

Prevention of Sports-related Orofacial Injuries- A Review on Dental Perspective

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ABSTRACT

The field of sports dentistry mainly deals with the prevention and management of sports-related maxillofacial trauma. There are many potential challenges to the oral health of athletes, including exercise-induced trauma, dental decay due to specialized diet, lack of awareness, oral dehydration, and lack of prioritization for dental care. However, there is good evidence that some oral diseases are preventable by simple interventions with good efficacy. Hence, dentists today must respond to these patients' specialized needs, providing them with the quality of care they deserve.

In this review article, we discuss the various preventive aspects of sports-related injuries and the impeccable role of the dentist in preventing and managing sport-related oro-facial injuries.

Keywords: Mouth-guards, Prevention of oro-facial trauma, Sports dentistry.

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INTRODUCTION

India is rapidly assuming a more health-conscious posture. As the interest and participation in exercise and sports are increasing, competitions like Olympic and professional sports have turned from mere dreams into goals.¹ With this increased participation, more emphasis must be placed on dental and orofacial injuries accompanying the particular sport. Injuries impact not only the athlete's contest and career but also the individual's life outside of sport as well. Fortunately, the use of proper equipment prevents many of these injuries.²

Orofacial injuries are the most common type of injury sustained during participation in a variety of sports. Hence, the dentist can be crucial in informing athletes, coaches, patients, and their parents about the importance of prevention, treatment, and diagnosis of orofacial injuries in sports.³

The term 'Sports dentistry' has been around for many years. It has been described as *the prevention and treatment of orofacial athletic injuries and related oral disease, as well as the collection and dissemination of information on dental athletic injuries and the encouragement of research in the prevention of such injuries* by the Academy for Sports Dentistry in the USA.⁴

This present review deals with the arena of prevention in sports dentistry and also suggests future areas for collaborative research.

NEED FOR A DENTIST IN SPORTS STAFF

Incidence of dental injuries is very high among sports players. Azami-Aghdash S *et al.* reported that the average prevalence of dental injuries is 17.5% in children and adolescents worldwide and two times higher in boys than in girls through a recent meta-analysis.⁵ Sports activities result in approximately 40% of all dental injuries.⁶

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Vidhatri Tiwari *et al.* conducted a study on 320 athletes from the central Indian population. They found a prevalence of oro-facial injuries of 39.1% in contact sports (sports that require physical contact or tackling between players, e.g., boxing, football). Compared to studies conducted in Brazil, Israel, and Birmingham, England, where the prevalence of orofacial injuries in contact sports was 28.8%, 27%, and 12%, respectively, this study reported a relatively higher prevalence.⁷ The author stated that this could be attributed to a lack of awareness and limited use of mouth-guards and other protective gear in India.

Also, given the esthetic value of the face, facial trauma often leads to heightened emotional distress, and as this is a region of interest for dental professionals, the trauma to the oro-facial region can be prevented and treated appropriately with the help of a dentist. (Figure 1)

Due to the complex anatomy of the oro-facial region and the proximity to vital structures, including the brain, preventing this region from any trauma is of paramount importance. The recent and tragic death of international cricketer Phillip Hughes is a classic example of the same.⁸

PREVENTION OF SPORTS-RELATED ORO-FACIAL TRAUMATIC INJURIES

Using basic protective devices such as properly-fitting helmets, facemasks, and/or mouth guards is the most important aspect in preventing sports-related oro-facial injuries. The likelihood and severity of sports-related traumatic injuries to an athlete's head, face, and mouth tend to reduce with the proper use of helmets, facemasks, and mouth guards.⁹ This article discusses the significance of these protective devices.

Helmets

Helmets are designed in a way to protect the skin of the scalp and ears from abrasions, contusions, and lacerations. Also, the bones of the skull are protected from fractures and the brain and central nervous system from direct trauma, which might lead to concussions, unconsciousness, cerebral hemorrhage, brain damage, paralysis, and death.¹⁰

The first designed and used was a sturdy leather helmet during the decades between the 1920s through the early 1950s. The advent of synthetic resins brought forth plastic helmets with protective rubber pads to protect the forehead and scalp. Suspension helmets and air helmets were recently introduced in the 21st century. Suspension helmets were covered internally by foam that absorbed traumatic forces, and air helmets consisted of an inflatable bladder and possessed the capacity to spring back to their original shape and enhance protection.¹¹

Faceguards

Facial injuries to the mouth, nose, eyes, nasal pyramid, and zygomatic arches can be prevented by the use of face guards. Different styles of faceguards are used depending on the

anatomic location. They can be manufactured from plastic, rubber tubing, welded steel, or aluminum of different diameters and are generally covered with a coating of vinyl plastisol.¹¹

However, when a facemask is pulled or twisted by an opponent during a play, serious physical consequences such as muscle, neck, or spinal column damage can result, which is one of its major disadvantages.¹² A thorough research and development into restructuring this equipment would be required.

