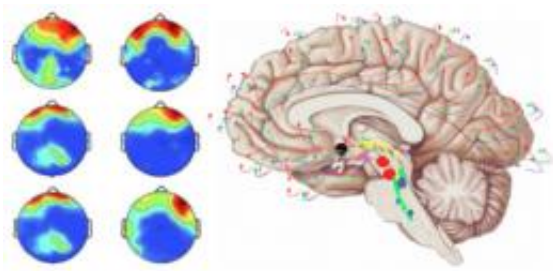


Patients in a minimally conscious state remain capable of dreaming during their sleep

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The brain of "minimally conscious" severely brain damaged patients shows "sleep-wake" activity as in normal healthy subjects. Changes in frontal "slow wave" activity during sleep (areas in red) are considered to reflect some capacity for neural plasticity or natural healing of the brain. © Coma Science Group, University/CHU of Liege

The question of sleep in patients with seriously altered states of consciousness has rarely been studied. Do 'vegetative' patients (now also called patients in a state of unresponsive wakefulness) or minimally conscious state patients experience normal sleep? Up until now the distinction between the two patient populations had not been taken into account by electrophysiological studies. Yet if the vegetative state opens no conscious door onto the external world, the state of minimal consciousness for its part assumes a residual consciousness of the environment, certainly fluctuating but real.

It is this difference which has led a group of researchers at the Coma Science Group and the universities of Wisconsin and Milan to compare the [sleep](#) of these two types of brain damaged patients. The results of their study are published this week in the journal *Brain*. They demonstrate once again the necessity of an adapted and specific medical care for each of these states.

The researchers' work rested on a sample of 11 subjects (6 in a state of minimal [consciousness](#) and 5 in a vegetative state) and made use of high density (256 electrodes) electroencephalography (EEG). The goal was to determine the structure of sleep within the two types of patient. "We used as a marker of arousal the fact that the subject had his/her eyes open and muscle tone, and as a marker of sleep the fact that the patient had closed eyes and muscle inactivity," points out Dr. Steven Laureys, the Director of the Coma Science Group.

The high density EEG revealed that the brain's electrical activity differed very little between sleep and wake states in patients in a [vegetative state](#). On the other hand the sleep of patients in a minimally [conscious state](#) had characteristics very close to that of normal sleep in a healthy subject. They showed changes in "slow wave" activity in the front of the brain considered important for learning and neural plasticity (figure). It also appeared that these patients produced NREM (non rapid eye movement) slow wave sleep and REM (rapid eye movement) sleep, which is the support for dream activity.

"Everything thus indicates that they have access to dreaming," emphasises Steven Laureys. "As a result, we can legitimately suppose that they still have a form of consciousness of self in addition to a certain consciousness of the external world."

The study published in *Brain* brings to light a relationship between the electrophysiology of sleep and the degree of consciousness in severely

brain damaged patients. Thus, once validated, the method used could constitute an additional tool to evaluate, in a routine clinical setting, the potential maintenance of a residual consciousness in these patients.

More information: [‘Electrophysiological correlates of behavioural changes in vigilance in vegetative state and minimally conscious state’](#), *Brain* (2011) 134 (8): 2222-2232. [doi: 10.1093/brain/awr152](#)

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