

SPORTS DENTISTRY - A PROLOGUE

*WASIF ALI KHAN, BDS (Pb), MSc (London)

ABSTRACT

The purpose of this article is to present an introduction of sports dentistry, which is an established discipline in most of the developed world. The main components of sports -dentistry are described briefly. Common sports dental injuries and oral diseases related to the lifestyles/habits of sports community are also discussed. The prevention of both sports dental injuries and specific oral diseases in sports community are important aspects of the sports dentistry. The significance of various preventive strategies such as use of mouthguards and dietary counseling are described. The role of sports team dentist is well recognized in diagnosis, management and prevention of dental injuries and diseases in sports community. The sports team dentist also acts as the main source of research in sports dentistry. It is recommended that sports dentistry should be included in dental curricula at both undergraduate and postgraduate levels.

Key words: Sports dentistry, dental injuries, prevention

INTRODUCTION

Sports dentistry had evolved as an independent sub-specialty during the last decade. It has expended much beyond its traditional image of being limited to mouthguard fabrication and treatment of fractured teeth. There has been a revolution in the concept of identification of cause, treatment and prevention of dental injuries and diseases related to sports community at both recreational and organized level. It encompasses sports activities from toddler age to the adult and senior citizens' stage.

According to the International Academy of Sports Dentistry (IASD), "sports dentistry involves prevention and treatment of oro-facial athletic injuries and related oral diseases as well as the collection and dissemination of information on dental athletic injuries and encouragement of research in prevention of such injuries"¹.

Oral health of participants in major championships and Olympic games has been surveyed². While the athletes at these events clearly represent the highest levels of physical development and conditioning, their

oral health was often found to be either at or below the average level as compared with the general population.

The National Youth Sports Foundation for Safety has presented the following facts about oro-facial sports injuries³;

Dental injuries are the most common type of oro-facial injuries sustained during participation in sports; the majority of these injuries are preventable. An athlete is 60 times more likely to sustain damage to the teeth when not wearing a protective mouthguard. Every athlete involved in a contact sports has about 10% chance per season of an oro-facial injury or 33% - 56% chance during an athletic career. Victims of knocked out teeth who do not have tooth properly preserved or replanted may face lifetime dental costs, hours in the dental chair and possible development of other dental problems.

Researchers have focused on the dental diseases such as tooth wear^{4,5} and soft tissue^{6,7} changes found in

* Prosthodontist and Head, Dental Department, Sports Medicine Hospital, Riyadh, Saudi Arabia.

Postal Address: Sports Medicine Hospital, PO. Box 10629, Riyadh 11443, Kingdom of (Saudi Arabia).
Telephone : 00 966 58455659 [E-mail: dr_wasif@hotmail.com](mailto:dr_wasif@hotmail.com)

athletic community as related to their life styles and eating habits. Consequently, dietary advice, life style change and oral health education have attracted much of the attention in sports dentistry.

The position of team dentist at the club level and national level has become a requirement. It is rewarding in not only treating injured athletes but also preventing more potential dental injuries and diseases from occurring.

Sports Dental Injuries

The common dental injuries which may be inflicted during sports competitions or outside competitions are briefly described below;

Tooth Fractures

This is the commonest dental injury in sports community'. It usually splits a tooth into two fragments, one remains attached to the socket and the other becomes free. The teeth which are mostly effected by dental trauma are permanent maxillary central incisors^{9,10}. The decision of allowing the athlete to continue or refer for dental treatment depends upon the type and level of the tooth fracture. Tooth fracture at the level of enamel or dentine (not involving the pulp) may not need immediate referral. The fracture which involves pulp or root fracture may cause severe pain and bleeding; hence needs quick referral to a dental clinic.

