

## Mouth Guards in Dentistry-A Review

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### Review Article

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#### Article History

Received: 21.09.2018

Accepted: 25.09.2018

Published: 30.09.2018

#### DOI:

10.21276/sjds.2018.5.9.10



**Abstract:** A physically active lifestyle which is essential for a healthy living is achieved by means of sports. However, participation in sports carries risk of traumatic injuries. Of such trauma, dental and orofacial injuries have been reported the commonest. Sports dentistry is a composite branch encompassing aspects of treatment, prevention, education and research in which sports and dentistry come together. Mouth guard an intra oral device, worn over teeth is reported to be the most efficient in protecting such injuries. This article reviews the various dental and orofacial sports injuries, to throw light on Mouth guard, its types and fabrication, awareness and usage among professionals from various sports disciplines.

**Keywords:** lifestyle, sports, oral health, traumatic injuries.

### INTRODUCTION

In today's world everybody is crazy about staying fit and healthy and oneway of achieving it is by means of sports. People participate in sports and related activities for pleasure, relaxation, motivation, competition, improvement of fitness and health. However, participation in sports carries risk of traumatic injuries which may even be fatal, affecting the quality of life of the athlete [1]. Sports activities carry six times higher risk than work related accidents and three times higher risk than traffic accidents [2]. During sports related activities various traumatic injuries are encountered of which dental and orofacial injuries are the most common type during participation [3]. The traumatic dental injuries happen as a result of falls and coming into collisions which frequently happens during sports activities [4].

Younger individuals and contact sports represent an important group in dental trauma etiology [5]. As the number of athletes in contact sports and competitiveness increase, the traumatic accidents in the last few years have also increased thus insisting the need for prevention [6]. However dental trauma in sports differ from other dental trauma as it is possible to easily prevent it by use of protective devices such as mouth guards that protect all dental and periodontal structures [7]. This review article discusses various aspects of sports related dental and orofacial injuries ,the risk factors associated, protection and prevention of traum.

### Dentistry and sports related activities

Traumatic dental injuries in sports are the main link between the sports and dentistry. Castaldi governed the factors such as the popularity, organized youth sports and the high level of competitiveness to be cause of recent rise of prevalence of orofacial injuries during sports activities [8]. About 30 million youth participate

in organized sports programs and all the types have an increased risk of traumatic injuries resulted from fall, collisions, contact with hard substances and related equipment [9].

Gassner and colleagues reviewed craniomaxillofacialtrauma cases presenting to the department of oral and maxillofacial surgery in 10years. Approximately, 3,385 cases with 6,060 injuries were reviewed by them among which, 31.8% of injuries in children were related to sports-related activities. Children between the age group of 7 and 11 years are most susceptible to sports-related traumatic dental Injuries [10]. Muller and colleagues surveyed the incidence of dental injuries in four countries including Switzerland, Austria, Germany and Italy and observed that the anterior teeth are the most commonly affected by dental trauma. The upper incisors are most predisposed to injury (52-90%), due to their anatomical location. The prevalence

Of uncomplicated crown fractures was 44-62.5% [11]. Huang and colleagues documented the highest occurrence of traumatic dental injuries in young male athletes in the age group of 15-18 years [12]. Hill and colleagues found that in some sports, such as cycling, horse riding and skateboarding, the younger age group are most at risk of dental injury because they are learning, but in team sports the highest risk is in young adults aged 20-30 because they play more frequently. The risk of injury also increases with higher levels of competition when players are more committed and probably have more exposure. The risk in cricket is highest in 40-49-year-olds, which is a reflection of the age at which people play cricket and, perhaps, on the slowing of reactions in older players [13]. Soccer is one of the most popular team sports in the world, with roughly 240 million amateur and 200,000 professional players [14]. Despite the popular belief that soccer is not a violent sport, it presents a high risk of injuries compared to athletes, including oral and craniofacial injuries [15]. The risk occurs due to the aggressive defense system, resulting in greater possibility of traumatic accidents [16]. In a study of Gay-Escoda 21.4% of the soccer players were suffering from dental trauma [17].

In 2002, Carlos Henrique Ferrari, studied six different sport modalities: two involved martial arts (judo and jiu-jitsu) and four involved ball games [football (soccer), basketball, handball and skate hockey], in social competitions which took place between March 1998 and November 1999. Groups of athletes with the highest rate of dental traumas were jiu-jitsu, handball and basketball players, respectively, which were the sports presenting the lowest rate of Mouth Guard usage [18].

### Preventive measures

#### Sports dentistry

Dentistry always has an overlook over prevention in any aspect. Sports dentistry is a branch of sports medicine that deals with the composite skills for treatment, prevention, education, and research in which dentistry and sports come together.

#### Mouth guards

The American Society for Testing and Materials has defined a mouth protector as a resilient device or appliance placed inside the mouth (or inside and outside) to reduce mouth injuries particularly to teeth and surrounding structures.



