

ATHLETIC MOUTHGUARDS

Athletic Mouthguards are intra-oral devices used to protect individuals who are involved in sports from injuries involving the teeth and other surrounding oral structures. (Fig1)



Fig. 1

Statistics indicate that individuals who participate in sports are highly likely to suffer from oro-facial injuries involving the teeth if they do not use a properly designed and fitted mouth guard.

There is a likely 10% chance per season or about 33 to 56% chance during an athletic career for injuries to happen.



Fig 2



Fig.3

The cost to restore a tooth fractured (Fig 2 and 3) by sports-related accidents far more exceeds the cost of having a dentist involved with Sports Dentistry to design, fabricate and fit a custom-made mouthguard.

If a tooth is knocked out completely (avulsed) (Fig.4) and was properly preserved, the cost for it to be re-implanted is relatively high.



Fig 4

In cases where it can not be re-implanted, the cost jumps even further up as it may now need to be replaced by an implant or a prosthetic restoration (bridge or a denture). (Fig 5, 6, 7,)



Fig. 5



Fig.6



Fig. 7

We highly recommend that dentist-designed, fabricated and fitted mouthguards be used particularly in contact sports such as basketball, lacrosse, rug-by, football, soccer, cycling, skate-boarding, hockey (street and ice) MMA and boxing.

TYPES OF MOUTHGUARDS

- a. **Stock Mouthguards.** (Fig 7) These are mouthguards that can be bought at sporting goods stores, gyms, or the internet. They come in various sizes (small, medium and large) or even a “one-size-fits-all”. These mouthguards are usually used straight out of the package and in most cases no attempt to fit them properly is ever done.



Fig. 7

Since they don't fit, the athletes need to constantly bite on them to keep them in place impeding breathing and causing a lot of discomfort.

The best thing that these types of mouthguards do is give the athlete a false sense of security.

We do not recommend these types of mouthpieces.

- b. **Self-fitted or Boil and bite Mouthguards:** (Fig 8) These mouthguards are made out of a pre-shaped thermo-plastic material that is soften in hot water. The material is allowed to cool to a tolerable temperature and placed in the mouth. The athlete then attempts to fit it using the tongue, cheeks and biting pressure. In so doing often times the end result will be a mouthguard lacking in posterior support and proper thickness necessary to provide adequate protection. Studies by a group led by Joon Park, PhD indicates that as much as 70 to 99% of the required posterior thickness is lost during the process the athlete is attempting to achieve fit.

Most often they are also cut in several places to reduce bulk and length to allow breathing and avoid gagging. This further reduces the critical posterior support necessary to provide adequate support.



Fig. 8

Although these mouthguards are slightly better than the “stock” mouthguards, we do not recommend them.

c. **Custom Made Mouthguards:** (Fig. 9) These mouthguards are designed, fabricated and fitted by a dentist with background in Sports Dentistry thus, the ability to address issues related to the proper design, fit and function of the appliance.



Fig.9

Custom made mouthguards are designed based on several factors such as the particular sports and the level of competition athletes are involved with as well as their age and medical and dental history.

These mouthguards fulfill all the necessary criteria associated with adaptation, retention, comfort, and material stability. Due to the process in which they are fabricated, they fit so snugly that breathing is not impeded allowing the athlete to focus on his game.

The same process allows these mouthguards to be custom designed and fabricated using different color combinations and esthetic designs. (Fig 10, 11, 12)



Fig. 10



Fig. 11



Fig. 12

There are two ways of fabricating custom made mouthguards.

(1) Vacuum forming. A special plastic material is heated to a certain temperature and formed over a dental cast of the athlete's teeth by a vacuum forming machine. This process is acceptable for single layer mouthguards such as those used for younger patients. (Fig 13, 14, 15)



Fig. 13



Fig. 14



Fig. 15

Although not ideally suited for heavier contact sports, vacuum formed mouthguards are still superior than stock and self- fitted mouthguards as they are made from a dental cast of the athlete's teeth by a dentist who knows the criteria for an acceptable mouthguard.

(2) Pressure Lamination: The second type of custom made mouthguards are those made using high heat and pressure lamination over an athlete's dental cast. (Lamination is the layering of several sheets of material using heat and pressure to attain a defined thickness. This process can not be done with the vacuum process).

Defined thickness in mouthguards is very important as studies indicate as the thickness of the material increases logarithmically, the transmitted impact force decreases logarithmically. Mouthguard expert, Dr Keith Hunter suggested the following thickness for finished mouthguards: 3mm on the labial, 2mm on the palatal, and 3 mm on the occlusal portion. Of course these are only suggestions as the proper thickness for each individual athlete must be based on their individual need.

Pressure lamination allows best adaptation of mouthguards. In addition, the process alters the elastic memory of the material therefore reducing the chances of early deformation. It also allows the placement of special protective inserts for additional protection. (Fig. 16)



Fig. 16 (Protective inserts on labial (red) and palatal (white))

Due to their over-all superiority over the other types of mouthguards, custom made mouthguards and fitted by a dentist are the only mouthguards we recommend.