Mouth Guards

Woolf Krause 1890 was the first to develop mouth guards or “gum shields” to protect boxers from lip lacerations. It was made from gutta-percha and was held in place by clenching the teeth.¹³ Injuries to the teeth, lips, gingiva, tongue, and mucosa can be prevented by the use of mouth guards. They also prevent jaw fractures, dislocations, and trauma to the temporomandibular joint by cushioning. By maintaining a separation between the head of the mandibular condyle and the base of the skull, the mouth guards also aid in reducing the likelihood of concussion. They should generally be worn when there is a possibility of body-to-body or body-to-equipment contact.⁹

Three basic types of mouth guards are available¹⁴:

- Stock mouth guard- Generic or readymade mouth guards are called stock mouth guards and are generally purchased over the counter. It is available in different sizes but does not contour to an individual's mouth as it is not form-fitted. Biting down keeps it in place. They can be worn immediately and are the least expensive but are no longer sold.²
- Mouth-formed mouth guard- Also known as the “boil-and-bite” mouth guard. It is more popular among athletes and quite economical. It is made of thermoplastic resin. Immersion in hot water softens the resin, which then is adapted in the mouth using tongue, finger, and biting pressure. Biting down molds an imprint.^{15,16}



Figure 1: Dento-alveolar fracture to anterior maxillary teeth due to trauma from boxing punch raising esthetic concern (upper right). Inter-maxillary fixation and splinting with arch bar (upper left).

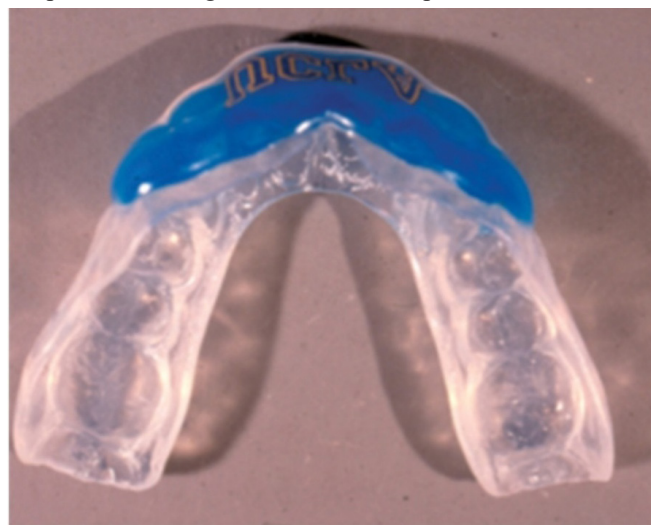


Figure 2: Custom made Mouth guard.
Courtesy-Google

However, both stock mouth guards and “boil-and-bite” mouth guards are bulky and loose, and hence, they require occlusal pressure for adequate retention.¹⁷

- Custom-made mouth guard (Figure 2) - The custom-fitted mouth guard is fabricated by vacuum forming techniques, pressure lamination techniques, and combined vacuum-pressure techniques. It is customized for an individual’s dentition by adapting a single layer of thermoplastic mouth guard material over the athlete’s cast. These provide better retention and comfort and less interference with speech and breathing and are more adaptable to orthotic appliances but are expensive.¹⁵

A reduction in dental injuries has been reported when mouth guards are worn.² After the introduction of facemasks and mouth guards, the incidence of football orofacial injuries decreased from 50% to less than 0.5%.¹⁸ A study found that football athletes who wore mouth guards had a decreased prevalence of orofacial injuries (0.07%) as compared to basketball players who did not wear mouth guards routinely (34%).¹⁹ In a meta-analysis reported an increase in the overall risk of an orofacial injury by 1.6 to 1.9 times when a mouth guard was not worn.²⁰ Therefore, athletes are encouraged to wear mouth guards to prevent orofacial injuries.

Liew *et al.* conducted a cross-sectional study on rugby players' preference to use a mouth-guard, factors contributing to the use, and discontinuation of a mouth-guard. The overall use of mouth-guard is as low as 31.1%. The least was for the custom-fitted mouth-guard (1.8%), followed by the stock mouth-guard (7.7%). The most commonly used was the Boil-and-bite type (21.1%). Only 28% of previous users continued the use of mouth guards. The discontinuation rate for Stock was 57.1%, boil-and-bite at 80.2%, and custom-made at 37.5%. Age was a significant factor in mouth-guard use. Significant factors for discontinuation were due to breathing disturbance and general discomfort. Discontinuation leads to an increased incidence of injury.²¹

Thus from the above description, it can be said that even with the availability of protective gears, their usefulness could not be explored to the fullest. This stresses the need for continuous efforts from the dental fraternity to improvise on these gears that athletes can use effectively.

FUTURE SCOPE

Professional sports carry a risk of significant orofacial injuries. Hence, dental professionals can play a significant role in their prevention. Along with this, in recent years, people have adopted a healthy outlook on life, and the younger, as well as the older generations, are more engaged in exercise and other physical activities. Thus, that is one more aspect of sports dentistry that could look into. Also, with significant advancements in dental materials and imaging modalities, the field of sports dentistry is better equipped. A dentist should be considered to be a part of the sports team as they play a significant role in the prevention of dental injuries. Sports dentistry is an ever-expanding field and should not be limited

only to professional players, but its services should also reach local players and school students to reduce the morbidity and permanent damage to dentition, supporting periodontium, and oro-facial structures.

CONCLUSION

Dental and oral injuries range from mild to severe and might lead to permanent complications among athletes. With the increased incidence of orofacial injuries and dentist expertise in the same, they must also be available on-site along with physicians to stabilize the athlete. Proper education and prevention, including the use of mouth guards, can significantly decrease the risk of dental and oro-facial problems.

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