

TEMPOROMANDIBULAR INJURIES AND DISORDERS IN SPORT

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Summary

Orofacial injuries are common in sporting activities, depending on type of sport and many other factors. Temporomandibular injuries and disorders have been found in 2 – 6 % of all orofacial injuries cases, and they are the result of macrotraumas and microtraumas of the mandible, the temporomandibular joint and adjacent anatomic structures. The results of such traumas are of different symptomatology and can lead to a temporary or permanent cessation of sporting activity.

Most injuries in sports, including orofacial and temporomandibular disorders, are predictable and therefore preventable. Measures for preventing orofacial injuries and temporomandibular disorders in sporting activities include various types of protection appliances: extraoral, interdental (intraoral) and combined mouth and teeth protectors. Interdental sports guards (mouthguards) can be stock or ready-made, mouth-formed or custom-made mouthguards. These mouthguards, mutually different in quality, play a very important role in prevention of orofacial and temporomandibular tissue injuries. Use of mouthguards significantly reduces the number of orofacial tissue injuries, and also reduces the severity of sustained injuries.

Sports injuries, including those to orofacial and temporomandibular area, regardless of whether they are incurred in recreational or competitive sport, require multidisciplinary approach, both in diagnostics and treatment and in implementation of prevention measures. Sports physicians, coaches, sports officials, parents and athletes themselves, should also be permanently educated on the exceptional importance of prevention measures, thus making the role of dentist in sport unavoidable.

Key words: sport; orofacial injuries; temporomandibular disorders; prevention; custom-made mouthguards.

INTRODUCTION

Orofacial injuries and disorders, including the temporomandibular ones, are very common and can have different etiology; for example they can be the result of sporting activities [1-5].

Since the 1950s, the oral health of athletes has been approached more systematically and consistently [6]. Since then, dentists take part in activities concerning prevention and treatment as experts in multidisciplinary teams of sports medicine. Their task is to help athletes obtain optimal results and maintain good health [7,8].

For these reasons, sports dentistry has been gradually developing for 60 years already as a specific branch of dental medicine, particularly in the USA. The aim of sports dentistry is to deal with diseases, injuries and conditions or occurrences in the temporomandibular system caused by sporting activities. Also, sports dentistry has an advisory and preventive role in that field [9].

The injuries of the temporomandibular system are relatively common and can be incurred in different stages of life, situations and activities. Data from the abundant literature on sports injuries as well as from a larger number of scientific studies in sports dentistry mostly refer to the orofacial region, that is, the area which, in addition to the temporomandibular joint, includes a part of the face, the nose, eyes and ears. Nevertheless, a larger part of the research refers to the injuries and disorders of the temporomandibular region; the results of which are not mutually comparable for different reasons, most of all due to different methodologies [10,11].

According to some studies carried out on the sample of young individuals, injuries resulting from sporting activities amount to 36% of all injuries. Also, in some other earlier studies, it has been observed that one third of all injuries occur during sporting activities. Furthermore, out of all sports injuries, one third occurs in contact sports, leading to the conclusion that most of orofacial injuries occur in noncontact sports [10,12,13].

However, the notion of traumagenic risk in sports has recently changed. Namely, all sports disciplines wherein an object or the body of another athlete can strike the teeth or the jaw (intentionally or unintentionally) were considered risky and therefore require wearing protective appliances. Today however, besides contact sports, every other sporting activity which can cause strain within the orofacial, that is, the temporomandibular system is considered risky [6,10,14].

Nowadays, the faster pace of sports games as well as the need for a more dynamic and aggressive game, particularly during the defensive part of the game, are the cause of more frequent injuries in the course of sporting activities.

It is partly because of more intensive strain in the temporomandibular system, more frequent and forceful contacts and also due to changes in the interpretation of the rules of the game and criteria for infringements in matches of certain sports disciplines [10,15-18].

