Smooth jumps from athletes integrating headphones with training

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Halo Neuroscience is making its mark as a company with a focus on neurotechnology for elite athletes. Halo, reported *Ars Technica*, says its headset can be beneficial in performance.

The United States Ski & Snowboard team is a case in point; The United States Ski & Snowboard Association tapped Halo Neuroscience to design a program focused on the unique demands of these athletes. The team made use of the company's Halo Sport to train; they reported performance gains in force and technique.

In a video, Luke Bodensteiner, executive vice president of athletics, Executive VP of Athletics, United States Ski & Snowboard Association (the association is the national governing body of Olympic skiing and snowboarding) said they were seeing enhanced learning ability and enhanced power output.

Dr. Jim Stray-Gundersen, sports science adviser, said this was potentially a paradigm shift—it goes beyond muscles and bones and ligaments.

The fact that Halo is just a set of headphones, said a video participant, makes it really easy for us to integrate it into the training program. The set is wireless so no cords get in the way.

Halo Neuroscience, the company behind the system, is made up of a team of doctors, neuroscientists, engineers, and designers. Daniel Chao MD, is CEO & co-founder. They said the product is as easy to use as any set of headphones.

Ars Technica UK described the product: "The wearable looks essentially like a pair of headphones, but if you look at the underside of the headband you'll see that it's lined with spiky foam-clad electrodes. According to Halo, if an athlete wears them while training, their neurons will react much faster, maximizing each session's gains."

Dave Jarrett, head coach, said what makes a difference between winning a medal and not winning a medal is small, small marginal gains. Another person in the video said that Halo offers them the ability to increase the

brain's ability to learn new skills.

The company said they have done thousands of hours of double-blind studies with more than 1,200 people and that their work builds on decades of academic research surrounding tDCS and TES. So far, said *Ars Technica*, the studies carried out by the company have been a series of small-scale studies. What is their tech all about? Step closer into their technology and its role and you meet up with the term "Neuropriming," which uses pulses of energy to increase the excitability of motor neurons.

The pulses of energy improve the brain's response to training, according to the company, enabling the motor cortex to send stronger, more synchronous signals to muscles. Improved neuromuscular signaling means athletes get more from each rep. Accelerated strength and skill acquisition are the beneficial results.

In discussing the ski jumper training program, the company said that Neuropriming was paired with a vertical jump program. The focus there was in improving the smoothness of athletes' jumps.

"Ski jumpers training with Halo Sport saw a 31 percent improvement in their propulsion force (1.7x improvement over sham control group) and a 25 percent decrease in jump entropy (1.8x improvement over sham control group)."

Does this approach have scientific basis? The company says yes, the ability of transcranial electrical stimulation to increase neuroplasticity and aid physical performance has emerged via peer-reviewed, reproduced papers over the last 15 or so years.

"This is a process done in most labs with sponges and wires and measuring tape; now, we've added some technology to make a usable,

convenient, beautiful product and we've wrapped it with the kind of product development that ensures stuff works right in a demanding, high-performance environment."

Halo Sport uses transcranial electrical stimulation, or tES, and that involves applying a small, controlled current to the user's scalp. The current creates a mild electrical field around the neurons.

Halo Sport is capable of producing both a sustained current (like tDCS) and modulated or pulsed current. In all cases, the frequencies used are less than 1000 Hz, with no RF or exotic signals.

The Halo Sport was available for $550 from the company website but the first wave of devices sold out., reported *Ars Technica UK*. People visiting the site wanting to buy are invited to enter their email address for notification of availability.

More information: www.haloneuro.com/

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