International Journal of Applied Dental Sciences 2020; 6(2): 507-510

ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2020; 6(2): 507-510

www.oraljournal.com
Received: 13-02-2020
Accepted: 15-03-2020

Lopamoodra Das
MDS Student, Department of Pedodontics and Preventive Dentistry, Dr. R Ahmed Dental College and Hospital, West Bengal, India

Dhrubojyoti Banerjee
MDS Student, Department of Prosthodontics, Crown and Bridge, Dr. R Ahmed Dental College and Hospital, West Bengal, India

Subrata Saha
Professor, Department of Pedodontics and Preventive Dentistry, Dr. R Ahmed Dental College and Hospital, West Bengal, India

Subir Sarkar
Professor and HOD, Department of Pedodontics and Preventive Dentistry, Dr. R Ahmed Dental College and Hospital, West Bengal, India

Corresponding Author:
Lopamoodra Das
MDS Student, Department of Pedodontics and Preventive Dentistry, Dr. R Ahmed Dental College and Hospital, West Bengal, India

Sports dentistry: Role of the dentist in prevention of sports related orofacial trauma

Lopamoodra Das, Dhrubojyoti Banerjee, Subrata Saha and Subir Sarkar

Abstract
Dentistry has an important role in the athlete's health and consequently on sport performance. Sports dentistry is the budding field of dentistry which involves the prevention and treatment of sports related orofacial injuries, as well as the collection and dissemination of information on dental athletic injuries. Many athletes are not aware of the health implications of a traumatic injury to the orofacial structures. The dentist can play an imperative role in increasing the awareness among athletes, coaches and sports administrators about the various aspects of sports accidents and also emphasize the use of orofacial protective devices in variety of sports events. This article will give an overview of sport injuries in orofacial region-incidence, risk factors and their preventive modalities.

Keywords: Sports dentistry, sports related orofacial injuries, orofacial protective devices

Introduction
Physical fitness, skill development and stress reduction are some of the bright aspects associated with participation in vigorous recreational activities and sports. Competitions, self-enjoyment, fame and recreational activity are attracting newer generation especially youngsters toward sports activity leading to more and more sports related dental and craniofacial injuries [1].

Sports Dentistry (SD) involves the prevention, maintenance and treatment of oral and facial injuries, as well as the collection and dissemination of information on dental trauma, in addition to stimulating research [2]. The role of dentistry in the sports is important, because it provides the athlete optimal oral health conditions which in turn can contribute to achievement of optimal performance during competitions. SD not only involves treatment of orofacial injuries but also directs the duty of the dentist to detect problems of the athlete, such as mouth breathing, poor positioning of the arches, and properly administer medications free of substances, such as positive doping present in many painkillers.

Dental injuries are the most common type of orofacial injury sustained during participation in sports [3]. Sports related injuries comprise of soft tissue laceration, tooth or alveolar bone fracture, avulsion and other luxation injuries, injury to gingiva, surrounding mucosa, tongue, palate and maxillofacial injury like fracture maxilla, mandible, zygoma etc. The risk-benefit ratio can be improved by preventing these sports-related traumatic dental injuries by the use of appropriate, properly fitted, protective athletic equipments. This review article discusses about the various aspects of sports-related injuries and the protective measures that should be undertaken for the prevention of orofacial trauma.

Incidenence of Sports Injuries
With growing interest in various types of sports activities, the incidence of sports related trauma has also increased manifold. The face is the most vulnerable area of the body and is usually the least protected. Studies have shown that 13-39% of all dental injuries are sports related and of all sports accidents reporting, 11-18% are maxillofacial injuries [4]. The National Youth Sports Foundation for the prevention of athletic injuries, Inc., estimates that during the season of play, athletes have a 10% chance of sustaining an injury to the face or mouth [5].