The origin of sports injuries altogether, including those in orofacial or temporomandibular region, depends on the type, specificity and level of organization of a particular sports discipline as well as on whether the game is a match or a training session and on many other factors: sex, individual traits, age and orthodontic status of an athlete, level of competition, position of the player in team sports, sports season, weather conditions, type of field, etc. In this way, out of all sports injuries, orofacial injuries incurred in basketball amount to 35%, ice hockey 57%, water polo as much as 98% of injuries [10,19-23].

The results of research reveal that the mean value of probability of injury to the orofacial system during one sports season amounts to 10% and during an entire sports career amounts to 33-56% [24-26].

On average, more than 50% of all orofacial injuries are injuries to soft tissues while dental injuries amount to about 40%. All other injuries occur less frequently, that is, in about 10% of cases, including fractures of the jaw, injuries to temporomandibular joint, etc. From the latter, injuries to temporomandibular joint and adjacent anatomic structures occur in about 2-6% of cases, although there is a lack of accurate and reliable data [16,27-31].

TEMPOROMANDIBULAR INJURIES AND DISORDERS IN SPORT

Although the etiology of temporomandibular disorders has not been sufficiently clarified, it is considered to be multifactorial while trauma, even one caused by sporting activity, is reported as one of many possible etiologic factors. Therefore, from the diagnostic procedures' point of view, in etiology of temporomandibular disorders, there is always a possibility of previous orofacial injuries, particularly in the temporomandibular region. Apart from those injuries incurred in traffic, workplace, physical fight, accidents, there are also traumas caused by sporting activities. All injuries and disorders in sporting activities, including temporomandibular ones, occur frequently, regardless of the fitness level, caution and the type of protective appliance. These pathologic conditions occur predominantly in sporting activities such as high risk ones (downhill skiing), contact sports (boxing, rugby) and in extreme sports (weight lifting), [30,32].

The type of sports injury and disorder depends on the mechanism of their origin and in each contact sport there is variability of their form. At the same

time, energy and force vector, the specific effect of transmitting or receiving force, the shape, size and thickness of the traumagenic object should be taken into account. As it has been recently described, there are two basic mechanisms of trauma in development of sports injuries and disorders: macrotraumas or extrinsic factors (acute, forceful, direct blows) and microtraumas or intrinsic factors (recurring, chronic overstrain and overload), both of which can be the result of direct or indirect blows [10,23,32,33].

Temporomandibular injuries and disorders in sport can be caused by direct blows to the temporomandibular region and indirectly by blows into the chin or laterally into the lower jaw wherein the force is transferred into one or both jaws. At the same time, the pathogenic effect of the force can be dissipated and modified by surrounding muscles, articular and extraarticular ligaments, articular disc and capsule, teeth. It should be stressed that a pair of joints plays a significant role in this type of trauma. *Macrotraumas* are the cause of jaw fractures, condylar fractures and dislocations, cranial base fractures, brain concussions, injuries and displacements of the articular disc, intracapsular hemorrhages and edematous changes. *Microtraumas* can cause tendinitis, synovitis, capsulitis, osseous or fibrous ankylosis, articular disc displacement, subluxation and condylar dislocation [10,34,35].

There is a wide range of symptoms including: limited mouth opening, deviations of the lower jaw on mouth opening towards the injured side, malocclusions, noise in the joint, sensation of pain in the joint, muscles and surrounding tissues, inhibited mouth closing (open bite) bilaterally or contralaterally in cases of condylar process fractures and bilaterally and ipsilaterally in cases of articular luxations. Apart from taking medical history and clinical examination, diagnostic procedures include conventional radiologic examination methods, computerized tomography, magnetic resonance and arthrography. It is important to mention that macrotrauma is easily recognised in diagnostic procedure because athletes remember the origin and the effects of the trauma and they accurately refer to them later in their medical history. However, they generally do not notice or remember microtraumas so that they do not refer to them in medical history, which can result in wrong diagnosis, treatment and prognosis of certain cases of sports injuries and disorders. Treatment procedures are complex and include, depending on the type of injury and disorder, manual repositioning of the condyle, immobilization of the jaws, limited mouth opening during at least one week, soft food diet, warming up the injured area, anti-inflammatory medications, analgesics, sedatives, myorelaxants, anesthetics, acupuncture and, less commonly, surgical procedures under general anesthesia.

