

## THE AUSTRALIAN

# The healing mind: how neurofeedback is treating trauma

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Trauma survivor Vital Keneza being treated with neurofeedback. Picture: Ellis Parrinder Source: Supplied

### **MIRJANA Askovic deals in broken spirits.**

From her ordered little office in a health complex a stroll away from Fairfield station in Sydney's suburban west, she has spent the past 13 years bearing witness to the hideous deeds of despots and psychopaths. She has seen the end results of Pinochet's henchmen, who fed their victims psychedelic drugs and then attached electric wires to their testicles, refining torture techniques. She's counselled men who've spent months in total darkness, alone in a tiny prison cell, being "re-educated" in Vietnam. She's listened to the stories of little girls who watched their families hacked to death by previously friendly neighbours in Rwanda.

Askovic, 48, is a psychologist who treats and rehabilitates torture and trauma survivors. Over the past 25 years, some 43,000 refugees have passed through the door of the service she works for, seeking help for the traumas they suffered before arriving in Australia. Most clients can be helped with traditional counselling and medication, but some, particularly those who were subjected to extreme stress and torture, fail to respond to any form of treatment. For those people, and their families, life is almost unbearable. They suffer constant flashbacks, imagining themselves back in the torture cell. They rarely, if ever, get a full night's sleep. They find it difficult to relate to their kids and spouses. They have trouble concentrating. They are hyper-vigilant and sometimes violent, their brain forever tuned to fight or flight. They find no joy in life.

The torturers had done their job — they'd crushed the human spirit. In doing so they had fundamentally altered the functioning and structure of their victims' brains. Askovic, a dedicated clinician and a refugee herself, was troubled by the fact there was little she could do to ease the immense suffering of these people.

And then, in 2003, her husband was watching a documentary about the use of neurofeedback to successfully treat a troubled child — the boy had been a nightmare for his parents, hyper-aggressive with ADHD (attention deficit hyperactivity disorder) and oppositional defiant disorder. Neurofeedback is essentially brain training, a way of teaching the brain to function in a calmer way. "When I got home my husband is telling me I would be interested in this," she says in her throaty Serbian accent. "I jump straight on internet to investigate."

Askovic was intrigued. If neurofeedback could calm the troubled mind of a child with ADHD, it might also work on the scrambled brain of a torture sufferer or a traumatised refugee. She threw herself into research, read everything she could on the subject and sought the advice of experts abroad. Children with ADHD have hyperactive nervous systems — disorganised brains. She discovered that a patient could be taught to control the electrical activity in their brain. The patient, by playing a kind of video game using only the electrical currents from their brain, would be "rewarded" if they stayed within a certain set of "calm" electrical parameters. Our brains are plastic and constantly changing and the theory is that with enough training the brain can learn these new neural pathways, patterns of operating, and that those changes become permanent.

Askovic approached her boss at the Service for the Treatment and Rehabilitation of Torture and Trauma Survivors (STARTTS), CEO Jorge Aroche, with her research. "We treat some very damaged people," says Aroche, an experienced clinician. "We have to be innovative and open to all sorts of new ideas to get results." He gave Askovic the go-ahead. She received training and started, at first, by experimenting on friends, colleagues and family. With neurofeedback, there are no drugs or electrical currents going into the brain; the brain is simply learning to function differently. "Think of it as being like physiotherapy for the brain," Aroche explains. Others have likened it to "rebooting the brain".

In 2007, Askovic and her team officially began to treat patients. The results were immediate and spectacular. Patients who had lived in a fug of torment for years, in some cases decades, began to reawaken. "When a client first comes in, all you see is fear and struggle," she tells me. "They don't really see you as a human being — other people don't really exist. The only thing that is real for them is their fear. So when you see a person emerge from that and find that they are cheeky, that they have a sense of humour, it is amazing. For me it is not so much the reduction in symptoms [that is satisfying]. It is about seeing the beauty of the person emerge." What neurofeedback does, she says, "is tame the fear. When you tame the fear the beauty emerges." With the fear quelled, those clients could then be helped further with traditional therapies and counselling.

Askovic is convinced neurofeedback works. She has treated 126 patients, many of whom have undergone incredible transformations. If she can prove it in a randomised controlled trial, it could lead to a revolution in the treatment of Post Traumatic Stress Disorder (PTSD). It could be hugely significant for the treatment of war-ravaged soldiers, rape victims and others exposed to trauma. It could be used in the rehabilitation of disturbed prisoners. The science on neurofeedback is far from settled and it is somewhat controversial. "But as a clinician, you don't necessarily care if the research is behind you," she says. "You care about outcomes. If it helps my client, then it works for me."

