

News from the beyond

A ground-breaking doctor who's found ways to communicate with coma victims

THE MIND

Helen Davies

Into the Grey Zone

A Neuroscientist Explores the Border Between Life and Death by *Adrian Owen*
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Adrian Owen is a scientist. He has a laboratory, a team of dedicated, well-funded colleagues, fMRI scanners, and reams of data and research. He is also one of the leading explorers in a radical new science dubbed the “grey zone”. Instead of mapping the constellations or plumbing the depths of the oceans, researchers in this

two-decade-old field are instead venturing into the “shadowlands” of the human mind – the damaged, murky in-between space where those who have suffered a catastrophic brain injury languish in a coma or vegetative state.

In **Into the Grey Zone**, Owen, currently the research chair in cognitive neuroscience and imaging at the Brain and Mind Institute at Western University, Canada, recounts his adventures into other people’s consciousness. It is an “unpredictable place,

mysterious and complex”, he writes. “Every brain is different, and every brain injury is different.”

The result is a fascinating and accessible account of cutting-edge science, and of those whose lives have been altered in an instant and who now survive hooked up to ventilators, fed and hydrated by tube, washed and turned by nurses to prevent bedsores.

Owen’s enthusiasm for his subject is infectious. He describes the trials and tests he conducts on his patients, such as showing them pictures of their loved ones alongside strangers to see if there is a difference in the way they register interest, or playing them Hitchcock films (which are particularly good at making us react) to see how they respond.

His case studies include himself. When he was 14, he was hospitalised with Hodgkin’s disease and endured two years of scans. Later, he watched his mother “get slowly drawn into the abyss” when she was diagnosed with an oligoastrocytoma, a cancerous brain tumour that was pushing its way into the folds of her cortex. He is also “haunted” by a former girlfriend called Maureen.

Their relationship ended acrimoniously, and a few years later, in 1996, she had a bike accident and suffered a brain aneurysm. “She was gone, but she wasn’t. How could she still be living and breathing, waking and sleeping, and yet be so completely absent?”

In 2003, a man called “Kevin” became the first patient Owen put into an fMRI scanner, his stocking feet protruding from the tunnel. The 53-year-old bus driver had collapsed, then suffered a paralysing stroke, and was declared vegetative a month later. Owen read to him a

series of sentences with ambiguous words, and watched as his temporal lobe lit up in the same way as healthy volunteers. His brain was still processing complex sentences, but it was not enough to prove irrefutably that Kevin was conscious.

Three years later, Owen

made medical history – and global headlines – when he “communicated” with a patient in a vegetative state. His team had hit upon two scenarios that were complex enough and long enough to sustain a thought process that could be captured in the



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scanner: imagining playing a game of tennis, and walking around the home. When the brain was activated in imagining these two activities, the team were able to map the neural pathways. “Carol”, who had been hit by two cars when crossing a busy road when she was 23, looked unresponsive and hopeless lying inert with part of her skull removed. Remarkably, though, when she pretended to play tennis her scans lit up in exactly the same way as those of a fully conscious person. This was the eureka moment.

Even more revealing was “Juan”. When he was 19, he suffered extensive damage to the frontal, parietal and occipital lobes of his brain. He had the lowest score on the Glasgow Coma Scale (the accepted neurological assessment of impairment)

that it is possible to have without being dead. When he was scanned there was little response.

Yet Owen learnt that within a year Juan was talking and walking and could recall his time in the grey zone. He described being in the scanner, could give details about the scientist who was there, and remembered the feeling that he was constantly trying to speak but to no avail. Most movingly, he says that he “couldn’t produce tears. But I still cried.” Here was evidence that a patient could appear to be entirely vegetative yet remain absolutely conscious, without medical experts really knowing.

It is a reminder of the

fragility of life and the resilience of the human spirit (many of those who recover

report suicidal impulses while in a coma). The dogged optimism of family members who visit daily to talk to their loved ones, even devising their own cures, is also humbling and extraordinary.

The questions raised by all this – about the right to life, the quality of that life and the right to die – are difficult and divisive, and Owen is actively engaged in the debate. This book will be required reading for anyone sitting by a loved one’s bedside, caregivers, doctors, ethicists, lawyers and philosophers.

And the future? Owen predicts that brain-computer interfaces (BCIs) will be as commonplace as smartphones in 20 years. These take a reading of a brain response, analyse it and turn it into intentional actions. They will enable the patients trapped in the grey zone to spell out “I’m conscious”, or to engage in conversation.

Perhaps there will even be a future when it is a machine that decides when to pull the plug. †

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He plays his patients Hitchcock films to see how they react

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Only sleeping Owen shows that vegetative patients can remain conscious without medical experts knowing