The use of custom-made mouthguards is recommended during the treatment which ensures a more appropriate position of the condyle in the articular fossa. It is important to note that chewing gum should be avoided during this period due to its harmful effects on recovery. Rehabilitation procedures imply passive mouth opening exercises using tongue spatulas during a longer period of time, thermotherapy, electrostimulation, iontophoresis as well as ultrasound procedure. Such symptomatology and treatment procedures undoubtedly result in a temporary or permanent cessation of sporting activities, that is, a limitation on those activities [10, 33-36].

PREVENTIVE MEASURES

In sports, risk from injury should be limited or completely diminished. Most of sports injuries occur from predictable reasons and therefore preventive measures can be taken. Prevention and adequate training of athletes are essential elements for reducing injuries related to sport. Good psychological health and physical fitness of athletes, technical and tactical training, experience and selection of adequate equipment and protective appliances affect the occurrence of injuries. Appropriate sporting activities should be chosen and at the same time it is important to obey the rules of a sports discipline. Therefore, coaches have a very important role as well as doctors, parents and the athletes themselves [10,33,37].

As early as in 1952, there were papers on the need to protect the orofacial system, not only in boxing and American football, but also in other sports such as ice hockey, basketball and car racing, thus significantly reducing the occurrence of orofacial injuries, that is, as much as 50 times [6,10].

By obligatory use of mouthguards in American football, which was introduced by the Rules Committee of the National Football League in 1962, the occurrence of orofacial system injuries was considerably reduced, that is from 50% of all injuries to only about 1.4%. Similar success was achieved in ice hockey by introducing such measures in 1977. However, even such tremendous success in preventing this type of injuries did not encourage the respective authorities to introduce obligatory use of mouthguards in many other sports [10,38].

Members of the *Academy for Sports Dentistry* in the USA consider the use of mouthguards in American football, boxing, ice hockey and martial arts an obligatory preventive measure. Participants in other sports which are traditionally considered as non-contact sports, such as basketball, baseball, cycling, rollerblading, football, wrestling, squash, surfing and windsurfing should also wear

interdental mouthguards. Around 40 of these sports disciplines are mentioned in the instructions of this Academy [9].

With regards to increased risk of orofacial (temporomandibular) injuries and disorders, *American Dental Association* also recommends the use of mouthguards in a larger number of sports disciplines: acrobatic gymnastics, basketball, boxing, field hockey, football, American football, gymnastics, handball, ice hockey, fencing, martial arts, squash, rollerblade hockey, rugby, shooting, skateboarding, skiing, parachuting, hang gliding, surfing, volleyball, water polo, weight lifting and wrestling [39].

In 1990, *World Dental Federation* (FDI) classified sporting activities into two risk groups in which the protection of the orofacial system was recommended [40], (Table 1). *American Academy of Pediatrics* classified sports disciplines in a more complex way with regard to the importance of orofacial system protection [41], (Table 2). In general, instructions of this type as well as the data point to the need for more efficient informing and motivating of athletes, people around them and the general public.