Before the 1994 genocide in Rwanda there was a smaller but equally vicious slaughter in neighbouring Burundi. Coffs Harbour resident Vital Kehefa, now 47, was then a young primary school teacher in Burundi. Due to his mixed Tutsi and Hutu heritage, his family was caught between the warring tribes. His father and five siblings were massacred and one of his daughters died of disease. He witnessed things he is still too frightened to talk about. He fled into exile in neighbouring Tanzania and the Democratic Republic of the Congo, but on a trip back into Burundi he was captured by rebel fighters and held captive for 14 months and forced to work. When he tried to escape he was severely bashed and shackled. He leans forward and shows me the deep scars on the top of his skull. He eventually escaped and found his way to a refugee camp in Uganda, where he was reunited with his wife and children.

For 10 years he lived in the squalid, violent camps where infection and disease were rife. As a mixed-ethnic family they were in constant danger. “All I would think of was food, medicine and security. I slept in my clothes every night so that if we were attacked I could run away.”

His daughter, Petronila, who was a young child when they arrived in Uganda, says her father was forever vigilant of danger in the camp, always on high alert. “For Dad it was particularly stressful,” she says. “The ethnic tensions in the camp wore him down. I can’t remember us ever sitting down as a family and just talking. It was all about survival.”

After years of disappointment and despair, the Kehefa family were finally granted refugee visas to come to Australia. Vital, his wife, and five of his children moved to Coffs Harbour, on the NSW north coast, early in 2007. Petronila was 12 and did not speak a word of English. Now, at the age of 19, she is studying at the University of New England to become a doctor.

Vital says that for the first year he thought he had moved to a paradise — “I could not believe that we could just eat what we wanted and that the police were there to help, not to brutalise.” But the terrors of his past caught up with him and he spiralled into a deep, deep depression. “He was pretty horrible to live with,” Petronila explains. “He just fell apart. He would lose his temper. He would just snap, over nothing.”

Vital was suffering severe PTSD. Flashbacks of massacres would haunt him while he was awake. He would dream, over and over, that he was digging a grave. He says he felt ashamed of himself, unable to work and provide for his family, unable to manage his fears or control himself in front of his children. “When my children saw me, they would want to run away.”

Anti-depressants didn’t work. He tried other medication but it caused him to gain weight and affected his memory — he would go for a drive and then forget where he had parked his car. He would forget the names of his children. He could not concentrate, and failed a basic introductory English course. It got to the point where he contemplated “taking many medicines at one time to end my life”.

Then a STARTTS counsellor in Coffs Harbour told him about Askovic’s neurofeedback program. They organised 20 intensive sessions late in 2011. The changes were immediate and drastic. “It made a very, very big difference to my life,” he says. “I have no way to explain this change, but it worked.” The first thing to improve was his sleep. His confidence returned. He started to exercise. The nightmares stopped. He began communicating with his family and became involved in his community. He enrolled in university.

“I started noticing that he had changed,” Petronila says. “He started asking what our days were like at school. He started organising family trips to the beach, or to the park for a picnic. It was amazing for our family and for my mum.”

This man who had become a stranger to his wife and children came alive. Petronila had barely had a conversation with her father in years and now he was helping her with her chemistry homework. “It felt like we were, you know, a family,” she says. Vital recently completed a bachelor degree in health, ageing and community services. He is no longer taking any medication and is looking for work.

The changes Petronila observed in her father’s behaviour could also be seen in his brain. A brain map, an EEG, was taken before Vital began his treatment. Another was done afterwards. His brain had changed significantly over the course of his treatment in the areas associated with trauma. “It meant that we were observing brain plasticity,” Askovic says, “that the brain does change after neurofeedback.”

In the past few years STARTTS has begun doing this comparative mapping with clients. So far it has evaluated 27 people — 23 of them have shown significant changes in their brain after neurofeedback. The amazing recovery of Vital Kehefa has been repeated time and again. Askovic says that of 126 patients she has treated, 107 have recovered to a point “where they’ve become functional”.

Jorge Aroche, the service’s CEO, says it is hard to believe until you’ve seen it. Initially, he was supportive of neurofeedback but sceptical. The first person Askovic treated was a Chilean man whom Aroche knew personally. This man had been hideously tortured by Pinochet’s henchmen and had been a client of STARTTS for more than a decade but had made little progress. “I remember speaking to him after he’d had his sessions and he told me he’d had his first night without nightmares in 20 years,” Aroche says. “He was a changed man. The transformation was incredible.”

I am invited to see how it works and so I head out to Askovic’s clinic. She leads me into a room with a row of computers along one wall and seats me in a comfortable reclining chair. She then places a cap on my head, and, after applying a sticky gel, attaches sensors to my skull, which measure the electrical activity in various parts of my brain. My brainwaves show up on a computer screen in front of her. I am instructed to close my eyes for the first

10 minutes of the session and then open them for the second part.

