Review Article

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SPORTS DENTISTRY- PRESERVING PEARLY WHITE SMILES

Rashmi Singh[1], Bhawna Gupta[2]
1,2. MDS, Paediatric Dentistry

ABSTRACT:

Dental injuries are the most common type of orofacial injury sustained during participation in sports with the increased popularity of contact sports and encouragement to participate at an early age, the role of the dental profession in relation to prevention of dental and other orofacial sporting injuries has become more important in view of this. It is common for the kids to get hurt during any form of sports, especially contact sports, and face is the main area of damage. As dentists, we have to deal with patients with various kinds of fractures of tooth and facial bones.
Dental trauma in sports is the major linking channel between the sports and dentistry. The combined impact of violence, traffic accidents, and sporting activities has contributed to the establishment of traumatic dental injuries as a public dental health problem.
Key words: sports dentistry, mouthguards, helmets and face mask.

INTRODUCTION:

In today's common usage, sport has come to encompass a wide range of human activities from games to pastimes, all involving physical activities, skills, and accomplishments that are not the routine part of an individual's life. In broader sense it is a mean *recreation* is a diversion or mode of diversion that allows for refreshment of strength, spirit and personality.

Sports participation is a frequent cause of injury in general to children and adolescents. Like fractured bones, muscle injuries, broken teeth, torn cartilage, tendinitis, soft-tissue lacerations, and contusions. This occurs because of popularity of organized youth sports and the high level of competitiveness. Sports dentistry had its origins in the 1980s.[1]

Sports dentistry is the prevention of oral/facial athletic injuries and related oral diseases and manifestations. It has two major components: First is the treatment of orofacial injuries and the second is the prevention of sports-related orofacial injuries. To provide comprehensive care, a dentist must be knowledgeable and adept in the areas of oral surgery, endodontics, operative dentistry, orthodontics, hospital dentistry, and patient behavior management[5].

*Corresponding Author Address: Dr. Rashmi Singh. E-mail: drrashmisingh321@yahoo.com

CLASSIFICATION OF SPORTS

A. According to American Academy of Paediatrics [2]:-

	CLASSIFICATION	SPORTS
I	Contact/Collision	Boxing, hockey, martial arts, soccer, wrestling baseball, basketball, bicycling, diving, field events,
II	Limited Contact/Impact	gymnastics, horseback riding, skating, skiing, squash, volleyball, Aerobic dancing, running, swimming, tennis, track, weight-lifting
III	Strenuous Noncontact	Cricket, Badminton, table-tennis, running, Rowing, Sailing, Swimming, Tennis, Weight lifting, Field events (Shot put, Discus, Javelin)
IV	Moderately Strenuous sports and Non Contact	Archery, riflery, badminton, table-tennis
V	Non Strenuous and Sports Non Contact	Golf

B)According to Federation Dentaire International:- Organised sports is divided into two categories based on risk of Traumatic Dental Injuries:

- High-risk sports - Characteristic of high-risk sports is seen in team sports in which rough contact between the players is allowed or in which a ball, puck or stick is used, but also in some individual sports where good balance is required. For example American football, hockey, ice hockey, lacrosse, martial sports, rugby, skating, skateboarding and mountain biking and

- Medium-risk sports - Medium-risk sports include team sports in which rough contact between the players is not allowed, but there is still a risk of contact or falling. For example basketball, soccer, team handball, diving, squash, gymnastics, parachuting and water polo.

RISK FACTORS FOR SPORTS INJURIES [3,4]

There are two broad categories of injury risk factors in sports- Intrinsic risk factors and extrinsic risk factors.

Intrinsic factors- are the physical aspects of the athlete's body that can cause injury. These are the biologic and psycho-social characteristics that may predispose a particular person to a particular kind of sports injury categorised as- Age, gender, injury history, body size, centre motor control, psychological and psychosocial factors, general mental ability, local factors, and other factors.

Extrinsic factors- are those potential predictors of injury that are independent of the individual. These risk factors are external to the body, which causes injury. These are essentially the injury predictors that are related to the type of activity demanded by a particular sport and can be categorized into four: Coaching, incorrect technique, environmental factors, and safety hazards.

PREVENTION OF OROFACIAL INJURIES

Protective devices available can be classified into two categories:

- Intraoral – mouthguards or mouth protectors.
- Extra oral- helmets and facemasks.

These can be used alone or in conjunction with one another.

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. Such injuries were a common and often disabling accompaniment of boxing contests in that era.[9] These gum shields were originally made from gutta percha and were held in place by clenching the teeth. By 1930s, mouthguards were part of the standard boxers' equipment and have remained so since that time.[10]

Materials Used For Mouthguards- Polyvinyl acetate-polyethylene or ethylene vinyl acetate (EVA) copolymer, polyvinylchloride, latex rubber, acrylic resin, polyurethane.

