

Wearing Sports Mouthguards to Prevent Oral and Maxillofacial Trauma

Chinese Stomatological Association¹

The theme of the academic annual conferences held by the Chinese Stomatological Association from 2021 to 2023 was “Protecting Natural Teeth to Maintain Oral Health” and coincided with the 24th Winter Olympic Games that took place in Beijing in 2022, and thus prevention of oral and maxillofacial trauma once again attracted the attention of stomatological experts and the public. The incidence of oral and maxillofacial trauma caused by sports is around 25% to 34%¹⁻⁵, and varies based on the type of sport and other factors, such as age, sex and the skill level of the participants. The risk of oral and maxillofacial trauma is extremely high in high-confrontation and high-speed sports, especially for children and adolescents. Wearing sports mouthguards when participating in sport is an effective way to prevent and reduce the incidence of oral and maxillofacial trauma in such sports, and is the simplest and most practical method of doing so. Sports have developed and gained in popularity significantly in China in recent years, but the awareness and use of sports mouthguards are low. Based on the above background, the Chinese Stomatological Association advocates that athletes and sport participants should wear mouthguards in various confrontational and high-speed sports, and calls on dental practitioners and sports-related organisations to actively support the popularisation and application of sports mouthguards to prevent or alleviate oral and maxillofacial trauma and to raise awareness and increase knowledge of methods to protect natural teeth.

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Role and use of sports mouthguards

Protective effect of sports mouthguards

Sports mouthguards protect the teeth, periodontal tissues, oral soft tissues, jaws, temporomandibular joints and even the brain by cushioning impact force⁶. Wearing a mouthguard can reduce the incidence and severity of oral and maxillofacial trauma experienced in sport significantly. The protective effects include:

- the ability to absorb and disperse the impact force to prevent or mitigate dental traumas, oral soft tissue injuries, and alveolar bone and jaw bone fractures;
- the ability to stabilise the mandible when subjected to traumatic external force to prevent mandibular fracture or reduce the severity of fracture;

- the ability to cushion the upward impact force on the mandible between the maxillary and mandibular teeth to avoid maxillary and mandibular dental trauma, bone fracture, temporomandibular joint injury and even skull base injury, or reduce the degree of trauma;
- the ability to prevent damage to the oral and maxillofacial soft and hard tissues and temporomandibular joint caused by clenching the teeth during sports.

The protective effect of sports mouthguards varies based on the type, material, method of manufacture, thickness, fit, extension and user compliance.

In addition to directly preventing sports injuries, wearing mouthguards may have additional positive effects for the user. For example, they may enhance the athlete's sense of security and increase the strength of the masticatory muscle, which in turn reflexively increases muscle strength throughout the whole body to improve athletic performance.

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Types and characteristics of sports mouthguards

Prefabricated sports mouthguard

This type of sports mouthguard is prefabricated by the manufacturer and can be purchased directly, available in multiple sizes and at the cheapest price. The disadvantages include the lack of individual suitability, poor retention and stability, poor protection, bulkiness, impact on breathing and speech, and lack of comfort. It is generally not recommended except for emergency or cost considerations.

Mouth-formed sports mouthguard

This type of mouthguard is prefabricated using elastic resin material with thermoplasticity. After softening in hot water, it can be shaped in the mouth with movements of perioral soft tissue, application of finger pressure and biting. It is the most widely used type and can be purchased directly, and it is affordable and easy to use and has a certain protective effect. However, its fit, retention and stability are not optimal.

Customised sports mouthguard

This type of sports mouthguard is designed and made by dental professionals in accordance with the user's dentition morphology, age, type of sport, intensity of sports confrontation and personal preference. It is the preferred type of mouthguard because it offers good retention, stability, fit, protection and comfort, and causes minimal interference with speech and breathing. Due to the difference in intensity of the impact force on the maxillofacial region in different sports, the characteristics of customised sports mouthguards, such as material, thickness and extension, should be designed differently based on the protective requirements.⁷

Indications for use of sports mouthguards

Confrontational or high-speed sports or recreational activities, such as boxing, sparring, wrestling, ice hockey, basketball, lacrosse, rugby, cycling, ice skating, skiing, car racing, parachuting and extreme sports, present a risk of trauma due to the impact forces on the oral and maxillofacial regions. As a result, participants who practise or compete in these activities should wear mouthguards, preferably customised.

Maintenance and replacement of sports mouthguards

Sports mouthguards and the boxes used to store them should be scrubbed using a soft-bristled toothbrush and toothpaste, then rinsed with cold or lukewarm water. Antibacterial agents or denture cleaning tablets can also be used. Mouthguards can be soaked in rigid containers with clear water after being washed, thus avoiding the high temperature of the storage environment. Ultrasonic cleaners can also be used regularly for cleaning.⁸ In the event of obvious abrasion, tears and deformation, the mouthguard should be evaluated by the dental practitioner to evaluate whether it needs to be replaced. It is advisable to replace sports mouthguards every 1 to 2 years. For growing children and adolescents or adolescents undergoing orthodontic treatment, the interval between the replacement of mouthguards should be shortened.

Health education and guidance for wearing sports mouthguards

Public education for sports participants and the public

The reasons why sports participants rarely wear mouthguards may include a lack of understanding of or negligence towards sports traumas, a lack of understanding of sports mouthguards, poor comfort, high cost, and inappropriate selection. Therefore, there is an urgent need to educate and guide sports participants and the public, with the most critical messages being as follows:

- The risks and consequences of oral and maxillofacial trauma in sport should be understood.
- Wearing sports mouthguards can effectively prevent sports trauma or reduce its extent in the oral and maxillofacial region.
- Wearing sports mouthguards is far better than not wearing them. While customised mouthguards are preferred, other types can certainly be effective when worn properly.

Requirements for dental practitioners

Dental practitioners play an important role in sports participants' compliance with the use of mouthguards, and compliance directly affects the effectiveness of their use. The requirements for dental practitioners are as follows:

- to pay closer attention to the prevention of oral and maxillofacial sports injuries and recognise the importance of wearing mouthguards for sports participants;
- to provide professional guidance and services relating to the selection, customisation, use, maintenance and replacement of sports mouthguards;
- to enhance the awareness of and ability to publicise sports mouthguards and encourage the public to maintain oral health and protect their natural teeth while actively participating in sports to strengthen their body and mind.

Strengthening the health education and management responsibilities of relevant departments

Government departments related to health, sports and education should strengthen the publicity of knowledge of this statement to schools, organisers of sports games, sports participants, sports coaches and the media. They should vigorously promote the popularisation and correct use of sports mouthguards in sports activities, especially in high-confrontation and high-speed sports.

The relevant management authorities should develop and supervise systems and rules requiring participants to wear sports mouthguards during high-confrontation and high-speed sports and activities.

Sports coaches should possess the ability to provide athletes with knowledge and methods of preventing and rescuing oral and maxillofacial injuries, and to encourage athletes to wear mouthguards during sports.

The public media should actively cooperate with the popularisation of sports mouthguards to create a positive atmosphere in which the public pays attention to sports and sports trauma, cares for sports participants and uses sports mouthguards.

To avoid or mitigate oral and maxillofacial trauma that occurs in sports as much as possible, to reduce the adverse physiological, psychological and economic consequences for individuals caused by sports trauma, and to reduce the burden on the public healthcare system, sports mouthguards should be promoted vigorously as an effective protective device.

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