Askovic reads the data and assures me my brain is OK, but she has some concerns. “It appears that at some point in your life something has happened to affect the functioning of your brain,” she informs me. She explains that what she observes is common in people who witness traumatic events, such as surgeons and nurses who see their patients die, or police and ambulance officers who attend horrific car accidents. “It means you need to be cautious,” she says. “It doesn’t mean that you will have depression or anxiety but that you are more susceptible to it. It shows that you have empathy and that you are vulnerable if you are exposed to the suffering of other people.”

I reveal to her that for much of my early career I was a police reporter and spent years reporting on disasters, murders and various other tragedies. It culminated, I say, in being dispatched to Tasmania in 1996 on the day Martin Bryant went mad. Half an hour after Bryant was arrested I was taken on a tour of Port Arthur, where bloodied blankets still lay on the ground and vehicles, riddled with bullets

and splattered in blood, were strewn by the roadside. I stood outside the Broad Arrow Cafe while policemen were inside, stepping over bodies. I hugged my colleagues as we were shown where Bryant walked behind a big old stringybark and shot dead a cowering Alannah Mikac, aged just six. The spot was marked with four sticks placed in a rectangle; the police had run out of crime-scene tape. Down the road, it was explained, Bryant had shot her sister, Madeline, three, and her mother, Nanette, 36, who'd begged for her children to be spared. I was simply unable to comprehend such evil. It affected me in a profound way and I considered leaving journalism.

As I am explaining this to Askovic, an uncontrollable sadness wells up from somewhere deep inside. And, as I do whenever I talk about Port Arthur, I burst into tears. "I thought I had dealt with this," I say, embarrassed. I feel a bit pathetic, aware of the truly horrible stories that have been revealed in this room. "It looks like it stayed with you," she says comfortingly. "It looks like it remains."

We move back to my brain map and she unpeels my personality, incredibly accurately. "How I see it is, when you have your eyes open you don't have markers for depression. But with eyes closed you do. That says to me that when you disengage from the world that is when things start for you. So for you, your mechanism to cope is to be involved, to have people around you because when you are alone you are more likely to ruminate."

She is spot on. I think of myself as a generally happy person, but I don't like to spend long periods by myself. I live with an underlying anxiety that bubbles to the surface when I am alone, and so I fill my life with family and friends and activities. Exercise, cycling, seems to help to keep everything in check.

"So with neurofeedback we try to get rid of these patterns," she says. "For you, what happens is that when you become withdrawn you have this loop of negative thoughts. Each time this happens they are physically getting more embedded in your system — neuroplasticity works both ways, negative and positive. In your case we can try to interrupt this area of the brain that is for trauma." Having identified the areas of my brain that are out of kilter, Askovic attaches electrodes to my skull to monitor those areas. "In your case, probably a little bit of stimulation to the frontal lobe would make you feel a little more in control. But calming you is the first step."

I lie back in the chair and watch an empty computer screen and slowly, square by square across the screen, picturesque landscape scenes are revealed. At first I am unable to relax and can feel tension in my temple, jaw and in my legs. Askovic switches one of the electrodes to another part of my scalp. When my brainwaves are calm, I am rewarded with a regular beep. I am not really aware of what is happening but as I relax, the blips start to come at a consistent, even tempo — my brain is working out how to play the game. Relax and the beeps come. But I am unaware of how this working; it is all taking place at an unconscious level. My only form of control over the beeps is to remain relaxed. The longer I do this, the stronger these relaxed neural pathways become. I feel the tension in my body start to dissipate and then something wonderful happens — I feel a complete absence of anxiety. It is blissful. It is amazing. I feel completely at ease.

Askovic smiles. "How do you feel?" she asks. "Wonderful," I reply. So, I inquire, if I did this twice a week for half an hour, could I permanently change the way my brain functions? "Yes, you would have to train and train, but if you did you could feel free of anxiety and fear." I had always figured this was just the way I was, that this was how I was wired; I'd never contemplated that I could live a calmer existence. The concept is tantalising — probably as much to my partner, colleagues and

friends as it is to me. My anxieties are relatively minor and not always with me. I can't imagine the relief Vital Kehefa must have felt when he reached this point after years of torment and fear and nodding off to sleep to dig his own grave.

There are those who view this neurofeedback as a bit too hippie-dippy to be true. In an article in The New York Times about its use to treat children with ADHD, the director of the Centre for Children and Families at Florida International University, William Pelham, dismissed it as “crackpot charlatanism” and warned that exaggerated claims about its effectiveness could lead patients to favour it over proven options, such as behavioural therapy and medication. However, in the same article, a host of eminent psychologists and psychiatrists gave qualified support to the treatment. “There is no doubt that neurofeedback works, that people can change brain activity,” said Professor John Kounios from Drexel University, Philadelphia. “The big questions we haven't answered are precisely how it works and how it can be harnessed to treat disorders.” Acceptance of neurofeedback to treat ADHD gained real traction in 2012, when the powerful American Academy of Pediatrics approved it as “best support” treatment for children with ADHD.

