

Review Article

Sports Dentistry

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ABSTRACT:

Every individual in some period of their lifetime will be involved in sports activities which involves playing extracurricular activities often leading to injuries. These injuries can occur between any age group and is often overlooked. Sports dentistry is that section of dentistry specializing in prevention of oral/facial injuries and related oral diseases and manifestations and is mostly exhibited in children with a 12% trauma. These traumatic incidents are however overlooked by the population due to multiple factors such as poor education or part of life. The occurrence for dentists to witness traumatic injuries is considerably less in their cycle of practice and often dentists are unable to tackle these situations. With the advancements in treatment modalities in treating such cases very less knowledge is seen. This review aims to discuss the relationship between sports and dentistry and the importance in educating parents on how to manage and prevent injuries occurring when playing sports.

Keywords: Trauma, Facial injuries, Sports

Received: 17 June, 2022

Accepted: 20 July, 2022

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This article may be cited as: Rasool N, Shetty SV, Nair PMS, Sports Dentistry. J Adv Med Dent Scie Res 2022;10(8):44-48.

INTRODUCTION

Sports trauma due to injuries are a major cause of injuries mainly occurring in the orofacial region. The combined impact of violence, engaged sporting activities has contributed to the establishment of traumatic dental injuries involving the teeth and orofacial structures (1). Sports dentistry is the prevention of oral and facial athletic injuries, oral diseases and other manifestations due to these causes. The treatment for this involves two major components; immediate attention for treatment of orofacial injuries and the second is the prevention of further injuries due to this occurrence (2). For this, a dentist should have elementary knowledge on the management protocol for immediate attention which involves immediate and shrewd attention and adapt in the areas of oral surgery, endodontics, restorative dentistry, orthodontics, prosthodontics, hospital dentistry, patient psychological guidance.

Various dental traumas generally encountered during sports are luxation injuries to tooth (luxation, subluxation), avulsion, fracture of the facial bones, and concussion injuries(3). Hence, it is imperative that preventive conditions should be implemented for

the athlete to avoid/reduce the amount of injuries occurring during physical activities such as usage of helmets, mouthguards and other protective gears(4). Currently various modifications of these protective devices have been studied and changes have been made to make them more comfortable, user-friendly with additional advantages. In this review article, we discuss the various aspects of sports-related injuries, the risk factors associated, protection and methods to manage these case scenarios.

EPIDEMIOLOGY

There are constant reports of dental trauma being the cause of occurrence during sports injuries with the frequency and intensity of contact often determining the main cause of dental injury(5). The type of sports injury occurrence can be by classified based on the contact; direct contact sports such as taekwondo, jiu-jitsu, kickboxing, boxing, sports with indirect contact with rival competitors such as handball, basketball, football, soccer, ice hockey and no contact with rival competitors' volleyball, badminton(6). The most common tooth of trauma in the maxillary region is the maxillary central incisors with an incidence till

80% (7). In children, the incidence rate is seen maximum in the age group of 8-11 years with boys showing more incidence of injury than girls (8). Further, more than 5 million teeth are avulsed each year many during sports activities, resulting in nearly huge amount of expenditure for replacing these teeth. In Alabama, a study on 754 football players revealed that 52% of orofacial injuries occurred in sports. Basketball, baseball and unorganized football were a few of the sports which showed a high incidence of oral trauma and concussions when mouthguard was not used (9). There has been some epidemiological studies showing similar results, with Morrow and Kuebker conducted surveys in selected Texas high schools to determine the incidence of orofacial injuries on approximately 122,000 male and female athletes (10). Further study has proven that an athlete has a 10% chance of receiving an orofacial injury during sports activities in addition having a 33%-56% chance of receiving an orofacial injury during their playing career (11).

SPORTS RELATED INJURIES

With increased incidence of orofacial injuries in sports, there is a greater concern for the emergency and long-term care of orofacial injuries and usage of preventive measures like helmets, mouthguards in these sports (12). There was a raising concern about the prevalence of sports-related dental injuries in children and youth. In 2002, The Council of Clinical Affairs of American Academy of Pediatric Dentistry recommended the following policy statements (13):

- Dentists should play an active role in educating the public on the use of protective equipment for sporting activities both organized and informal.
- Continuation of preventive measures practiced in youth, high school, and college level football, lacrosse, and ice hockey
- Mandating the use of properly fitted mouthguards in sporting activities which have a risk of orofacial injury
- Advocating coaches on initiating practices for a sporting season to consult a dentist who is expertise in orofacial injuries, for immediate management of injuries.

IMPORTANCE OF TIMELY INTERVENTION FOR SPORTS INJURIES

Modern dentistry has developed numerous techniques and appliances to help protect the sports participant from a variety of orofacial injuries. Preventive sports dentistry represents the most important aspect which enables the dentist to incorporate preventive measures while further decreasing the impact of injuries (14).

