

# Prevention Of Orofacial Injuries – A Review:

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## **ABSTRACT:**

One of the newest and evolving fields of dentistry is Sports Dentistry. It is involved in oral and facial disease prevention, maintenance and treatment, as well as the compilation and distribution of dental trauma information, beyond study stimulus. Preventing these orofacial accidents in sports dentistry is the primary concern. The value of different preventive measures, such as the availability and use of different types of preventive aids, is briefly defined in their significance and maintenance for a person in sports dentistry. Overall, in different areas of the sports community, a dentist plays a significant role in the diagnosis, treatment planning, assessment, prevention and management of these orofacial dental injuries. This article includes a summary of preventive aids that can be used while playing

**KEYWORDS:** Mouthguard, Helmets, Prevention, Sports dentistry

## **INTRODUCTION:**

Dental injuries are the most common form of orofacial injury incurred during sports involvement<sup>1</sup>. Participation in sports is a significant cause of injury to children and adolescents in general muscle injuries, torn cartilage, fractured bones, tendinitis, soft tissue lacerations, contusions and broken teeth<sup>2</sup>. This happens because of the prominence and high level of competition of organised youth sports<sup>2</sup>. Soft tissue injury and hard tissue injury, such as tooth intrusions, luxations, crown and/or root fractures, complete avulsions and dental facial fractures, are typical orofacial sports-related injuries<sup>2</sup>. Sports dentistry is the prevention of facial/oral injuries and associated signs and oral diseases in athletes<sup>3</sup>. It has two main components: one is the management of orofacial injuries and the other is the prevention of orofacial injuries associated with sports. A dentist must be experienced and skilled in the fields of oral surgery, endodontics, operative dentistry, orthodontics, hospital dentistry, and patient behaviour management to provide comprehensive treatment<sup>3</sup>. The frequency of injuries to the athlete has been altered by protective aspects during sports<sup>3</sup>. Preventive measures such as the use of helmets, mouthguards and other protective gears have minimised the athlete's impact, thus reducing injuries<sup>3</sup>.

## **PREVENTION OF SPORTS RELATED ORO-FACIAL INJURIES:**

Most traumatic dental injuries associated with sports are preventable; the risk to benefit ratio can be increased by using suitable, correctly equipped, protective athletic equipment<sup>3</sup>. In addition, as the predictive risk factors associated with such injuries are more clearly established and defined, the design and development of new protective devices will contribute significantly to the prevention of potential athletic injury<sup>3</sup>.

## **HELMETS:**

They are intended to protect against abrasions, contusions, and lacerations of the skin of the scalp and ears<sup>1</sup>. They protect the bones of the skull from fractures and from direct concussions, unconsciousness, cerebral haemorrhage, brain injury, coma and death in the brain and central nervous system<sup>1</sup>.

The predominant style of football headgear was the durable leather helmet during the decades between the 1920s and the early 1950s<sup>1</sup>. For the protection of the head, lateral parts of the face and ears of the athlete, this type of helmet was made of different layers of leather stitched together<sup>1</sup>.

## **PLASTIC HELMETS:**

The plastic helmets were made from thermoplastics consisting of polycarbonate and acrylonitrile-butadiene-styrene<sup>4</sup>. To cushion the traumatic forces created by the rigid plastics, soft padding was mounted to the

internal elements of these hard helmets<sup>4</sup>. A guard was added to a snap-on strap that held the helmet in place to minimise the risk of laceration to the jaw, but disengaged when pulled by an opponent<sup>4</sup>. A later improvement was the placement of a protective rubber pad at the midline of the plastic helmet's forehead area to avoid lacerations of the nasal pyramid caused by pushing the helmet during touch or collision into the soft problems of the forehead<sup>4</sup>. Another major benefit of rigid plastic helmets has allowed the mouth and other facial structures to be further covered by the possible positioning of facemasks<sup>4</sup>. Helmets increase player safety when used properly and decrease morbidity<sup>4</sup>.

#### **FACE MASK:**

They are built to secure the eyes, nose, nasal pyramid, zygomatic arches, and mouth from traumatic forces that are directed towards the face, such as a fist, ball, puck, or stick<sup>1</sup>. Face masks increase player protection when used properly and decrease morbidity<sup>1</sup>. Face masks are made from varying diameters of plastic or rubber tubing or welded steel or aluminium and are coated with a vinyl plastisol coating<sup>1</sup>. A contoured single bar was the earliest facemask type introduced into football in the 1950s. Both facemask types provide the maxilla horizontally with varying degrees of protection from an extended finger, clenched hand, forearm, or helmet directed toward the zygomatic region of the eye nasal pyramid or the mandibular arch<sup>3</sup>. One biggest drawback of the facemask is that it has a protruding object within the ready grasp of an opponent player<sup>2</sup>. Severe physical effects such as muscle, spine, or spinal column damage can occur when the facemask is pulled or twisted by an opponent during the course of a match<sup>2</sup>. The full cage face mask offers the highest degree of overall facial safety and is typically chosen by defensive players to prevent line play and tackling-related injuries<sup>1</sup>.

