

New mouthpiece found to reduce stress levels after strenuous exercise

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Mouthguards are used by almost everyone participating in sports. These devices, typically purchased over-the-counter and used on the upper teeth, are designed to protect against broken teeth and an injured tongue. Recently, researchers in South Carolina found that a customized device which rests on the lower jaw can decrease levels of serum cortisol following exercise. The reduction of this steroid hormone indicates less stress following strenuous activity and may provide a more rapid recovery after intense muscle exertion.

The findings will be presented in an abstract of the study conducted by Wes D. Dudgeon, Larry A. Buchanan, Ashley E. Strickland, and Dena P. Garner, from the Department of Health, [Exercise](#), and Sport Science at The Citadel; and Timothy P. Scheett, from the Department of Health and Human Performance from the College of Charleston, all in Charleston, South Carolina. The study,

"Mouthpiece Use Reduces Post Exercise Serum Cortisol Levels," is part of the science being presented at the meeting [Experimental Biology 2012](#), being held April 21-25 at the San Diego Convention Center. The abstract is sponsored by the [American Physiological Society](#) (APS), one of six scientific societies sponsoring the conference which last year attracted some 14,000 attendees.

Study and Results

The researchers studied 13 college-age males who wore the custom-made mouthpieces that allowed the lower jaw to move down and slightly forward when teeth were clenched due to a wedge shaped design during one exercise session and did not wear the mouthpiece during the other. All participants completed two identical exercise trials, separated by seven days, of ten repetitions of back squats with a two minute rest period between sets. Blood was collected immediately before, during, and immediately after each event and during three subsequent periods during recovery (30-, 60- and 120-minutes post-exercise). The samples were analyzed for physiological changes in cortisol.

Researchers found no difference in pre-exercise cortisol levels between the groups. However, the group that wore the mouthpiece had lower cortisol levels at the midpoint (19.39 ± 6.90 vs. 27.84 ± 14.55) and 30 minutes after exercise (22.91 ± 8.47 vs. 31.81 ± 10.79). No differences were found immediately after exercise or at the 60- or 120-minute marks.

"The findings are important because decreasing the cortisol response after exercise may lead to a quicker recovery time which is an important consideration for those who train daily, such as competitive athletes," according to Dr. Dudgeon of the research team. "The findings also show the potential to enhance exercise performance without the use of drugs or supplements," he added.

The researchers have not yet determined why the mouthpiece causes serum cortisol levels to decline. As the mouthguard changes the alignment of the lower jaw, one theory is that the mouthguard increases cerebral blood flow to the hypothalamus, the area of the brain that controls the stress response, which could in turn reduce the amount of cortisol that is released, according to Dudgeon.

The study builds on previously published findings by members of the

research team. One study found that oxygen consumption and carbon dioxide production increased in people who wore the mouthpiece during a running exercise. A second study found collegiate football players who wore the mouthguard had lower cortisol levels in their saliva following exercise training. The current study involving serum [cortisol levels](#) is believed to be the first of its kind.

Provided by Federation of American Societies for Experimental Biology

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