Males are traumatized twice as often as females, with the maxillary central incisor being the most commonly injured tooth [6]. The most common types of sports related facial trauma are

the soft tissue injuries and the fractures of the "T-zone" bones (the nose, the zygoma and the mandible). These injuries often occur in combination [7]. The majority of sport-related dental and orofacial injuries affect the upper lip, maxilla and maxillary incisors, with 50-90% of dental injuries involving the maxillary incisors [8, 9]. Nasal bone is one of the most affected structures in sports accidents, because it is located in a vulnerable area of the face and projected forward in relation to adjacent structures [10]

Three groups—children and adolescents, middle-aged athletes, and women—are particularly vulnerable. Some sports injuries result from accidents; others are due training mistakes, quality of the playing surface, status of the equipment to be used or worn, climatic conditions such as ice or rain etc [11]. Given the high incidence of sports trauma, there is need for expanding and disseminating knowledge about this field of dentistry.

Risk Factors for Sports Injuries

Type of sports: Risk of injury increases in case of contact sports or fast moving sports. For instance, some team sports such as boxing, judo, karate, wrestling, sumo, soccer, basketball, football etc and fast moving sports like cycling, car racing etc are at a high risk for injury.

Age: In young children, trauma directed to the primary dentition most often results in luxation injuries. Young bone is more resilient, pliable and less mineralized which accounts for this phenomenon. This is in marked contrast to the young permanent dentition, where crown fractures are more frequent. Robey *et al.* [12] and Blyth and Mueller [13] conducted two separate studies and both concluded that the risk of injury in high school football increases with age. Another study reported that the most of sports injuries occurred in adolescents and young adults and that the risk of injury decreased with increasing age [14].

Gender: Men and boys have an apparent tendency to select more aggressively vigorous or "contact" sports. Stephens *et al.* [15] have concluded that men and boys are more likely to participate both in vigorous exercise and sports competition than women and girls. Pinkham and Kohn[16] suggested that are girls are at a higher risk than boys for sports accidents when exposure rates are considered.

Injury history: Several studies were performed to access the relationship between past injuries and the risk of recurrence and it was concluded that previous injuries, if treated properly and thoroughly, do not necessarily predict a repeat injury. However, it was also noted that certain individuals with injury-prone characteristics, like children with muscular imbalance, cerebral palsy, or epileptic patients may remain risk prone for sports accidents [13].

Skilled coaching: Lack of skilled coaching and improper training can increase the risk potential. Ranalli and Lancastar [17] have suggested that athletes are more influenced by their coaches than parents, other athletes or officials.

Body size: With increased body size the center of gravity increases, leverage increases due to greater length of limbs and/or limb strength, and stress on joints due to additional weight. A number of research studies have documented that excessive height and weight predispose athletes to injury [18].

Orthodontic status: Maxillomandibular relationship influence vulnerability to sports related accidents. A class II molar relation with an overjet greater than 4 mm, short hypotonic or incompetent upper lips and mouth breathing increases the risk for sports trauma.

Psychological factors: Kerr and Fowler documented that any psychological factor like stress, anxiety, performance pressure or low self-confidence would reduce the athlete's attention to the challenges and/or increase the possibility of fatigue, which may be an etiologic factor in sports injury [19]. State of mind of the player has a impact on his/her level of concentration which affects the performance.

Protective Equipment for Prevention of Sports Trauma

Dental trauma in sports activities is often associated with serious consequences: aesthetic, functional, economic and psychological. Depending on the severity, it can even exclude the athlete of an important competition. Therefore use of proper protective equipment is mandatory during any form of sports activities. Sports accidents can be largely prevented by using basic protective devices such as properly-fitting helmets, facemasks and/or mouth guards.

Mouthguards: Mouthguards or "gum shields" were originally developed in 1890 by Woolf Krause, a London dentist, as a means of protecting boxers from lip lacerations because boxing contests were quite common in that era [20]. Mouthguards help in protecting the teeth from fractures and/or luxation injuries, preventing soft tissue bruises and lacerations etc. They also reduce the chances of concussions and neck injuries by maintaining a partition between the condylar head and base of skull. Protective properties like high impact absorption and distribution prevent jaw fractures, dislocations and other TMJ injuries The use of mouthguard is increasing and diffusing among athletes and is becoming mandatory in certain sports: boxing, rugby, football and ice hockey. Three basic types of mouth guards are available.