#### **MOUTHGUARD:**

The word mouth guard is universal and generic and involves a wide range of products ordered by a dentist in the sporting good shops to professionally crafted custom made<sup>5</sup>. The mouth guard, also called as a mouth protector or gum shield, is as a "resilient device or device inside the mouth to reduce oral injuries, especially to the teeth and adjacent structures"<sup>5</sup>. These were originally created as a way of shielding boxers from lip lacerations by Woolf Krause, a London dentist, in 1890<sup>1</sup>. Mouthguards also help minimise the risk of injury to the throat, concussion, brain haemorrhage, unconsciousness, major damage to the central nervous system, and death. In that age, such incidents were a popular and sometimes debilitating accompaniment to boxing contests<sup>1</sup>. Originally, these gumshields were made from gutta percha and were kept by clenching the teeth in place<sup>1</sup>. By the 1930s, mouthguards were part of the regular equipment of boxers and have remained so ever since<sup>1</sup>.

#### **PREVENTIVE AND PROTECTIVE ROLE OF INTRA-ORAL MOUTH GUARD:**

Mouth guard is intended to serve as a shield by pushing the soft tissues in the oral cavity away from the teeth preventing lacerations, swelling of lips, cheeks, and tongue during an impact<sup>6</sup>. It is intended to avoid tooth fractures or dislocations by cushioning the teeth from direct frontal blows while redistributing the force of the blow over all the teeth<sup>6</sup>. Opposing teeth are shielded from reciprocal seismic interaction<sup>6</sup>. Elastic, recuperative support is given to the mandible, which may avoid fracture or damage to the lower jaw angle that is not supported<sup>6</sup>. Their use may also provide patients undergoing orthodontic care with significant security<sup>6</sup>. Mouth guards should also be worn on the maxillary teeth, since it was clear that the maxillary anterior teeth were most vulnerable to injury except for malocclusion in class III, so the mouthguard should be worn on the mandibular teeth in such a situation<sup>6</sup>. Some of the most used muscles in the body are muscles in the face, jaw, and neck. Most people feel pain, nerve pinching, and even an accumulation of toxins in these areas because of frequent usage and a high tendency for stress to damage these muscles<sup>6</sup>. However, both of these issues are treated and resolved by releasing stress and aligning the jaw with neuromuscular therapy<sup>6</sup>. Many scholars have proposed that mouth guards provide an important way of avoiding spinal injury and concussion<sup>6</sup>. Athletes feel more secure physically. Provide the competitor with the confidence that accidents are less likely to suffer, providing them with the competitive advantage for aggressive competition<sup>6</sup>.

### **BENEFITS OF MOUTHGUARD:**

- It stays in position securely and safely during operation<sup>6</sup>.
- It encourages speaking and does not restrict breathing<sup>6</sup>.
- It is durable, resilient, resistant to tearing, comfortable, odourless, and flavourless<sup>6</sup>.
- It helps protect the teeth, periodontal ligaments, soft tissue, bone structure, joints, etc<sup>6</sup>.
- It reduces the occurrence of concussions and fractures to the neck<sup>6</sup>.
- It exhibits protective properties involving high absorption, distribution and expansion of electricity<sup>6</sup>.
- Provides the maxillary arch with a high degree of comfort and fit<sup>6</sup>.

### **CLASSIFICATION OF MOUTHGUARD:**

The American Society for Testing and Materials in Designation F697-80 (Reapproved 1986) defined the for athletic mouthguards as follows<sup>6</sup>:

Type I: Stock mouthguards

Type II: Mouth-formed mouthguards

Type III: Custom-fabricated mouthguards

### **STOCK MOUTHGUARDS:**

Stock mouthguards are bought over the counter from sporting goods stores by customers. Of the three types of mouthguards available, they are the least costly and come in a range of designs and colours, with or without bands<sup>1</sup>. Since one size is designed for all people, they are ready to wear; this is similar to a scenario that would try to fit all athletes into the same shoe size<sup>1</sup>. Stock mouthguards are not suited to the athlete's dentition in order to hold them in place by biting the teeth together<sup>1</sup>. Either rubber, polyvinyl chloride or a copolymer of polyvinyl acetate are stock mouth guards<sup>4</sup>. Their primary benefit is that they are relatively cheap<sup>4</sup>. These are however, only available in small sizes, do not fit very well, are less retentive, sometimes heavy, obstruct speech and breathing, and require the jaws to be clenched to keep the mouth guard in place<sup>4</sup>. Stock mouthguards are undesirable to most athletes because of all these variables and provide less protection for the prevention of sports-related traumatic dental injuries<sup>4</sup>.

