Thinking, feeling and remembering take place in the brain. It is here that our consciousness lies, here that we keep secret longings, fears and misdemeanours hidden. Only the efficiency of our brain makes it possible for us to speak, see, smell or move. Today, neurosurgeons and neurobiologists with modern surgical and investigative methods are intervening directly in the brain. Karin Bundschuh from BioRegio Freiburg spoke with Dr. Jens Clausen of Freiburg’s Interdisciplinary Ethics Centre about the ethical questions and problems raised by modern brain research.

Curing disease is something that is fundamentally positive. But how does an ethicist judge when direct brain intervention should be part of the therapy?

Healing is not only an ethically justifiable objective, it is an ethically imperative one. However, this should not be at any cost. The question must be asked as to which methods are appropriate. Brain interventions have a particularly shattering effect since the brain forms the biological basis of all the central aspects of our self-understanding. Characteristics such as self-confidence, cognitive abilities, the emotions and memory are all located in the brain. If these functions are impaired by the intervention, then that is a shattering effect.

How do you rate a brain pacemaker operation, where electrodes are implanted in the brain in order to free Parkinson’s patients from trembling and stiffness? In this case, the electrodes certainly have an effect on the brain.

On the one hand, it is precisely the goal of these electrodes to influence the brain and provoke the desired effect: To reduce or completely eliminate tremors. On the other hand, an electrode in the brain always creates a certain amount of anxiety. It is active inside the brain and triggers stimuli, but the different effects it may have are unpredictable. With deep-brain stimulations, serious side effects have arisen time and again, making psychiatric treatment necessary. This must always be taken into consideration, even if the goal of the intervention is a high priority. After all, the patient is very seriously ill. If there is no other way to help, it is difficult to justify a fundamental refusal of this therapy. One must look very carefully, however, at who is suitable for the operation and how any risks can be avoided.

What are the ethical aspects related to mechanisation of the brain and to foreign bodies in the brain?

On whose authority should decisions be made about the use of brain stimulations? For example, is it more important to maintain language function or to protect the memory? Or are there functions that must not be impaired by the intervention? Deep-brain stimulation is a relatively new form of therapy, which is high risk and about which a lot is still unclear. The desired effect: To reduce or completely eliminate tremors. On the other hand, an electrode is implanted in the brain in order to free Parkinson’s patients from trembling and stiffness.

What is your reaction to the statement: It is not ethically justifiable for a patient to be operated on only when medicines are no longer helping and the condition has worsened accordingly?

It is in the patients’ own interests that such a serious intervention should be performed only when medicine is no longer having any effect – or at least not sufficient effect. Deep-brain stimulation is a relatively new form of therapy, which is high risk and about which a lot is still unknown. This method should not be used rashly if different, lower risk alternatives still exist.

What do you think about epilepsy patients who are not helped by medication? Physicin and patient are time and again faced with the dilemma that the operation, which frees the patient from attacks, destroys other brain functions.

Neurosurgeons are faced with an extremely difficult situation with regards to epilepsy surgery or tumour operations. On the one hand, brain surgery is aimed at keeping a patient as healthy as possible and increasing life expectancy and quality of life. On the other, cognitive achievements and regions of the brain’s communication network, such as language and memory or emotions, can be damaged. In this case, any benefits from this operation must be weighed against the risks. Moreover, the decision cannot be made by the physician alone. The issues that need to be taken into consideration can vary enormously from patient to patient. There are patients who are ready to accept restrictions on their ability to retain and remember if it means the attacks will finally stop and a social life can once again be possible.

Are there any generally accepted recommendations that can make the physicians’ and perhaps the patients’ decision easier?

Each individual case has its own difficult questions, which cannot be answered in a general way. An agreed method of prioritising higher brain functions might assist decision-making. For example, is it more important to maintain language function or to protect the memory? Or are there functions that must not be impaired under any circumstances? The biases and considerations here are based on images of humanity that are backed by implicit anthropological convictions. The consequences of not intervening must also always be part of any decision about surgery. A growing tumour can eventually lead to function failure.

As an ethicist, are you ever called in by physicians for advice on such difficult decisions?

We are in close contact with neuroscientists and physicians for clarification on this important question. Furthermore, we offer consultation in Freiburg in the form of the Ethics Council. In situations where there is ethical conflict the treating physicians can call us here and request advice.

As an ethicist, are you ever called in by physicians for advice on such difficult decisions?

Where does man stop and machine begin?

The human brain is the biological basis of central aspects of human self-understanding. This also includes our ability to speak. Speech areas are highlighted in red. (Photo: Neurocentre Freiburg)

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Where does man stop and machine begin?

Scientists are using electrodes to measure the existing brain activity of the brain motor areas. The signals are transferred to a computer via an amplifier. Mathematical analysis methods are then used to determine the intended movements from the measured brain activity. Once the brain signals are translated, a computer then controls a prosthesis or robotic arm.

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