

**Wear mouth guards because it's all fun and games till one loses a tooth – A complete review of mouth guard & it's role in preventing dental - sports injury.**

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## Abstract

Dentistry and sports come together in sports dentistry, which is a composite of abilities for treatment, preventions, education, and research. The most common type of traumatic injury resulting from sports-related activities has been reported to be dental and orofacial injuries. Face injuries can injure teeth, lips, cheeks, and tongue in almost any sport.

It is critical to use a mouthguard that is correctly fitted to protect your teeth and smile. Sports dentistry is a relatively new branch of dentistry concerned with the proper diagnosis, prevention, and treatment of orofacial injuries and disorders. This section is also responsible for gathering and disseminating information on oral athletic injuries, as well as encouraging research into the prevention of such severe injuries. The purpose of this article is to provide an overview of sports-related injuries in the orofacial and dental region, including their incidence, evaluation, treatment, and prevention. It also goes into the many types and functions of mouthguards.

It emphasizes the need of dentists in educating the general population, parents/guardians, emergency room staff, coaches, and athletes about their health.

**Keywords:** mouth guard, dental - sports injury, types of mouth guard

## Introduction

Sports dentistry is a subspecialty of sports medicine that focuses on the prevention and treatment of dental injuries and related oral illnesses that occur as a result of sports and exercise [1]. This field of dentistry dates back to the 1980s and is concerned with the prevention and treatment of orofacial injuries in sports, as well as the gathering and dissemination of information on traumatic oral injuries and the promotion of research into their prevention [2]. Various traumatic dental injuries occur during sports-related activities, including tooth luxation, intrusion, extrusion, and avulsion, facial bone fractures, temporomandibular joint (TMJ) injuries, and the most lethal concussion. Because of the orofacial discomfort, psychological impacts, and socio – economic

ramifications, these orofacial injuries have traumatic consequences for participating children and their families [1].

During sports, preventive methods (helmets, mouth guards, and protective gear) have reduced the occurrence of such injuries among participants. Sports dentistry has responded to these athletes' unique requirements, attempting to offer them with the high-quality care they need. [2]

### **Dentistry and sports related injury**

Chipped teeth, broken teeth, knocked out teeth, broken jaws, and fractures of the temporomandibular joint are all common dental problems. Protruding front teeth, insufficient lip coverage over the front teeth, and current orthodontic treatment, such as wearing braces, are all risk factors [3].

The zygoma (cheekbone) was discovered to be the most common and frequent location of bony damage in the face. [4] When a mandibular fracture develops, the patient's airway management becomes a top priority as part of urgent therapy. In both toddlers and adults, Guyette discovered that the condyle is the most susceptible region of the mandible.[1] Blows to the mandible can cause a large amount of force to be transmitted to the TMJ disc and its supporting structures, resulting in lifelong injury. The condyle can be forced posteriorly to the point that the retro discal tissues are severely crushed in such injuries. This generates inflammation and edema, which forces the condyle to move forward and downward, potentially causing acute occlusion problems. This form of severe impact can sometimes result in intracapsular haemorrhage, which can lead to TMJ ankylosis if left untreated. [1]

Traumatic dental injuries affecting permanent dentition crown fractures can take a variety of forms, the most basic of which is crown infraction. [1]. One of the most

serious sports-related dental injuries is complete tooth avulsion. The avulsed tooth can be replaced with variable degrees of success, depending primarily on how long the avulsed tooth has been out of its socket. If the periodontal fibers connected to the root are not destroyed by handling, an avulsed tooth has a fair chance of regaining full function. [5]

### **Concussion**

Concussion is the most serious and life-threatening complication of orofacial sports injuries. Various degrees of hits to the jaw and chin are repeatedly given during contact sports. The concussive vibration from these strikes travels to the temporal bone of the skull, which includes cranial nerve trunks that exit the base of the brain and affect hearing, balance, and brain blood flow. The brain is protected by the skull and "floats" in cerebrospinal fluid. Unfortunately, the skull cannot shield or prevent the brain from being impacted violently. As a result, there's a potential that the brain will rotate within the skull, resulting in a concussion. The mouthguard isolates the mandible from the maxilla, preventing concussions from reaching the base of the brain. [6,7]

### **Levels of concussion**

No loss of consciousness (LOC); post-traumatic amnesia (PTA) lasting less than 30 minutes in grade 1 (mild).

LOC less than 5 minutes or PTA greater than 30 minutes in grade 2 (moderate).

LOC higher than 5 minutes or PTA larger than 24 hours in grade 3 (severe).[8]

### **Consequences of concussion**

#### **Grade 1 Concussion**

If the athlete demonstrates complete recovery after 15 minutes, return to play (no symptoms at rest or with exertion). The injured player should be inspected right away and every five minutes until the symptoms go

away. In the same game, a second Grade 1 concussion should result in the player exiting the game for the duration. Before returning to competition, the player must demonstrate no symptoms at rest or effort for a week and undergo a neurological examination.

