Cascadia Institute for Neurotechnology (CIN). Seattle, Washington, USA. 2045.

Known for its cutting-edge research, CIN provides many neurotechnology treatments and procedures. Today, the Board of Directors is reviewing the cases of four current patients to better understand the realities of using neurotechnology therapies.

-------- CIN Pediatric/Adolescent Unit --------

At four years old, Oliver suffered a traumatic brain injury. As a result, Oliver developed some mental issues. In his younger years, this included grumpiness, temper tantrums, and speech delays. As he got older, he had more violent, dangerous outbursts. A year ago, at age 14, he and his mom agreed to have a deep brain stimulation (DBS) device implanted using nano-surgery. The implant reads the signals in his brain to determine when an outburst may occur. It then sends electrical impulses to the area of his brain that controls his behavior and emotions.

Recently, Oliver's mother has noticed that he is calmer and his temper tantrums are fewer. However, his sleep schedule has become irregular, and he has lost interest in sports. Now she wants the implant removed. She believes Oliver needs to learn to control his anger with more common methods, such as meditation and breath control.

Oliver disagrees with his mom. He thinks the implant gives him the chance for a normal life. While he knows his sleep is worse, his grades are good, and he just joined his high school's drama club.

-------- CIN Neurology Unit --------

Nikola, a newly-retired officer of the Drone Force, is visiting CIN. She wants to discuss the implant she received before her military service. This implant reduced stress responses by changing the soldiers' hormones. It was -- literally -- a lifesaver during active duty. The commanding officer controls the implant via encrypted radio signals. Nikola knew that commanders maintained her platoon's level of focus. Also, sometimes she received controlled bursts of hormones to help with periods of intense work.

When Nikola retired, she was told that there was no way to take out the implant. It had become too deeply buried in her brain tissue to be safe to remove. However, it was switched off and should no longer affect her emotions.

But Nikola's headaches have gotten worse recently. Her stress levels have risen as she looks for work and re-enters normal life. Last week, she stepped into a busy crosswalk without noticing the cars whizzing toward her.

As Nikola prepares questions for her appointment, another pain shoots through her temple.

-------- CIN Neuro-Zoology Office --------

Prisha arrives to discuss new options to control her severe depression and anxiety. Last year, after getting sick with SARS-41, Prisha developed "brain fog" that makes her feel tired and confused. She also began to have panic attacks, sleeplessness, and trouble focusing. Treatments, including counseling and medication, have not helped much.

Today, her treatment team is considering an Enhanced Emotional Support Animal Assistant (EESAA). Prisha is meeting neuro-enhanced animals to decide which animal will help her the most. Each animal was genetically designed with a modified cloning process. Each animal's brain was altered to make it more concerned with its owner's feelings. The animals understand facial, voice, and smell signals from their owner to provide comfort. Prisha has the choice between a marmot, a dog, or a sheep. It is important that the EESAA and its owner get along well. Therefore, Prisha meets each of the animals before discussing the choices with a neuro-zoologist.

EESAAs are very expensive. Because this is a new treatment, the US Healthcare System will only cover 40% of the costs. Prisha has a private insurance plan, too. It has agreed to pay for another 40%. To earn this, she must participate in a research study on her use of an EESAA. Even with the costs and responsibilities of the therapy, Prisha and the team determine that an EESAA dog will benefit her.

-------- CIN Physical Therapy Unit --------

Ricardo wiggles the fingers on his robotic hand. He is intrigued by how the electroencephalogram (EEG) headband reads his thoughts. He reaches out to pick up chopsticks from the bench, clumsily moving them into place. As he clicks them together, they clatter out of his grasp, and he sighs. No sushi today.

"You say you're not ready for a more invasive option, Ricardo," the therapist says, watching him become frustrated. "I hope you'll think about it. These prosthetics are becoming outdated. I just don't know how much longer the institute will even support them. These things require constant tech support, you know. Brain-computer interfaces (BCI) are the wave of the future!"

He flexes the beautifully crafted hand into a fist. The E-Sports Outfitters warehouse where he works already watches him all the time. They track his smart devices to calculate everything from when he arrives, how much work he does, and his physical health. "What would happen if they also had access to my BCI data?" he wondered.

The Cascadia Institute for Neurotechnology's Board of Directors have asked you, Future Problem Solvers, to analyze their use of neurotechnology. Select an Underlying Problem related to the use of neurotechnology at the CIN, then develop an appropriate Action Plan detailing a strategy for the successful continuation of neurotechnology therapies.