Table 1. Sports according to the risk level by *World Dental Federation* – FDI (adopted from ref. 40)

HIGH RISK SPORTS	MODERATE RISK SPORTS
Boxing (Queensberry rules)	Basketball
Boxing (free styles)	Diving
Football	Gymnastics
American football	Parachuting
Ice hockey	Equestrianism
Field hockey	Squash
Martial arts	Water polo
Rugby	Handball
Ice skating	Cricket
Hang gliding	Baseball

SOME GENERAL INFORMATION ABOUT MOUTHGUARDS

When prevention of orofacial injuries is discussed, it is considered to be primary prevention, which is preventing injuries from occurring or becoming more severe. Primary prevention of orofacial sports injuries includes the use of different types of preventive appliances: helmets, face masks, face shields and mouthguards. The wear of mouthguards during sporting activity is recommended to all athletes involved in any high risk sports discipline whereas in some

Table 2. Sports according to the risk level by *American Academy of Pediatrics* (adopted from ref. 41)

CLASSIFICATION	SPORTS DISCIPLINE
Contact/ Collision	Boxing, field hockey, football, ice hockey, lacrosse, martial arts, rodeo, American football, wrestling
Limited contact / Impact	Baseball, basketball, cycling, diving, gymnastics, equestrianism, skateboarding, skiing, softball, squash, volleyball
Strenuous Non-contact	Acrobatic dance, fencing, running, swimming, tennis, weight lifting, track & field,
Moderately Strenuous Contact	Badminton, curling, table tennis
Mild Contact	Archery, golf, shooting

sports such as boxing, hockey, American football and skiing, the use of protective appliances has become obligatory [42].

Additionally, orofacial injuries are the reason for irregular participation or cessation of sporting activities. It is important to bear in mind the fact that the loss of teeth leads to permanent functional, esthetic and psychosocial deficiency in athletes causing large expenses for treatment and subsequent prosthodontic rehabilitation. Therefore it is more cost-effective and simple to take care of timely protection of the orofacial system and about the fabrication of adequate protective appliances. Preventive measures for orofacial sports injuries include the use of different types of protective appliances. Mouthguards fall into three groups (Table 3). The first group consists of *extraoral mouthguards* in the form of a wire cage or basket which is attached to the athlete's head or protective helmet. The second group consists of *interdental* (intraoral) *mouthguards*, placed in the mouth, within the dental arches, and their form corresponds to the shape of the dental arch, most commonly of the upper jaw to which they are attached. The

Table 3. Types and subtypes of mouthguards (adopted from ref. 43)

Type of mouthguard	Description
<i>Extraoral</i>	Attached to the helmet or the head.
<i>Interdental</i>	Type I <u>Stock mouthguards</u>
	Type II <u>Mouth-formed mouthguards</u>
	Type III <u>Custom-made mouthguards</u>
<i>Combined</i>	Intraoral and extraoral part attached to the helmet.

third group consists of *combined mouthguards* which have an intraoral part (tooth protection) and an extraoral part (lip protection). The extraoral part is usually attached to the helmet. All the above mentioned mouthguards are of different quality and have an important role in prevention of injuries to the orofacial tissues [10,43-46].

INTERDENTAL MOUTHGUARDS

In most sports disciplines, protection of the entire face is not possible, for example by helmets, facial masks or shields (*extraoral* or *combined mouthguards*). This type of protection is an exception to the rule. Efficient prevention of teeth, jaws, joints and soft tissues' injuries can be achieved by well adapted *interdental* (intraoral) *mouthguards*. First mouthguards of this kind were used in 1913. At first they were used only in boxing, whereas the materials, different methods of fabrication, types and forms were more seriously investigated into only in the second half of the 20th century, primarily in the USA [6,10], (Figure 1).