### **Grade 2 Concussion**

Not allowed to play the rest of the day. At regular intervals, the player should be inspected. The player should be re-examined the next day by a trained individual. Before returning to competition, the athlete must be free of symptoms at rest and effort for a week and undergo a neurological examination. A second Grade 2 concussion necessitates the absence of symptoms at rest or during exercise for two weeks, as well as a neurological test.

### **Grade 3 Concussion**

If still unconscious or if indicators of concern are noticed, such as a vacant gaze, delayed verbal or motor responses, disorientation or difficulty to focus, slurred speech pattern, or any loss of consciousness, the patient is taken by ambulance to the nearest emergency department. On indicators of pathology such as generalized swelling of the brain, small subdural Hema Toma, and/or raised intracranial pressure, or if the player's mental condition remains abnormal, a full neurological examination, including a CT scan, should be performed quickly after admission to the hospital. If a player sustains a Grade 3 concussion, he or she should not return to play for at least two weeks after experiencing no symptoms at rest or effort. A second Grade 3 concussion necessitates at least a month of recovery.[8]

### **What is a Mouth Guard...?**

Mouth guard is the term both universal and generic, referring to a wide range of equipment available in sport good retailers. A mouth guard is, also known as a gum

shield or mouth protectors, is a protective device worn in the mouth [9].

### **Ideal Requirements of Mouth Guard**

- Must be correctly fitted and suited to the wearer's mouth and oral structures.
- Be made of FDA-approved resilient material and cover all remaining teeth on one arch, usually the maxillary.
- Remain comfortable and secure in its position.
- Be physically compatible with the person who is using it.
- Be cleanable in a reasonable amount of time.
- Absorb a lot of energy from impacts and lessen transmission forces.[9]

### **Functions of Mouth Guard**

1. It serves as a buffer between the soft and hard, preventing the formation of rigid dento-facial structures, any laceration or bruising that occurs as a result of the trauma.
2. It acts as a cushion between the teeth, as a result of direct frontal collision and redistribution.
3. It prevents the opposing dentition from colliding with each other during a seismic event.
4. It protects the bone from fracture or damage, unsupported mandibular angle during impact.
5. It aids in the reduction of neurologic injury by acting as shock absorbers in the space between jaw on both sides otherwise, the trauma may be permanent.
6. It provides positive reinforcement in the face of adversity injury to the neck.
7. It aids athletes' psychological well-being as it provides assurance in terms of protection.
8. It provides by filling in the gaps adjacent teeth support this advantage enables the athlete to use his or her during competition, the prosthesis might be removed [1].

## Features of Mouth Guard

Wearing a mouth guard that is properly designed and built will offer protection from dental injuries while engaging in sports. Players of all ages who participate in sports or activities that put them in danger of sustaining a facial injury should wear a mouth guard. The mouth guard should be snug but comfortable, allowing normal breathing, speech and swallowing. It should not be odourless and tasteless, as well as thick enough (4mm) to provide impact protection. Mouth guard were used made of the following materials:

1. poly (vinyl acetate-ethylene) copolymer
2. clear Thermoplastic
3. polyurethane
4. laminated thermoplastic [3].

Sports which need Mouth Guard

The ADA recommends mouth guards be used in

Acrobatics	Ice skating	Water polo
Basketball	Inline skating	Weightlifting
Bicycling	Lacrosse	Wrestling
Boxing	Martial arts	Volleyball
Equestrian events	Racquetball	Handball
Extreme sports	Rugby	Surfing
Field hockey	Shot putting	Soccer
Foot ball	Skateboarding	Softball
Gymnastics	Skiing	Skydiving

## Types of mouth guards

### Basic types

1. The Ready-Made or Stock Mouth guard
2. The Mouth- Formed “Boil-And- Bite” Mouth guard
3. The Custom-Fitted Mouth guard
  - a. The Vacuum Mouth guard
  - b. Pressure Laminated Mouth guard.

## Stock – a ready-to-wear mouth guard

- That has already been formed.
- The standard mouth guard, which can be found in most sports goods’ stores.
- This sort of mouth guard is frequently altered and cut by athletes in an attempt to make it more comfortable, diminishing the mouth guard's defensive characteristics.[3]
- Stock mouthguards have been proved to only provide a little amount of protection. [10]
- The mouthguard may become unseated and produce an airway obstruction if the wearer is rendered unconscious. [11]
- Less preferred
- Advantages: -not expensive
- Disadvantages: - only a few sizes are available
- Inadequate fit inhibits speech and breathing, necessitating the shutting of the jaws to keep the mouth guard in place.



Fig 1: (Stock mouthguard) The Mouth- Formed “Boil-And- Bite” Mouth guard.