#### **Advantages:**

- They are readily accessible<sup>6</sup>.
- They are not cost-effective, but the patient can afford them<sup>6</sup>.
- They come in numerous varieties with a large range of shapes, sizes and flavouring agents<sup>6</sup>.

#### **Disadvantages:**

- Breathing problems
- Bulky
- Improper fit
- Non-adjustable
- Occlusion imbalance creates and contributes to an orofacial problem.
- Leads to incorrect bite and can cause malocclusion.
- Inadequate assistance and retention
- Distorted easily over time
- Uncomfortable
- Leads to Malocclusion
- Insufficient safety<sup>6</sup>.

### **MOUTH-FORMED MOUTHGUARDS:**

Mouth shaped mouthguards between the stock and custom produced forms are intermediate. There are two types of mouth-formed mouthguards: shell lined and boil and bite<sup>1</sup>.

### **SHELL-LINED MOUTH GUARDS:**

By inserting freshly mixed ethyl methacrylate into a hard shell, the shell lined variety is made, and is then placed into the mouth of the athlete before the material is set<sup>2</sup>. The shell liner type is made of a preformed shell with an acrylic or silicone rubber plastic liner<sup>2</sup>. The lining material is placed in the mouth of the player and moulds to the teeth, and set is then allowed<sup>2</sup>. Although the dental arch is reasonably well adapted, this variety is often too voluminous and uncomfortable and has an unpleasant odour and taste<sup>2</sup>. Furthermore the liner should be altered after each usage for best performance. Consequently, athletes do not favour the shell-lined variety<sup>1</sup>.

### **THERMOPLASTIC MOUTH GUARDS:**

In today's market, the thermoplastic boil and bite variety claims the largest share<sup>1</sup>. Such mouthguards are produced to soften the material by putting the shape of the mouthguard in boiling water<sup>1</sup>. The softened material is then inserted into the mouth of the athlete, where it is moulded with finger pressure as well as facial and intraoral muscle movements to strengthen tolerance to the mouth's hard and soft tissue structures<sup>1</sup>. Upon removal from the mouth of the competitor, the mouthguard is put in cold water until the form is firmly set<sup>1</sup>.

#### **Advantages:**

- Better stability
- Proper coverage
- Breathing and speaking is better when compared to stock mouthguard
- Disposable
- Low cost.

#### **Disadvantages:**

- Improper bite
- Improper occlusion
- Reduced retention over time
- Low shock absorber
- Not fabricated by the dentist hence improper coverage.

### **CUSTOM FABRICATED MOUTHGUARDS:**

Custom made mouthguards are professionally manufactured over a dental cast of the arch of the athlete (maxillary arch for patients with Class I or Class II malocclusion; mandibular arch for patients with Class III malocclusion)<sup>1</sup>. Custom produced mouthguards are considered superior to the mouthguards developed by either stock or mouth<sup>1</sup>. Custom-made mouthguards are claimed to interfere less with breathing (oxygen exchange) and expression because of their superior adaptation and retention<sup>1</sup>. They are more likely to be embraced by athletes because of their superior fit and comfort<sup>1</sup>.

#### **Advantages:**

- Adequate occlusal fit
- Maximum Occlusal Strength
- Never contribute to malocclusion,

- No breathing or speaking impact
- Better absorption of shocks.
- Maximum teeth and surrounding structure defence
- Comfortable for the patient as it is tailored to his/her occlusion.
- Full retention
- Least distortion and limited retention loss over time<sup>6</sup>.

**Disadvantages:**

Expensive

Preseason screening and tests are another necessary tool for avoiding dental injuries. History taking, risk dentition, diagnosis of dental caries, maxilla mandibular relationship, mobile teeth, dental habits, prosthodontic status and need for extraction should be included in exams<sup>3</sup>. Injuries can also be avoided by awareness and knowledge of sports dental injuries, emergency treatment of traumatic dental injuries and the use of protective devices among athletes, coaches and school teachers<sup>3</sup>.

**CONCLUSION:**

Sports dentistry gives a broad variety of prevention and treatment modalities for oral/facial sporting injuries and associated oral diseases and their symptoms. Protective devices and preventive options are gaining importance with the rising trend of sports participation in schools and colleges. Healthy participation in sports should be the goal of every sports programme. Preventive programmers should provide information on orofacial injuries associated with athletics, preventive measures such as helmets and mouthguards, and their management to increase the general population's awareness. It is also our duty to recognise, educate and provide preventative measures for athletes, such as mouth guards, helmets and face masks.

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