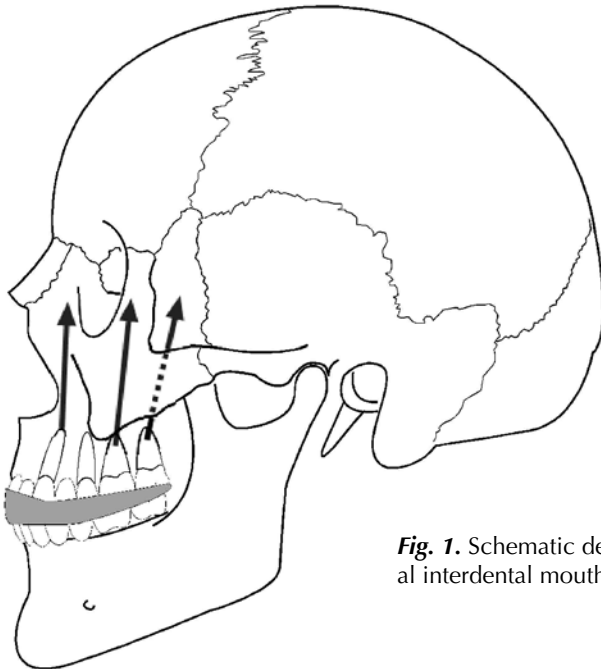


Fig. 1. Schematic design of the monomaxillary individual interdental mouthguard.

The use of *interdental mouthguards* significantly reduces the number of orofacial, that is, temporomandibular injuries. At the same time, the severity of inju-

ries is significantly reduced. *Interdental mouthguards* have multiple roles [8,42,47-51]:

1. Protection of surrounding tissues (cheeks, lips and tongue) from being injured by sharp dental edges, especially of the upper jaw;
2. The use of mouthguards reduces the possibility of fractures and luxation of the anterior teeth due to direct blows and the posterior teeth due to sudden mutual impacts of the upper and lower dental arches caused by trauma;
3. To greatly reduce the possibility of the upper jaw fracture as well as body and lower jaw condylar process fracture by dissipating and absorbing the impact force;
4. By dissipating the effects of impact force, mouthguards also prevent lower jaw condylar displacement towards the cranial base, thus reducing the risk of surrounding osseous tissue structure's deformities and intracranial pressure (Figure 2);
5. By dissipating the transfer of impact force, mouthguards reduce the possibility of brain concussion and injuries of cervical spine. Namely, upon impact on the lower jaw, due to close contact between dental arches and the interdental mouthguard, there is additional activation and contraction of head and neck muscles thus increasing resistance to rotational forces which are exerted;
6. Increasing the athletes' self-esteem so that they can focus on quality performance.

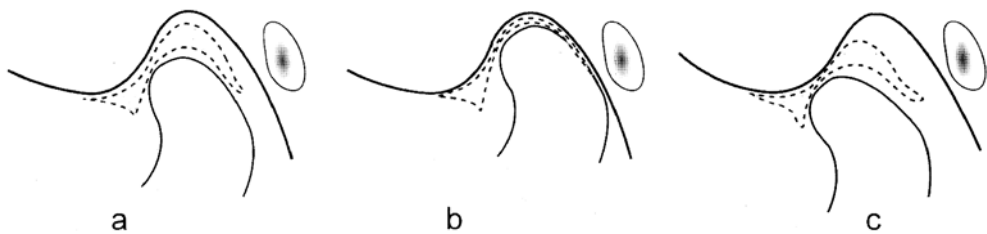


Fig. 2. Position of the condyle on closed mouth position (a), upon blow to the lower jaw (b), and with interdental mouthguard *in situ* (c).

Interdental mouthguards are the most efficient protective appliance in prevention of orofacial and temporomandibular sports injuries and disorders. Three types of such mouthguards are used, out of which the second has two subtypes. Considering the advantages and disadvantages of all the above mentioned mo-

uthguards, it should be stated that custom-made mouthguards are the most efficient ones (Table 3; Figure 2).

Type 1: Stock mouthguards (over-the-counter appliances) are most widely used although they are the least efficient. They are sold in different colors and sizes. They are ready-made and used as such. They are made of rubber or polyvinyl chloride. They are the least adapted to the mouth and dental arches of all existing mouthguards and therefore they obstruct breathing and speech. They are insufficiently attached to the upper jaw teeth where they are usually positioned and the lower jaw teeth keep them in place. They fall out easily, provoking gag reflex. Consequently, they are used in closed mouth position which has adverse effects on the athlete's breathing and concentration. They are also inappropriate for hygiene maintenance.