Fig-1: Mouth guard

#### History of mouth guards

Boxing was the first sports activity to use mouth guard. Boxers used devices like cotton, tapes, sponge or small pieces of wood. They clenched these materials between teeth believing that they will act as shock absorbent. However it was thought that the players were distracted in order to keep these materials clenched between teeth and it is also stated that these materials were dislodged from oral cavity and entered larynx. Thus in 1930s the first description of mouth guards came into existence into dental literature [19, 20].

#### Classification of Mouth Guard ASTM (American society of testing and Materials) reapproved the classification for athletic mouth guards as follows

- Type I - Stock Mouth guards. (Least preferred)
- Type II - Mouth formed mouth guards.
- Type III - Custom fabricated (over a dental cast) mouth guards (Most preferred)<sup>[21]</sup>.

#### STOCK MOUTH GUARDS

These are prefabricated and must be clenched between teeth for protection. Clenching a stock mouth guard in place can interfere with breathing and speaking and, for this reason; stock mouth guards are considered by many to be less protective [22].

#### MOUTH FORMED MOUTH GUARDS

Mouth-formed, also known as “boil-and-bite”, mouth guards are made from a thermoplastic material adapted to the mouth by finger, tongue, and biting pressure. Woodansey added that because they are formed at body temperature, they readily distort and wear off. They often lack proper thickness and extension leading to lesser protection and retention [23].

#### CUSTOM MADE MOUTH GUARDS

They are more expensive, most comfortable, best-fitting custom-designed mouth guards recommended by the dentist [24]. Varieties of materials are currently being used for mouth guards, most commonly polyvinyl-acetate-polyethylene copolymer and polyvinyl chloride. Silicone rubber, natural rubber,

soft acrylic resin, and polyurethane are less widely used after immersing the appliance in hot water. ADA has

recommended this type of mouth guard for athletes to prevent sports-related injuries.



Fig 2. Stock mouth guards



Fig 3. Mouth formed mouth Guards



Fig-4: Custom made mouth guards

## FUNCTIONS OF MOUTH GUARD

### Dental and orofacial trauma prevention

It acts as a buffer between hard and soft tissues preventing lacerations, bruising of lips, cheeks and tongue during impact. It also provides a cushioning effect redistributing the force of the blow over all the teeth. Mandible is made elastic preventing fracture to the unsupported angle of lower jaw [25].

- **Concussion prevention**

Stenger *et al.* claimed a benefit for both head and cervical spinal injuries by mouth guard use. They concluded that a mouth guard in situ, there was an altered mandibular position on lateral skull radiographs,

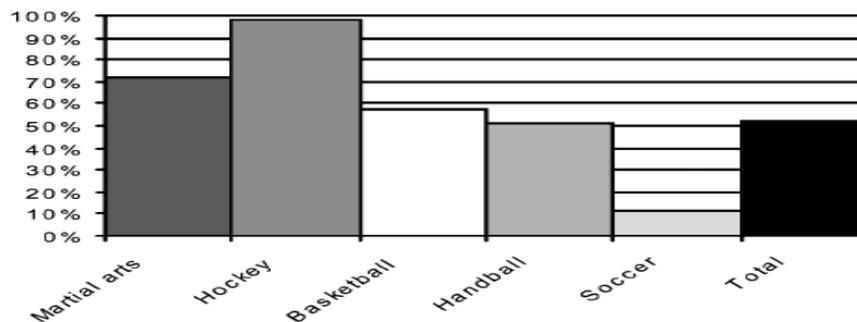
so that the condyles were distracted from their fossae [26].

- **Psychological effect**

Psychologically the player feels more confident that they are less likely to sustain injuries [27].

### Dental trauma and level of information of mouth guard use in different contact sports

2002-A research in Brazil- Findings of an interview taken on 1189 athletes [18]



### BARRIERS TO USE

Apart from cost, other barriers to mouth guard use include problems with retention, speech, nausea, dryness and difficulty in breathing. Girls and lower social groups appear to be less likely to wear mouth protection [28]. Australian amateur football players reported that the primary reasons for not wearing a mouth guard were 'too much hassle' and 'never thought of it' [29]. Student athletes revealed that they preferred custom-made mouth guards to self-adapted types but the cost and the inconvenience of having to make a dental appointment to obtain a custom-made one stopped them from the usage of mouth guards[30].

### CONCLUSION

Thus injuries during sports activities inevitable. Preventive measures can be adopted such that these injuries become less traumatic and also enhance the competitiveness among players. The published researches show mouth guard use during sport activities to consistently offer significant protection against orofacial injuries. However its usage among players is considerably less and thus sports dentistry in conjunction with the respective contact sports associations must mandate the use of mouth guards in all sports activities.

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