RISK FACTORS FOR SPORT INJURIES

An essential component of any injury prevention program is an appreciation and understanding of the factors involved in it. There are two broad categories

of injury risk factors, these are extrinsic and intrinsic risk factors.

EXTRINSIC FACTORS

Extrinsic risk factors are those factors that independent of the individual. These are essentially the injury predictors that are related to the type of activity demanded by a particular sport. For example, running or jogging during football, basketball and other sports is more likely to produce a stress injury than that caused by engaging in contact sports (15). Also, improper methods of preparing for competition, such as training mistakes, can also be significant extrinsic risk factors for sports injury. Other extrinsic factors include quality of the playing surface, status of the equipment used or worn for sports, climatic conditions such as ice or rain which can influence the player performance, and the quality of supervision of the participants (16).

INTRINSIC FACTORS

Intrinsic risk factors are those factors which are caused by intrinsic qualities of the participants. These are the biologic and psycho-social characteristics that may predispose a particular person to a particular kind of sports injury (17). A recent review of intrinsic risk presented convincing evidence that intrinsic factors play a significant role in the evolution of some sports injuries. They concluded that many potential intrinsic risk factors have received inadequate attention and that more studies are warranted to verify the overall significance of these factors to sports medicine and dentistry (18).

AGE

This is an important contributing factor such as growth and development, physical maturity, body strength, coordination, healing ability which plays a crucial role in development. It should be noted that in young children, before the eruption of the permanent incisors, trauma directed to the primary dentition often occurs to luxation injuries (19) whilst in young permanent dentition, crown fractures are more frequent occurrence during trauma.

GENDER

The role of gender as a potential risk factor for sports-related traumatic injuries may be due to level of intensity that boys play sports in contrast to girls with boys showing more engagement in contact sports in relation to girls further playing with more ferocity (20).

INJURY HISTORY

In an event of previous injuries, it was concluded that previous injuries, if treated properly and thoroughly, do not necessarily predict a repeat injury. However, there is still a percentage of incidence of injury occurrence to occur such as muscular

imbalance, cerebral palsy and epilepsy which can influence the patient's health in the long run (21).

INFLUENCE OF BODY SIZE

Increased body size has a directly proportional effect on injury due to the higher centre of gravity, increased leverage due to greater length of limbs and/or limb strength and stress on joints due to additional weight(22).

EXPERIENCE OF THE INDIVIDUALS

Beginners are at a greater risk of injury in many types of sports than are veterans due to the inexperience in the field. Physically handicapped populations, which display central motor disabilities, are probably also at a greater potential risk for injuries associated with physical conditions such as sports than might be true for those without impaired coordination(23).

PSYCHOLOGICAL FACTORS

Psychological factors like stress, trait anxiety, low self-confidence, or performance pressure would reduce the participant's attention to the challenges of the sport or increase the possibility of fatigue, which may be an etiologic factor in sports injury(24).

MENTAL STRENGTH

There is a correlation between sports injuries and intelligence which ultimately influences the sport person ability to play the game effectively. Further research is needed to check if any influence is there between the two variables (25).

Other factors that may impact upon the risk for sports injury include miscellaneous considerations such as body type, physiologic age, nutritional status, metabolic variations and genetic factors. This is a relatively poorly characterized set of predictors at present which needs to have further research.

IMPORTANCE OF DENTISTRY FOR TREATMENT

The very fact that certain patients will need treatment for tooth, bone, or oral and perioral soft tissue injuries as a result of participation in sports shows the importance of dentistry and its value for treatment. Beyond this practicality, the overriding importance of dentistry's ability to meet the diagnostic and therapeutic needs of those with oral injuries lies in the emotional and psychological importance to the patient of having a normal appearance and function of the face.

Therefore, dentistry is needed for a practical side of health care as well as for the emotional consequences of facial or dental trauma. The patient suffering a sports injury of dental significance deserves both the practical approach to immediate and long-range health problems as well as the one that accounts for the emotions associated with facial injury and its esthetic ramifications.

Fortunately, modern dentistry has developed numerous techniques and appliances to help protect the sports participant from a variety of orofacial injuries. In fact, preventive sports dentistry represents the most important contribution the dental profession can make to assure a sports participant's welfare(26).

MANAGEMENT OF TRAUMATIC INJURIES

Many sports-related traumatic dental injuries are preventable and can be improved by the use of appropriate, properly fitted, protective athletic equipment. Furthermore, as the predictive risk factors associated with such injuries are more clearly identified and defined, the design and development of new protective devices may contribute positively to future athletic injury prevention(27).

At present, helmets, facemasks and mouthguards are required in some sports to reduce the incidence and severity of sports-related traumatic injuries to the head, face and mouth of an athlete.