- **Stock mouthguards:** Prefabricated mouth guards made of rubber, polyvinyl chloride or a polyvinyl acetate copolymer. They are easily available and cost effective. But these devices are quite bulky, non-adjustable and uncomfortable to wear and also interferes with breathing and speech.
- **Mouth-formed protectors:** Two types of mouth-formed protectors are:-
- **Shell-liner type:** Fabricated by placing a freshly mixed ethyl methacrylate onto a hard shell. It is then inserted inside the mouth and molds to the teeth and is allowed to set. But they are bulky and liner easily gets separated.
- **Thermoplastic lining (also known as "boil and bite"):** It is immersed in boiling water for 10-45 s, transferred to cold water and then adapted to the teeth. They have a better fit and coverage. Breathing and speaking is better than stock mouthguard
- **Custom made mouthguard:** Fabricated by the dentist over a dental cast of the athlete (maxillary arch for patients with class I and II malocclusion, mandibular arch for class III malocclusion), They have the best occlusal fit and maximum ccclusal stability. They are the most retentive ones with minimum loss of retention over time and also highly comfortable. The only pitfall is that they are expensive.

Helmets protect the skin of the scalp and ears from abrasions, contusions, and lacerations. They protect the skull bones from fractures, and the brain from direct trauma like concussions, cerebral hemorrhage, paralysis, and death. The outer layer of modern helmets are usually fabricated from polycarbonate or polymers of higher quality, which promote better distribution of the stresses [21]. A soft padding is given on the inner aspect to cushion the traumatic forces.

Face guards are designed to protect the eyes, nose, nasal pyramid, zygomatic arches, and mouth from traumatic forces such as a fist, ball or stick directed toward the face. Facemasks are manufactured from plastic or rubber tubing or welded steel or aluminum of various diameters and are covered with a coating of vinyl plastic. The vulnerable location of the nasal bone makes it prone to fracture, So adequate protection should be given with nasal shields. The shields made with a 2 mm layer of ethylene vinyl acetate (EVA) layered with a flexible sheet of 1 mm EVA disk, greatly reduce the risk of nasal bone fracture [10]. Eye injuries related to sports can be prevented with the use of protective eyewear, without compromising the vision of the sportsperson.

Sports Related Dental Implications

Sports drinks, especially carbonated are often consumed by the players for rehydration and electrolyte replacement during highly vigorous sports. These drinks have detrimental effect on the teeth as they lower the pH and the presence of citric acid in its composition can lead to tooth erosion if consumed improperly and with high frequency. Sports drinks are potentially harmful to the properties of composite resins.6 months evaluation of composite resin resoration was done in an in-vitro study and it was concluded that energy drinks affected the color of composite resin restoration [22].

In relation to water sports, chlorination of swimming pools are done to reduce bacterial contamination and algal growth. Hence swimming athletes are affected with bio corrosion of enamel. It has been documented that swimming athlete showed loss of tooth enamel, in just two weeks, especially in their anterior teeth. This case emphasizes the need to ensure that the water is properly chlorinated and pH adjusted to 7.5 [23].

To enable the athlete maintain high standards of performance, it is important that the dentist make a meticulous assessment of oral health status of the athlete to detect changes and pathologies such as dental malocclusion. Alterations in the occlusion can significantly compromise the performance since it interferes with the efficacy of chewing, and subsequent digestion of food, thus impairing nutrient absorption. Moreover certain malocclusions like proclined incisors and incompetent lips are more prone to trauma. The duty of dentist is thorough assessment of the patients, identifying individual risks, and develop preventive plans to reduce the likelihood and severity of sports trauma.

Conclusion

Participation in sports activities are a good mode of relaxation, socialization and maintainance of physical fitness and health. Despite these benefits, there are certain risk factors associated with these vigorous activities. Depending on the sport practiced, milliseconds can make the podium and the same sport can cause physiologic and/ or psychological damage, as a result of sports related trauma. Modern dentistry has developed various techniques and protective equipments to protect the players from orofacial injuries. The dentist has an utmost responsibility to educate the athletes regarding sports related issues and also periodically perform a detailed assessment of the oral health of the athlete. Sports dentistry may be challenging but rewarding too.