Luxation

In this condition the tooth shifts its position at the level of root but does not completely remove it from the socket¹¹. The tooth may be extruded from the socket or it may be intruded into the socket. It may also be displaced laterally. During sports activity, it may need immediate attention and an attempt is made to reposition the tooth, and stabilize it by biting on a towel or wearing a mouth guard until more definite treatment is provided in a dental office. If it is not possible to reposition the tooth, immediate referral to a dental office is required.

Avulsion

This dental injury causes the tooth to be knocked out or removed completely from its socket. Boys are three times more likely to experience avulsion than girls, and most frequently between the age of 7-11 years¹². According to Andreasen¹³, eruption teeth have loosely structured periodontal ligaments which favor avulsion. The avulsed tooth may be replanted

immediately into the socket with extreme care to avoid infection and damage to the periodontal ligaments. The replanted tooth can be further stabilized by biting on a towel or wearing mouthguard until further treatment is provided in a dental office. However, if it is not possible to replant the tooth at the spot, the tooth must be stored in an ideal storage medium until it is replanted in a dental office. A 90% success rate is achieved if the tooth is replanted within thirty minutes of the avulsion". Ideal transport media include saliva, physiological saline and milk. Custom prepared Hank's balanced salt solution or Viaspan solution¹⁵ is biocompatible with periodontal ligament cells keeping them viable for 24 hours, due to its pH and osmolality. The tooth should not be stored in water, alcohol for antiseptics, as they all compromise the vitality of the periodontal ligament cells. It is recommended that Hank's solution should be included in emergency sports care kit.

Prevention of Dental Injuries

All these dental injuries and other major oro-facial injuries are preventable. The National Alliance Football Rules Committee¹⁶ of USA in 1962 adopted a resolution to instruct players to wear intra-oral mouth and tooth protection. IASDI has also strongly recommended the use of mouthguard during several sports such as basketball, baseball, boxing, equestrian events, football, gymnastics, handball, martial arts, squash, volleyball, water polo, weightlifting and wrestling. Each of these sports has the potential to seriously harm the head, face and mouth of the players as a result of head to head contact, hazardous fall, tooth clenching or blows to the mouth and teeth. It has been estimated that about 200,000 injuries per year have been prevented by use of mouthguards or other protective equipments". The use of mouthguard also places the head of mandibular condyle in temporomandibular joint at a position which sustains most concussions from blows to chin¹⁸.

The mouthguard is made up of the materials which are resilient, tear resistant and comfortable. There are three basic types of mouthguards:

The ready-made or over the counter mouthguards.

The mouth formed "boil and bite" mouth guards.

The custom-made mouthguards by a dentist.

In a position statement, IASDI recommends the use of a properly fitted mouthguard; encourages the use of custom-made mouthguard made over a dental

cast and delivered under the supervision of a dentist, and supports a mandate for the use of a properly fitted mouthguard in all collision and contact sports. IASDI has also recommended the inclusion of special trauma cards in emergency care kits to help sports coverage personnel in providing field treatment in case of a dental injury.

Oral diseases in Sports Community

Tooth wear/tooth substance loss is becoming an increasingly common problem in athletic community⁵. It has been reported that athletes may be placing themselves unintentionally at risk for dental erosion¹⁹. It has been identified that dental problems are arising from the consumption of acidic foods and drinks among several sporting groups²⁰.

Dental erosion is a non-carious pathological loss of tooth substance by chemical process. Vigorous exercise and strenuous sports cause dehydration which reduces the salivary protection against the acids present in sports supplements and soft drinks consumed during and after the sport activities^{4,5,19,20}. Dehydration reduces the salivary flow rate and in turn its buffering capacity to clear acids from mouth²¹. Dental erosion is also common in people who swim regularly in gas-chlorinated pools, where the water becomes acidic²².