- The most often used type of mouthguard.
- The shell liner and the thermoplastic mouthguard are available.

- A prefabricated shell is combined with a plastic acrylic or silicone rubber liner to make the shell-liner. The liner is kept in the athlete's mouth and shaped around his or her teeth before being set.
- The premade thermoplastic kind, on the other hand, has a lining that is soaked in boiling water for 10-45 seconds before being transferred to cold water and suited to the teeth. [12]
- They don't give the necessary thickness, comfort, or protection for the posterior teeth.
- Due of the inaccuracy of the fit, clenching pressure is frequently required to achieve acceptable retention.



Fig 2: (Boil and bite mouthguard)

### The Custom-Fitted Mouth guard

- ❖ A dentist or a dental technician makes custom-fit mouth guards to fit the individual's mouth.
- ❖ Because of their snug fit, comfort, and cushioning (shock absorption) effect, they provide the finest protection.
- ❖ They are the costliest choice.
- ❖ Custom - fit mouth guards are recommended by dentists.

### Two categories

- Vacuum Mouth guard
- Pressure Laminated Mouth guard.
- ❖ It's constructed from a stone cast of the mouth, usually of the maxillary (upper) arch, taken from a dentist's impression.

- ❖ With devices like the Druformat, the Erkopress 2004, or the Bio star, a thermoplastic mouth guard material is applied over the cast with a specific vacuum machine that will chemically fuse under high heat and pressure.
- ❖ A poly-EVA (ethylene vinyl acetate) copolymer is the most prevalent material for this use [13]
- ❖ Following that, the mouth guard is cut and polished to ensure optimum tooth and gum adaptation.[3]



Fig 3: Custom fitted mouthguard

### Barriers for mouthguard use in children

Cost, a lack of understanding and information, and a lack of a mouthguard policy have all been identified as causes for not wearing mouthguards in numerous studies.[14] Other significant causes to children's restricted use of mouthguards were shown to be poor retention with a slipping sensation, interference with breathing and speaking, and parental judgments of mouthguard use.[15]

### How to care mouthguard

- Do not chew on or modify the mouthguard as this will impair the fit, perhaps causing damage or reducing its efficacy.



- Before and after each usage, rinse the mouthguard with cold water or a mouth rinse. Contact with hot water should be avoided since it can cause distortion.
- Because germs and plaque exist in the mouth, it is critical to clean your mouthguard after each use. It can be cleaned with toothpaste and a toothbrush, or it can be cleaned in cool, soapy water and well rinsed.
- To prevent damage and allow air circulation, store and transport the mouthguard in a rigid, perforated container. Close the mouth guard container only after the mouthguard is completely dry.
- Don't let anyone else use your mouthguard.
- To reduce distortion, avoid high temperatures or direct sunshine.
- Inspect the mouthguard on a regular basis and replace it if it has holes or tears, gets loose, or causes irritation to the teeth or gums.
- It's best to avoid wearing removable orthodontic appliances at the same time as the mouthguard. Mouthguards lose their effectiveness over time. It is advised that you replace your carpet every two to three years, or sooner if it is ripped, cracked, or badly worn out.[16]

#### **Role of dental team in prevention of sports injury**

Officials, coaches, parents, and players' attitudes on wearing mouth guards have an impact on their use.[17] Although coaches are thought to have the most influence on whether or not players wear mouth guards, parents see themselves as equally responsible for ensuring that players wear mouth guards.[18] Professional athletes should serve as role models for young athletes by advocating the usage of correctly fitting mouth guards through public service announcements. Local dentists can also help by educating their communities and even producing low-cost mouth guards for school teams.[8]

#### **Conclusion**

Protective and preventive measures are becoming increasingly vital for a dental practitioner as children and teenagers participate in more sports in schools and colleges. Dentists, as health professionals, must have extensive clinical experience and awareness of sports-related Dentofacial injuries, and must collaborate with instructors, coaches, trainers, parents, sports administrators, and other health care providers to offer timely dentofacial care to athletes.[1] Mouth guards help to prevent orofacial injuries and lessen the number and severity of sports-related injuries that occur during practice and play. Starting at the municipal and state level, sports dentistry should enforce the use of protective devices, particularly mouthguards, in all sports. A mouth guard that has been custom fitted by your dentist is thought to offer the finest protection for your teeth, lips, and jaw.[3]

#### **It is generally suggested.**

- Mouthguards must be worn during practice and games.
- Wearing a mouthguard should be instilled in children at a young age.
- Mouthguards should be replaced on a frequent basis while children are still growing.
- Adult players should change their mouthguards every two years at the absolute least.
- Because acute injury to the teeth may never heal entirely, and it can cause a lifetime of expensive, long-term difficulties for the affected athlete, prevention is preferable to cure.[9]

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