References

1. David P Kumamoto, Yoshinobu Maeda. A literature review of sports-related orofacial trauma. General dentistry. 2004; 52(3):270-281.
2. Academy for Sports Dentistry. Defi nition of sports dentistry. [cited 2013 Jan 13]. Available from: http://www.acadsportsdent.org.
3. Scott J, Burke FJ, Watts DC. A review of dental injuries and the use of mouthguards in contact team sports. Br Dent J. 1994; 176:310-4.
4. Camp J. Emergency dealing with sports-related dental trauma. J Am Dent Assoc. 1996; 127:812-5.
5. Padilla R, Balikov S. Sports dentistry: Coming of age in the ‘90s. J Calif Dent Assoc. 1993; 21(36):27-34.
6. Meadow D, Lindner G, Needleman H. Oral trauma in children. Pediatr Dent. 1994; 6:248-51
7. Sane J. Maxillofacial and dental injuries in contact team sports. Proc Finn Dent Soc 1988; 84 (6, 7):1-45.
8. Takeda T, Ishigami K, Nakajima K, Naitoh K, Kurokawa K, Handa J *et al*. Are all mouthguards the same and safe to use? Part 2. The influence of anterior occlusion against a direct impact on maxillary incisors. Dent Traumatol 2008; 24:360-5
9. Kumamoto DP, Maeda Y. A literature review of sports-related orofacial trauma. Gen Dent 2004; 52:270-80
10. Coto NP, Meira JBC, Dias RB, Driemeier L, Roveri GO, Noritomi PY. Assessment of nose protector for sport activities: fi nite element analysis. Dent Traumatol. 2012; 28:108-13
11. Cannel H. Oral, dental and maxillo-facial injuries. Sports Injuries and their Treatment. London: Chapman and Hall, 1986
12. Robey JM, Blyth CS, Mueller FO. Athletic injuries. Application of epidemiologic methods. JAMA. 1971; 217:184-9.
13. Blyth CS, Mueller FO. Football injury survey: Part I. When and where players get hurt. Physician Sports Med. 1974; 2:45-52
14. De Loes M, Goldie I. Incidence rate of injuries and their mechanisms: A prospective study. Med Sci Sports Exerc. 1983; 15:267-70
15. Stephens T, Jacobs DR Jr, White CC. A descriptive epidemiology of leisure-time physical activity. Public Health Rep. 1985; 100:147-58.
16. Pinkham JR, Kohn DW. Epidemiology and prediction of sports related traumatic injuries. Dental Clinics North America. 1991; 35(4):609-626
17. Ranalli Denis, Lancaster N, Diana M. Attitudes of College Football Coaches regarding NCAA mouth guard regulations and player compliance. J Public Health Dentistry. 1995; 55(3):139-142
18. Berson BL, Rolnick AM, Ramos CG, Thornton J. An epidemiologic study of squash injuries. Am J Sports Med 1981; 9:103-6
19. Kerr G, Fowler B. The relationship between psychological factors and sports injuries. Sports Med. 1988; 6:127-34.
20. Ekstrand J, Gilliquist J. Soccer injuries and their mechanisms: A prospective study. Med Sci Sports Exerc

1983; 15:267-70.
21. Vetter L, Vanderby R, Broutman LJ. Infl uence of materials and structure on performance of a football helmet. Polym Eng Sci. 1987; 27:406-21
22. Erdemir U, Yıldız E, Eren MM. Eff ects of sports drinks on colour stability of nanofi lled and microhybrid composites after long-term immersion. J Dent. 2012; 40:e55-63.
23. Dawes C, Boroditsky CL. Rapid and severe tooth erosion from swimming in an improperly chlorinated pool: case report. J Can Dent Assoc. 2008; 74:359-61.