If it can work for them, can it also be used successfully for other ailments, such as PTSD? “Of course it can,” says Sebern Fisher, a well-known US psychotherapist, who recently published the book *Neurofeedback in the Treatment of Developmental Trauma*. “These [disorders] are all manifestations of a hijacked nervous system. Our job is to figure out how to quieten that nervous system and neurofeedback has been proven to do just that.” She says that ADHD and PTSD have traditionally been treated as psychological problems when, essentially, they are neurological problems. The brain, she says, “cannot learn new neural pathways simply by taking medications”.

The military, too, is taking note of neurofeedback. Michael Villanueva is a clinical psychologist and reserve officer in the US Medical Corp who has long had an interest in PTSD. In 2011 he was sent to Afghanistan. He tells me he went with some radical ideas about the use of neurofeedback to calm soldiers. “After combat you have a central nervous system that is racing with stress hormones,” he says. “You have an interior signalling system that is on fire.”

Villanueva's idea was to put out the fire before it spread. He set up an outpatient clinic on the base offering neurofeedback, 24 hours a day, to soldiers returning from combat missions. He marketed it not as a mental health clinic but as a brain-training centre, and “every soldier understood that — you train your body, you train your brain. We had a waiting list of soldiers lining up to get in.” Soldiers would come in from a 2am helicopter mission and calm their brains with a session of neurofeedback before going to bed. He treated more than 200 soldiers at the base.

The most immediate effect was improved sleep — those who had neurofeedback significantly reduced their use of sleeping tablets. It also reduced their nightmares, their anger and their fear — the precursors of PTSD. The soldiers took to it also because it improved their marksmanship and physical training scores. “We'd have soldier after soldier coming into the clinic saying, ‘I can't believe the scores I am getting at the firing range’.”

He believes the soldiers who received neurofeedback in Afghanistan will have a better quality of life, post-deployment, than their comrades who didn't. “But that's the bitch about this whole goddamn thing,” he tells me. “I could not get the permission to do the follow-up research. I believe their quality of life is probably better, but I can't prove it.”

And while Villanueva could not follow up, his ideas about neurofeedback to treat veterans have been

embraced by some of the US Army's leading psychologists. Dr Jerry Wesch, who heads the PTSD program at Fort Hood, Texas, where 45,000 soldiers are based, said he was so astounded by the treatment he spent several thousand dollars of his own money to buy neurofeedback equipment for the base. "The results had our jaws dropping," Wesch told US website The Daily. "I'd like to use this treatment on every soldier that comes through my door."

But scientists are wary about where some segments of the neurofeedback industry appear to be heading. In the US, the UK and now in Australia, neurofeedback clinics have sprung up offering help for all sort of ailments from epilepsy, autism, depression, dyslexia and chronic fatigue to drug addiction; some promise self-improvement for managers, while others offer to help actors refine their stage craft and golfers eradicate a slice. I rang one of the Sydney clinics and they told me I could hire a neurofeedback machine and that sessions would be conducted over the internet, via Skype, with a "trained technician". While many may be legitimate, neurofeedback — if uncontrolled and unregulated — is a field into which snake oil salesmen could easily slither.

Scientia Professor Richard Bryant of UNSW, a world expert in PTSD, is likewise wary of proclaiming neurofeedback as the next miracle cure for the disorder. Yet he is collaborating with STARTTS on research, looking at how torture affects the brain and its emotional responses and why refugees with PTSD might benefit from different treatment approaches such as neurofeedback. "And I wouldn't do that unless I thought it was worthy," he says. "What I will say is that this is a promising treatment. STARTTS is doing what needs to be done. They are picking the hardest group of people to do it with and they need to be creative." Bryant says the trials they are doing now will allow them to evaluate if it is worth taking things to the next step, which is to conduct a randomised controlled trial. "Once you get that RCT evidence then you are on very strong ground to say this is one of those treatments that needs to be considered alongside the others."

Askovic is keen to have such a trial, but she says she doesn't need a scientific study to know that it works. She is an experienced clinician. She's looked into eyes of men and women and seen absolute fear. She's witnessed that fear evaporate. "This is a very difficult job," she says. "But witnessing the beauty that emerges when you tame the fear is like being at a birth. It is an extraordinary privilege. It keeps me going." Incredibly, she says, many of her patients have come to forgive the men who - tortured them. She smiles and says, "The human spirit is truly remarkable."

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