

Performance Enhancing ... Mouthguards?

PHOTO: THOMAS BALSAMO

Mouthguards have been recommended to athletes who participate in contact sports for years. The benefit of using a well-fitting mouthguard in preventing dental injury is so great that all youth league and high school football, hockey, and lacrosse teams mandate its use.

BUT CAN A MOUTHGUARD ALSO ENHANCE THE ATHLETIC PERFORMANCE of an athlete? Recently released research suggests that manipulating jaw position with a specific type of mouthguard can increase strength, speed, endurance, and reaction time. For an athlete, this can make the difference between a win and a loss.

The concept is not a new one. It is known that ancient Greek athletes would bite down on a leather strap for increased strength and power while Roman and Viking warriors would clamp down on a leather bit to increase focus on the battlefield. Native American women would bite on sticks during childbirth to ease delivery. Soldiers in the Civil War were told to literally “bite the bullet” to help them endure the agony of amputations on the battlefield. The list goes on. These stories may be anecdotal, but there is a scientific explanation to the phenomena. Recently, science has begun to explain more thoroughly the links between oral appliances and enhancement of human performance.

To understand the physiology behind the performance enhancing mouthguards, we must understand the human body’s response to stress. Stress is a normal physiologic response and can be beneficial in maintaining alertness, focus, and efficiency. However, when stress becomes excessive our bodies shift into a “fight or flight” mode. This response is defined by a cascade of events, one of which is the increased levels of the hormone cortisol in the body. This prepares the body for a short term, heightened physical response. The heart rate increases, breathing rate increases, blood pressure

increases, and pupils dilate. When the fight or flight response is prolonged however, there can be detrimental effects to the health and performance of an individual. A person will tend to over-react, while fear is exaggerated, thinking is distorted, and the rational mind is disengaged. When in the “fight or flight” mode, the attributes that make an athlete great will actually be diminished.

Recent research has suggested a link between clenching of the teeth and the release of cortisol (the stress hormone). The current thinking is that as the teeth are clenched there is compression of the temporomandibular joint (TMJ). This compression signals the hypothalamus which then triggers the excess production and release of a cascade of hormones including cortisol. Cortisol is the hormone released in the “fight or flight” response. If one can prevent the teeth from clenching together by dropping the jaw down and forward (putting a measured space between the teeth), it will relieve pressure on the TMJ and change the signal to the hypothalamus, preventing the excessive production of hormones including cortisol, thereby preventing any performance diminishing effects.

Bite Tech has teamed with Under Armour to produce a performance enhancing mouthguard based on the knowledge of the link between jaw clenching and cortisol production. It is a multi-composite bioengineered intraoral device that relieves pressure on the temporomandibular joint that occurs each time the jaw clenches during stress. The guard relieves this pressure by causing the lower jaw to be moved into the “optimal safety power position.” The desired movement of the



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jaw is achieved by positioning a “reverse wedge” bite plate over both sets of rear molars. Subsequently, when the teeth are clenched—exerting pressure—the twin wedges provide the necessary pivot points that induce the mandible (lower jaw) to move downward in a slight arc.

These performance enhancing mouthguards are not only being used by professional athletes like NHL star Jonathon Toews and PGA golfer Hunter Mahan, but by amateur athletes and anyone who asserts themselves physically or deals with stress such as firefighters, policemen, and military special teams. These mouthguards are not available in stores but must be made by a specially trained dentist. U