CLASSIFICATION

The American Society for Testing and Materials (AMERICAN SOCIETY OF TESTING AND MATEIALS (ASTM)) classifies mouthguards by three categories:

- Type I – Custom-fabricated mouthguards (most accepted).
- Type II - Mouth formed Mouthguards – these are further classified as:-
  - Shell-lined mouthguard
  - Boil and bite mouthguard
- Type III – Stock mouthguards (easily available over the counter)

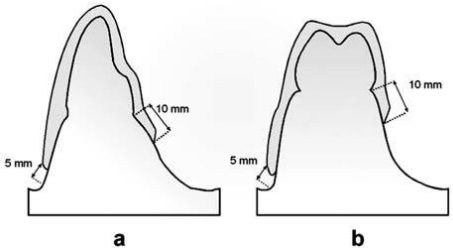
Recommended mouthguard design is as follows:

- It should enclose the maxillary teeth to the distal surface of second molar.
- Thickness should be 3 mm on the labial aspects, 2 mm on the occlusal aspect and 1 mm on the palatal aspect.
- The labial flange should extend to within 2 mm of the vestibular reflection.
- The palatal flange should extend about 10 mm above the gingival margin.

- The edge of the labial flange should be rounded in cross section whereas the palatal edge is tapered.

- Even when a single maxillary protector is constructed it should be articulated against the matching mandibular model to give optimum comfort.

Multiple layers of EVA should be utilised to build a 5 mm thick layer in the thicker parts of a custom made protector.



Relationship of edges and base of custom-made mouthguard in relation to supporting tissues on the maxillary anterior (a) and posterior (b) teeth.

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.[11] The custom made mouthguards can be fabricated using either injection moulding technique or Heat pressure laminating technique on the models obtained after the alginate impression.

Mouth-formed mouthguards come in two varieties: 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 molded over the maxillary teeth and soft tissues. The excess is trimmed with crown and bridge scissors and the mouthguards are then ready for use.[11]

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.[12]

Type	Description	Pros	Cons
Custom-made	Custom made from a full-mouth impression taken in the dentist's office and sent to a dental lab for fabrication.	Provides the most protection and comfort. Covers all teeth and cushions the jaw. No interference with speech or breathing. Adjustable for all sports.	More expensive than commercially made mouth guards.

Mouth-formed or "Boil-and-Bite"	Boiled in water for a period of time and then formed to the teeth by applying pressure.	Cost effective Available from department and sporting goods stores. Provides better individual fit than stock mouth guards.	Tend to wear quickly and may need to be replaced during the sports season. Difficult to adapt to orthodontic appliances. Difficult to speak and breathe.
Stock or commercial mouth guards	Rubber or polyvinyl and sold in small, medium or large sizes.	Sold in major department and sporting goods stores. Inexpensive.	Cannot be modified to fit the individual's mouth. Least effective in terms of protection. Impairs breathing and stays in place only when mouth is closed.

Newer types of mouth guards

1. Mouthguards with sensors (smart mouthguards)
2. Mouth guard with straps
3. Jaw joint positioned
4. Mouthguards with lip guard
5. Flavoured mouthguards

EXTRAORAL DEVICES:-

A) FACEMASKS

DEFINITION-

The devices that are designed to protect against facial injuries to the mouth, nose, eye, nasal pyramid and zygomatic arches etc during sports are known as facemasks.

Facemasks are manufactured from plastic or rubber tubing or welded steel or aluminum 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.[6,7]

TYPES-

1. Single-bar type - In this type of facemask one bar is attached to the helmet at the ear level extending from one side to another. It was more prevalent earlier and not used frequently now days.

The disadvantage of single bar facemask is that it provides the least amount of protection from forces directed angularly such as those from an extended finger, a clenched fist, a forearm, or a helmet directed respectively towards the eyes, nasal pyramid, zygomatic region or mandibular arch.

2. Full-Cage type Facemask - This facemask provides greatest degree of overall facial protection and is generally preferred by defensive players.

One major disadvantage of the facemask is that it presents as a protruding object within the ready grasp of an opposing player. When the mask 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.[8]

HELMETS- A hard or padded protective hat which are worn by soldiers, police officers, motorcyclists, sports players, and others to protect the skin, skull, brain, central nervous system, and ears of the athlete from abrasion, contusion, laceration, fracture, concussion, unconsciousness, cerebral haemorrhage, brain damage, paralysis and death.

TYPES-

1. Suspension Helmet- it is lined with soft plastic-covered foam that absorbs traumatic forces and possesses the capacity to spring back to original shape.

2. Air Helmet- this has the added safety feature of an inflated bladder to enhance the protection.

CONCLUSION:

Contact sports are a major contributor to the incidence of orofacial injuries. Many athletes are not aware of the implications of such trauma due to sporting activities. Orofacial injuries that occur during sports activities are largely preventable. Mouth protection for athletes is one of dentistry's contributions to sports medicine. It is the responsibility of the dental profession, therefore, to become more active in sports injury prevention programs.

The epidemiology of orofacial injuries undergoes a paradigm shift with changes in equipment and regulations. There is

need to popularize the use of orofacial protective devices in a variety of sports events by interacting with coaches, sports administrators and sports persons as well as familiarizing the Indian dentists in a relatively new field.

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