A new generation of athletic mouthguards

Today's mouthguards enhance performance, offer more protection and are more marketable

By Eric Yabu, DDS

Time to play a little “Dental Jeopardy”! Answer: gutta-percha.

Question: What were the first athletic mouthguards made of? (OK, even Alex Trebek would’ve had a tough time with this one.)

Double Jeopardy! Answer: Has his own line of custom mouthguards.

Question: Who is Shaquille O’Neal?

Indeed, there is little doubt that today’s athletic mouthguards are not like your granddaddy’s mouthguards, but more like Shaq Daddy’s.

Mouthguard history

Athletic mouthguards, or mouthpieces, have been around for nearly 120 years since a London dentist named Woolf Krause developed them in 1890 to protect boxers from lip lacerations. Known as “gum shields,” they were made from gutta-percha. Krause’s son Philip, also a dentist and an amateur boxer, refined the design and began making the shields from vulca rubber.

Mouthguards were first introduced in the United States by Chicago dentist Thomas Carlos in 1916. For decades, mouthguards remained largely unchanged.

It was not until the early 1960s that a Canadian pediatric dentist named Arthur Wood, appalled by the number of dental injuries he saw in hockey players, developed a “mug guard” or “teeth guard” for which he became known as the father of the modern mouthguard. Since then, mouthguard materials, fabrication techniques and subsequent fit have been improved to increase both protection and comfort.

Mouthguards today

Most recently, mouthguard design has been studied in an attempt to enhance athletic performance as well as decrease the incidence of concussions. The central focus has been on the role of the mouthguard to guide occlusion and, in turn, condylar position within the fossa.

There are three major players in the performance-enhancing mouthpiece arena: Mahercor Laboratories, Pure Power Mouthguards, and Under Armour Performance Mouthwear™ by Bite Tech. Each attempts to enhance athletic performance by improving strength, endurance, balance, flexibility and reaction time while decreasing injury risk from concussions and jaw injuries.

**Maher guards and splints**

Dr. Gerald Maher, a Massachusetts dentist who specializes in TMD and facial pain, was one of the first to explore how an athletic mouthpiece can affect performance and protection. As the team dentist for the New England Patriots, his primary goal was to reduce the number of concussions the players suffered.

He concluded that 64 percent of adults have misaligned mandibles where the condyles do not sit on the cartilage discs; and, if someone suffers a blow to the jaw in this position, the condyles are more likely to be driven into the base of the skull, causing a concussion.

The Maher guards and splints (www.mahercorlabs.com) are designed so that the opposing teeth are seated in a centric relation position so that the condyles are in alignment with the discs. These discs will then act as shock absorbers to cushion the impact of the condyles on the skull.

In addition, because of the thickness of the appliance, the condyles are moved from a position where they are resting directly against the articular disc — or even against the fossa in the case of patients with internal derangements where the disc is displaced, usually anteriorly — to a position farther away from the fossa on the articular eminence.

This would mean that it would take a greater force to drive the condyles into the skull.

Each refined year, Maher, along with Drs. G. Dave Singh and Ray Padilla, published a preliminary study that suggests a customized mandibular orthotic may decrease the incidence of concussions. The study, however, did not attempt to explain the mechanism of protection.

While Mahercor Laboratories does not market their line of mouthpieces and mouthguards for their performance-enhancing effects and doesn’t claim to have specific studies to substantiate these benefits, some of the athletes that have been outfitted with their mouthpieces claim to have noticed a significant increase in strength, balance and speed.

They attribute this effect to the full-body benefits of a properly, CR- or neuromuscularly designed custom mouthguard.

The Maher splint design is a Gelb splint or MORA (mandibular orthopedic repositioning appliance). It is not designed to offer soft tissue protection, but Maher’s line also includes upper full coverage mouthguards. Maher appliances may be fabricated by dentists who are trained in neuromuscular dentistry and generally retail in the $1,500 to $2,000 range.

**Under Armour Performance Mouthwear™**

The most recent mouthpiece to enter the marketplace is the Under Armour Performance Mouthwear™ by Bite Tech (www.pattersondental.com/underarmour). The design is neither innovative nor proprietary, however, Bite Tech is the only manufacturer of the three that can claim peer-reviewed, placebo-controlled studies to support their claims for performance enhancement.

Their mouthpieces do not rely on a CR or neuromuscularly determined bite, but simply the lack of pressure in the fossa area created...
ONLY $109

YES!

IPS e.max
Lithium Disilicate

NOW FROM keller

- Cement or Bond
- CAD/CAM Accuracy
- Pressed Strength
- All-Ceramic Esthetics
- Only 4 Lab Working Days
- FREE SHIPPING when you bundle*
- Made in the USA
- Only $109

“e.max Lithium Disilicate is the most robust ceramic system tested to date”**

Log on to www.kellerlab.com to learn more

CALL FOR YOUR CASE PICK-UP TODAY!
1.800.325.3056 www.kellerlab.com

Keller Laboratories, Inc. • 160 Larkin Williams Industrial Court • Fenton, Missouri 63026

*No shipping charge when you bundle 2 or more cases in one box. Offer only valid in the contiguous U.S. Additional charges apply for overnight service.
**Materials Fatigue and Durability Study
Fernando C. Cardenas, Teresita Concepcion, California USA and P. Thompson, NY
by a multicomposite reverse wedge bite plate over the molars. This, their research claims, prevents the neuroreceptors in the brain from feeling pressure upon clenching.

That lack of pressure prevents the hypothalamic-pituitary-adrenal (HPA) axis from triggering, effectively interrupting the fight-or-flight response.

Their studies showed a trend for lowered cortisol levels and a significant reduction in lactic acid with the wedge appliance.

Like Maher and PPM, Under Armour’s Mouthwear comes in two different designs: an upper mouthguard for contact sports and a lower mouthpiece for non-contact sports.

These appliances may be distributed by authorized providers who purchase a Launch Kit from Patterson Dental for $995. The laboratory fee is $120 per guard and the recommended retail price is $499.

Comparing the options

Overall, the three different manufacturers offer mouthguards that are very similar in design.

However, Maher recommends a CR-driven occlusal scheme to orthodontically correct the TMI. PPM is based on neuromuscular principles and Bite Tech’s research concludes that performance enhancement is not related to a CR or neuromuscular bite.

Maher’s primary focus is on protection, studying its mouthpieces’ ability to reduce incidences of concussions in NFL players and even soldiers in Afghanistan.

PPM markets its appliances for their performance-enhancing benefits, boasting a cadre of loyal professional athlete users.

Under Armour also concentrates on performance enhancement, referencing its literature and an assortment of patents to back up its claims.

Evolving technology

From gum shields to mouthwear, from gutta-percha to multicomposites, from Woolf Krause to Shaquille O’Neal, mouthguard technology has evolved to produce appliances that are more protective, performance-enhancing and, maybe most of all, more marketable.

About the author

Dr. Eric Yabu is a general dentist in Oakland, Calif. His practice is the city of Oakland’s first certified “green” dental office. He is an assistant clinical professor at the U.C. San Francisco School of Dentistry and a team dentist for the University of California at Berkeley Sports Medicine Program.

You may contact him at:

Advanced Technology Dentistry
4174 Park Boulevard
Oakland, Calif. 94602
(510) 550-7000
www.oaklandlaserdentist.com