

No need to speak, the doctor can read your mind

Groundbreaking study raises hope that people suffering severe paralysis could still communicate

By Sarah Knapton SCIENCE EDITOR

SCIENTISTS have developed mind-reading technology that can understand people's thoughts without the need for them to speak or even move.

The new non-invasive technology,

which is able to interpret answers to questions by detecting changes of blood oxygen levels in the brain, offers the possibility that patients paralysed by injuries, motor-neuron diseases and a range of other conditions will be able to communicate again.

In a pioneering experiment, four people who were incapable of moving their eyes were able to respond with "yes" or "no" answers. On seven out of 10 occasions the patients said they were happy despite their condition, which requires round-the-clock care. In one

case, a family requested that the researchers ask one of the participants whether he would agree for his daughter to marry her boyfriend. The answer was "No" nine times out of 10.

"The striking results overturn my own theory that people with complete locked-in syndrome are not capable of communication," said Professor Niels Birbaumer, from the Wyss Center for Bio and Neuroengineering in Geneva.

"If we can replicate this study in more patients I believe we could restore useful communication in com-

pletely locked-in states for people with motor-neuron diseases."

Locked-in syndrome is classified as having mental awareness but complete paralysis except for up and down eye movements and blinking. In such cases, patients can communicate using simple blinking systems.

However if all eye movements are lost, as in the case of patients in the study, the condition is referred to as complete locked-in syndrome.

But the new device was able to pick up the changes happening in the brain

and read thoughts. All four patients were suffering from ALS - a progressive motor neuron disease that leads to complete destruction of the part of the nervous system responsible for movement.

Scientists asked questions to which they already knew the answer, such as "Your husband's name is Joachim?"

One of the patients Kerstin Wirth, 26, of Leverkusen in Germany, was diagnosed with juvenile ALS (Lou Gehrig's disease) and within just four years was in a completely locked-in state. But she was able to confirm that her moth-

er's name was Margit and say that she still felt happy with her life.

The researchers said they were amazed to find that all the participants reported being happy most of the time.

Prof Birbaumer added: "All four had accepted artificial ventilation in order to sustain their life when breathing became impossible so, in a sense, they had already chosen to live. As long as they received satisfactory care at home, they found their quality of life acceptable."

The research was published in the journal *PLOS Biology*.