Prevention of Oral Diseases

Prevention remains a cornerstone in the management of toothwear particularly dental erosion. Proper dietary analysis and advice should be provided to sports community^{19,22,23,24}. The frequency of taking acidic foods and drinks should be checked, limiting the intake to mealtimes only. Neutral sodium fluoride mouth washes are advised to combat acidic damage, and to control tooth sensitivity. Patient is advised to avoid tooth brushing immediately after consuming acidic foods and drinks. The toothbrush pressure may cause significant loss of already demineralized tooth surface. The use of mouthguard with application of alkaline solutions (sodium bicarbonate, milk of magnesia) is also advised during strenuous sports activity. Patients with rapid erosive tooth wear may need restorative dental treatment to arrest the progress of the wear and related complaints.

Drug Abuse Among Sports Community

Use of anabolic steroids and performance enhancers by athletes is strictly prohibited presently by

antidoping laws. There is a significant association between the use of anabolics and misuse of cannabis and cocaine. Insulin may also be abused by the athletes due to its growth promoting properties. Anabolic steroids and performance enhancers may cause consumption of a diet high in carbohydrates which increases the risk of dental caries²⁵.

Smokeless Tobacco and Sports Community

There is a historic link between sports community and use of smokeless tobacco. The smokeless tobacco is also known by other names such as spit tobacco, dip, snuff or chewing tobacco. The longstanding relationship between athletes and smokeless tobacco had its origin in dusty playing fields of bygone days which used to cause stress and discomfort. Although, cigarette smoking has largely replaced the use of smokeless tobacco, it is still present and taken as a ritual position rather than necessity²⁶. It is a potent source of nicotine and known carcinogens, and research has documented it as addictive and adverse to oral and general health^{6,7,26}.

IASDI supports the concept that smokeless tobacco is not a safe alternative to cigarettes or any other forms of smoking. Research studies have shown that half of the smokeless tobacco users are at risk for precancerous lesions in their mouth; and chances of getting oral cancers is 400 times greater than the non-users². Another potential risk is that the smokeless tobacco users may start smoking cigarettes and other forms of substance abuse^{26,27}. In athletes, abstaining or stopping the use of smokeless tobacco poses greater challenge than stopping cigarette smoking²⁶. The use of nicotine gum, transdermal patches and mint snuff as placebo oral substitutes are advised in these cases. Mint snuff is simply mint leaves packed in small round tins designed to mimic cans. This product contains no sugar and nicotine and effectively imitates smokeless tobacco².

Sports Team Dentist

The importance of participation of dentist along with other support personnel is well recognized²⁸. The dentist required support specific knowledge and special training in order to work during sporting events. The responsibilities of a team dentist may include:

Providing dental care coverage during sports competitions.

Organizing the dental care for a specific team.

Developing a dental prevention program.

Working as a main source of research required in this field.

Identifying drug abuse in sports.

Continuing education courses for team dentists are conducted in sports dentistry conferences, and are also available on-line^{1,2} Fellowship certificates are also awarded after successfully completing the required credit hours and examinations in the field of sports dentistry¹.

The IASDI supports the inclusion of topics related to sports dentistry and fabrication of mouthguards in dental school curricula. The sports dentist can assist in developing the curricula for the dental schools, dental societies and athletic trainers. Sports dentistry should be included in dental curricula in Pakistan²⁹.

SUMMARY

As world of sports is expanding fast, our professional responsibilities related to sports dentistry extend beyond the dental office. Sports dentistry may be in its initial stages of development, but it will continue to grow to recognize, treat and prevent dental conditions in large sports community. Sports dentistry is certain to become a part of our future undergraduate dental education.

ACKNOWLEDGMENT

I am grateful to Dr Ajmad H Wyne from King Saud University College of Dentistry, Riyadh for helping in preparation of this article.

REFERENCES

Dental injury fact sheet. National Youth Sports Foundation for the Prevention of Athletic Injury Incorporated. Needham, Massachusetts, C 1992.

Harrison J, Roder L. Dental erosion caused by cola beverages. *Gen Dent* 1991; 39: 23-24.

Milosevic A. Sports drinks hazard to teeth. *Brit J Sports Med* 1997; 31: 28-30.