Type 2: Mouth-formed mouthguards are over-the-counter protective appliances which adapt in the mouth (subtype a) or on a cast (subtype b) after having been softened by heating in water (*boil and bite*).

- a) *The first subtype of mouth-formed mouthguards* can be bought in shops and is available in different colors and sizes and their purpose and shapes also vary. They are made of polyvinyl and intended for different adaptations. The mouth-forming should be performed by a dentist and not by athletes themselves. This type of mouthguard is personalized by heating the mouthguard material and coating its base with other materials as well as by other procedures. If they are properly adapted, they can be adequate protection from orofacial injuries. The advantages of these mouthguards are their price and quick fabrication. The retention is good, at least in the beginning, so the mouthguard does not fall out on mouth opening. Nevertheless, their retentive force diminishes over the time. Athletes often adjust these types of mouthguards themselves and as a result, the flaws in such cases are often the consequence of unprofessional use.
- b) *The second subtype of mouth-formed mouthguards*, which are sold over the counter, are formed on plaster casts of the athletes' jaws and not in the mouth as the first subtype. It is as equally functionally valuable as the first subtype of over-the-counter mouthguards. For its fabrication, plaster casts of the upper and lower jaw are necessary. The most precise and optimal adaptation of these mouthguards is achieved by using plaster casts in an articulator, a device which imitates both jaws and the movements of articular joints.

Type 3: Custom-made mouthguards offer the best kind of protection. They are fabricated in dental offices or dental laboratories ensuring a more harmonized

relationship with the dental arch, better absorption of a blow and distribution of forces. They are made of different materials and shaped on an individual plaster cast. *Custom-made mouthguard* has a higher degree of retention on the teeth compared with the first two types of mouthguards and adheres well to the oral tissues. This type of mouthguard is the most comfortable for wear; it does not obstruct breathing and speech thus making the athlete more focused on the sporting activity. The shape of the mouthguard can vary, depending on the sports discipline in which it is used. Mouthguards fabricated in this way are especially suitable for the athletes who wear fixed orthodontic appliances as well as for those who are missing some teeth. Their main disadvantage is the long period of fabrication, with at least two visits to the dentist, which results in larger expenses compared with stock or mouth-formed mouthguards. *Custom-made mouthguards* can be *monomaxillary* or *bimaxillary*. *Monomaxillary mouthguard* has retention on one jaw, generally on the upper jaw, except in the case of prognathism when it has retention on the lower jaw (Figure 1). *Bimaxillary mouthguard* has retention on dental arches of both jaws wherein normal breathing must be ensured and for this purpose the mouthguard has one or more openings in its central part between dental arches of the upper and lower jaw [4,33,47].

Properties of the materials mouthguards are made of are an important factor of their efficiency. They should be made of resilient materials which are easily washed, cleaned and disinfected. Materials should be biocompatible, nontoxic and should not provoke allergic reactions. They should have the appropriate mechanical, physical and biological properties in order to successfully absorb and distribute energy thus softening blows and preserving structures of oral tissues. It is important that they be made of bright colored materials in order to notice them more easily on the sports ground when they fall out from the mouth. These days, for this purpose, various materials are used: polyvinyl acetate polyethylene copolymer, ethylene-vinyl, acetate copolymer, soft acrylates, silicones, polyvinyl chloride, etc. Depending on sports discipline, anatomic features of the athlete's jaw as well as the type of mouthguard material, their thickness varies from 3-4 mm, which achieves a satisfactory level of absorption, distribution and dissipation of the impact force. For high risk sports, mouthguards up to 6 mm thick are recommended although they are less comfortable and accepted. Fabrication methods of this type of mouthguard are different. They can be made of one or two layers of material, combination of a soft and hard layer, as well as of materials of different colors. Their fabrication technology employs vacuum technique or pressure technique as well as thermal, polymerization (conventional or injection) and light-curing procedure and their combinations, depending