Helmets are designed to protect the skin of the scalp and ears from abrasions, contusions, and lacerations. They protect the bones of the skull from fractures, and the brain and central nervous system from direct concussions, unconsciousness, cerebral haemorrhage, brain damage, paralysis and death. Facemasks are designed to protect the eyes, nose, nasal pyramid, zygomatic arches and mouth from traumatic forces such as a fist, ball, puck, or stick directed toward the face. When used by the sportsperson properly, helmets and facemasks enhance player safety and reduce morbidity(28).

Facemasks are manufactured using different materials plastic, rubber tubing, welded steel or aluminium of different diameters and are covered with a coating of vinyl plastisol. The earliest style of facemask introduced into football in the 1950s consisted of a contoured single bar. All styles of facemasks provide varying degrees of protection to the maxilla horizontally from an extended finger, a clenched fist, a forearm, or a helmet directed respectively toward the eye nasal pyramid zygomatic region or the mandibular arch.

One major disadvantage of the facemask is that it has a protruding object within the ready grasp of an opposing player. When the facemask is pulled or twisted by an opponent during the course of a play, serious physical consequences such as muscle, neck, or spinal column damage can result(29).

Mouthguards or "gum shields" were originally developed in 1890 by Woolf Krause, a London dentist, as a means of protecting boxers from lip lacerations. Such injuries were a common and often disabling accompaniment of boxing contests in that era. These gum shields were originally made from gutta percha and were held in place by clenching the teeth(30). By 1930s, mouthguards were part of the standard boxers' equipment and have remained so since that time. There are different types of mouthguards available currently in the market. The

stocktype is the least expensive of the three types of mouthguards available and come in different styles and colours with or without straps. They are ready to wear because one size is intended for all users, and they must be held in place by biting the teeth together. Because they are the least retentive and often bulky, stock mouthguards interfere the most with the athlete's ability to breathe and speak and often cause the athlete to gag. Because of all these factors, stock mouthguards are unacceptable to most athletes and offer the least protection for the prevention of sports-related traumatic dental injuries(31)

Mouth-formed mouthguards come in two types, shell-lined and boil-and-bite. The shell-lined variety is fabricated by placing freshly mixed ethyl methacrylate into a hard shell, which is then inserted into the athlete's mouth and moulded over the maxillary teeth and soft tissues. The excess is trimmed with crown and bridge scissors and the mouthguards are then ready for use(32).

The thermoplastic boil-and-bite mouthguard is fabricated by placing the mouthguard in boiling water to soften the material. The softened material is then placed into the athlete's mouth, where it is molded with finger pressure as well as with facial and intraoral muscular movements to enhance adaptation to the hard and soft tissue structures of the mouth(33).

Custom-fabricated mouthguards are made professionally over a dental cast of the athlete's arch. Because of their superior adaptation and retention, custom-fabricated mouthguards are believed to interfere least with breathing (oxygen exchange) and speech. Because of superior fit and comfort, they are more likely to be accepted by athletes(34).

Photopolymerized urethane diacrylate custom lip guards and mouthguards are also used nowadays for better adaptation and better comfort and protection. Studies done by various scientists show that there is always lesser trauma caused to a person wearing any kind of protective gear than that caused to a person without wearing it(35).

PROFESSIONAL RESPONSIBILITY OF DENTISTS

A rapid proliferation of sports programs for children and adolescents has taken place over the past few years. The participation has grown dramatically at both the recreational and organized sports levels. The dentist has a professional responsibility to educate himself and the public regarding the issues related to sports dentistry, specifically to the prevention of sports-related orofacial trauma. Dentists should also take the lead in educational, research, and public service activities(36).

It is the duty of dentists to create awareness among the people, teachers as well as students, and children. It was found that 10.9% had experienced a kind of dental trauma and 12.5% would look for a dentist for

treatment in emergency. 34.5% would re-implant the avulsed tooth, 33.4% would maintain the avulsed tooth in handkerchief, and 25.3% would maintain it in saline solution. 41.1% were aware of the possibility of oral injuries during sports practice, and 55.4% knew about mouthguards but only 11.2% of the participants reported using them(37).

CONCLUSION

Sports dentistry encompasses a wide range of preventive and treatment modalities of oral/facial athletic injuries and related oral diseases and their manifestations. With the increasing trend of sports participation in schools and colleges, protective devices and preventive options gain significance. Sports-related dental injuries are not uncommon during participation and they deserve our immediate attention. Preventive programmes should include information regarding sports-related orofacial injuries, preventive measures like helmets and mouthguards, and their management, resulting in better awareness of the general population. It is the responsibility of the dentist to increase awareness of the patient for management and avoiding further injuries in the long run.

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