Cooling helmet, supplement show potential as concussion healers

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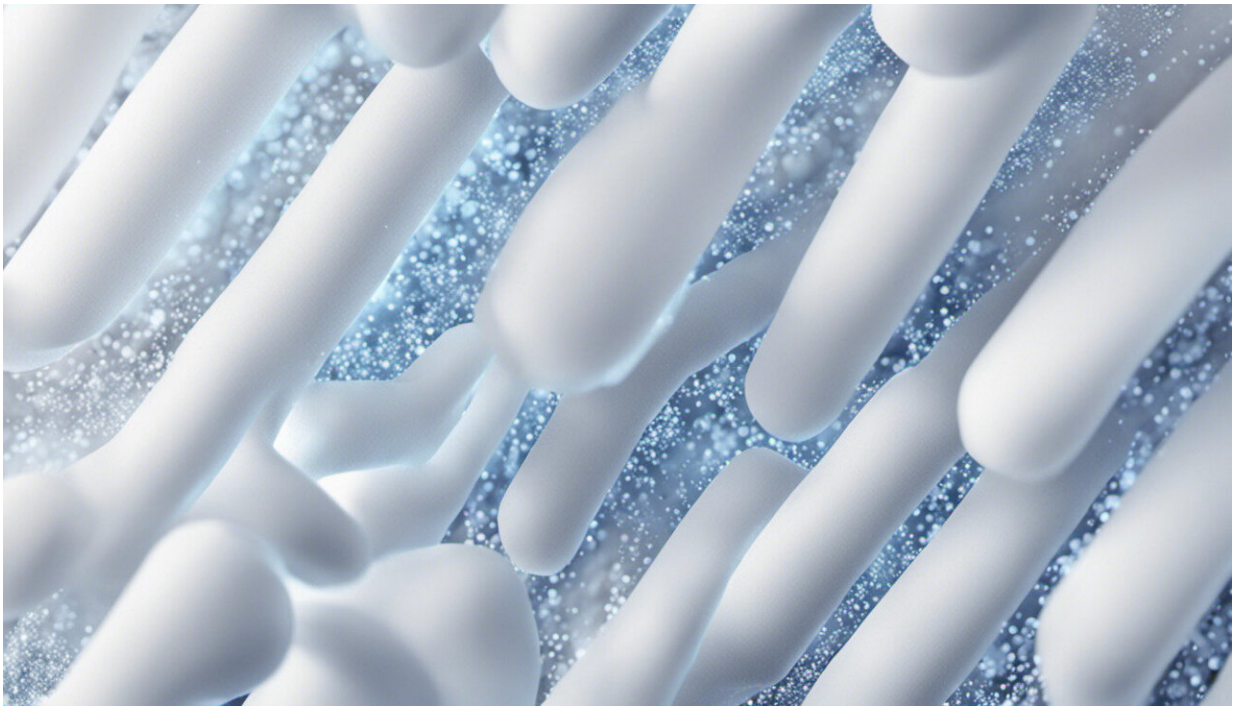

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A brain cooling device and an oral supplement made from pine bark extract both have potential to expedite concussion recovery, according to two new studies by Penn State researchers.

"Currently there are no clinically validated tools or procedures to treat

concussive injury," said Semyon Slobounov, professor of kinesiology and an author of the studies. "The results of these studies provide some preliminary evidence that concussive brains may benefit from science-based treatment, such as brain cooling and the use of a new supplement."

The first study used an FDA-approved cooling helmet designed by Spartan Medical to explore the biological effects of lowering temperature on brain injuries in athletes. Researchers applied the WELkins Temperature Management System to the scalp and the back of the neck of subjects, including 12 student-athletes suffering from concussive injury, and 12 without histories of concussion.

The helmet system is comprised of a cooling unit, tubing and a washable nylon head covering. An ice cartridge, which is made up of water and propylene glycol, is inserted into the unit. Coolant within the unit is chilled and cycles through the head covering at a temperature of about 50 degrees Fahrenheit, cooling the scalp and lowering brain temperature in 15 to 20 minutes.

Athletes in the acute phase of injury, or within seven to 10 days of diagnosis, underwent functional MRI and arterial spin labeling testing – an MRI technique for measuring blood flow in tissues – before and after using the cooling device.

After cooling, concussed subjects reported temporary relief of concussion symptoms such as dizziness, nausea, concentration and memory difficulties. Researchers also noted increases in cerebral blood flow, or blood flow to the brain, after cooling was applied.

"This study suggests that compromised brain functioning in the acute phase of injury could be temporarily restored with brain cooling," Slobounov said.

Further validation is needed and researchers are taking steps to examine direct effects of temperature change within the brain by using cooling techniques while participants are in an MRI machine.

In a study of the oral supplement Enzogenol (ENZO), researchers examined subjects in the chronic phase of injury, or months after diagnosis, to study neuropsychological and biological functions of the brain after concussion. Forty-two student-athletes with histories of sport-related concussions were enrolled, comparing ENZO to a placebo.

Enzogenol is a natural extract from the bark of New Zealand grown pine trees produced by ENZO Nutraceuticals using a specialized water-only extraction method. The active compounds in Enzogenol are flavonoids and other plant polyphenols with antioxidant and natural anti-inflammatory properties.

Subjects took the supplement for six weeks and were tested before and after supplementation using virtual reality and electroencephalography (EEG), with neuropsychological tasks primarily used to induce cognitive challenges.

EEG results revealed that the ENZO group showed reduced mental fatigue, suggesting that ENZO has the potential to improve brain functioning in the chronic phase of concussion, or three to six months post injury.

Slobounov said these results are promising; however, the search for an effective treatment after concussive injury is an ongoing challenge.

The brain cooling study appears in the journal *Brain Imaging and Behavior*. The study on ENZO appears in the journal *Developmental Neuropsychology*.

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