Deniels TE, Hansen LS, Greenspan JS et al. Histopathology of smokeless tobacco lesions in professional baseball players: Associations with different types to tobacco. *Oral Surg Oral Med Oral pathol* 1992; 73: 720-725.

Gansky SA, Ellison JS, Kavanagh C et al. Oral screening and brief spit tobacco cessation counseling: a review and findings. *J Dent Educ* 2002; 66: 1088-1098.

Andreasen JO, Andreasen FM. Dental Traumatology: quo vadis. *Endod Dent Traumatol* 1990; 6: 78-80.

Marcenes W, Al-Beiruti N, Tayfour D, Issa S. Epidemiology of traumatic injuries to the permanent incisors of 9-12 years

school children in Damascus, Syria. *Endod Dent Traumatol* 1999; 3: 117-123.

Al-Majed I, Murrey JJ, Maguire A. The prevalence of dental trauma in 5-6 and 12-14 year old boys in Riyadh, Saudi Arabia. *Dent Traumatol* 2001; 17: 153-158.

Andreasen FM, Andreasen JO. Luxation injuries in: *Textbook and Color Atlas of Traumatic Injuries to the teeth* 3rd ed. Copenhagen: Munksgaard Publishers, 1993: 315-382.

Camp JH. Diagnosis and management of sports related injuries to the teeth. *Dent Clin North Am* 1991; 35: 733-756.

Andreasen JO, Borum MK, Andreasen FM. Replantation of 400 avulsed permanent incisors. Factors related to root growth replantation. *Endod Dent Traumatol* 1995; 11: 69-75.

Barrett EJ, Kenny DJ. Avulsed permanent teeth: a review of the literature and treatment guidelines. *Endod Dent Traumatol* 1997; 13: 153-136.

Trope M, Friedman S. Periodontal healing in replanted dog teeth stored in Viaspan, milk and Hank's balanced Salt Solution. *Endod Dent Traumatol* 1992; 8: 183-188.

Bureau of Dental Health Education: Mouth protectors for football players: The Dentist role. *J Am Dent Assoc* 1962; 64: 419.

American Dental Association, Bureau of Health Education and Audiovisual Services, Council on Dental Materials, Instruments and Equipment: Mouth protectors and sports team dentists. *J Am Dent Assoc* 1984; 109: 84.

McCrory P. Mouthguards prevent concussion? *Brit J Sports Med* 2001; 35: 81-82.

Sirimaharaj V, Messer LB, Morgan MV. Acidic diet and dental erosion among athletes. *Aust Dent J* 2002; 47: 228-36.

Milosevic A, Kelly MJ, Mclean AN. Sports supplement drinks and dental health in competitive swimmers and cyclists. *Brit Dent J* 1997; 182: 303-308.

Young WG. The oral medicine of tooth wear. *Aust Dent J* 2001; 46: 236-250.

Watson ML, Burke FJ. Investigation and treatment of patients with teeth affected by tooth substance loss: A review. *Dental Update* 2000; 27: 175-83.

Shaw L, Smith J. Dental erosion-the problems and some practical solutions. *Brit Dent J* 1998; 186: 155-118.

Young WG. Diet and nutrition for oral health: advice for patients with tooth wear. *Australian Dental Association News Bulletin* 1995; 224: 8-10.

Meechan JG. Drug abuse and dentistry. *Dental Update* 1999; 26: 182-190.

Guggenheimer J. Implications of smokeless tobacco use in athletes. *Dent Clin North Am* 1991; 35: 797-808.

Glover ED, Laffin M, Edwards SW. Age of initiation and switching patterns between smokeless tobacco and cigarettes among college students in United States. *Am J Public Health* 1989; 79: 207.

Godwin WC. The role of sports team dentist. *Dent Clin North Am* 1991; 3: 701-705.

Almas K. Dental education imperatives for Pakistan. *Pakistan Oral Dental Jr* 2000; 20: 193-199