on the material, type of sporting activity and individual characteristics of the jaw. The most common complaints refer to insufficient retention of the mouthguard on the dental arch, their mobility and size, which provokes a gag reflex as well as breathing and speech difficulties. Mouthguards of the first and, less often, second type, accompanied by poor hygiene, acquire a bad taste and smell. Furthermore, due to the type of material, durability of the first and second type of mouthguards is relatively short whereas custom-made mouthguards can last from 1 to 3 years. In younger population of athletes, there is a problem of more frequent replacement of mouthguards due to quick changes of the jaws and the dental arch of mixed dentition. Although custom-made mouthguards are considered the best regarding the number of flaws, one of the reasons for complaints is the frequency of visits to the dentist because of examination, fabrication, adaptation and maintenance, which requires additional time and expenses. According to data from earlier research, stock and mouth-formed mouthguards are used by about 90% of mouthguard users in the USA and only 10% of users wear custom-made mouthguards. The authors report that this is the result of the lack of information as well as of the athletes' and especially coaches' perception of mouthguard quality [6-10,14,39-52].

Experience and evidence suggest that *custom-made mouthguards* provide the best protection and comfort. *Mouth-formed mouthguards* ('boil-and-bite') are less adequate, and *stock mouthguards* provide the lowest quality of protection and wearer's comfort. Participants of all ages, genders and skill levels are at risk of sustaining orofacial injuries at both recreational and competitive levels of sports. Traumatic orofacial injuries also occur in non-contact activities and exercises. Studies have consistently shown that *custom-made mouthguards* with adequate labial and occlusal thickness offer significant protection against injuries by providing a resilient, protective surface to distribute and dissipate impact forces, but there is, however, insufficient evidence to confirm that mouthguards prevent concussion injuries [53-56].

World Dental Federation (FDI) recommends to the national dental associations, dental schools, other institutions and individuals to promote to the public and to oral health care professionals the benefits of sports mouthguards, including the prevention of orofacial injuries. Appropriate oral health care professionals are advised to determine if their patients participate in any sports, or any activities which carry a risk of oral injury, and should inform people of all ages to use a mouthguard while participating in any such sports or activities. Patients should be also educated about the benefits of mouthguards in preventing orofacial injuries, including appropriate guidance on mouthguard types, their protective properties, costs and maintenance requirements [57].

It should be mentioned that in Croatia there are still no rules concerning the obligatory use of mouthguards and carrying out of preventive measures in athletes although the protection of orofacial system and sports dentistry have been developing systematically for more than half a century. Orofacial sports injuries are also included on the list of dental pathology in the international classification of diseases [58]. This is a flaw from both the sports and the health point of view. However, it should be pointed out that it is more important to increase the athletes and the general public's level of awareness about the importance of the use of mouthguards than just to rely on mere introduction of regulations [41].

CONCLUSION

Sports injuries, including temporomandibular injuries and disorders, regardless of whether they are incurred in recreational or competitive sport, require a multidisciplinary approach, both in diagnostics and treatment as well as in preventive measures.

In order to reduce the frequency of injuries in sports, legal policies should be modified and preventive measures should be carried out while participating in sports. These measures include constant sharing of information, professional counseling and timely fabrication of adequate mouthguards.

Not only the athletes themselves, but also coaches, sports physicians, parents and everyone else involved in sports as well as the general public should continuously be informed about the great importance of preventive measures in this field thus making the role of dentists in sports essential.

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Sažetak

Temporomandibularne ozljede i poremećaji u sportu

Ozljede orofacijalnog sustava u sportu su učestale, ovisno o vrsti sportske discipline te drugim okolnostima. Temporomandibularne ozljede i poremećaji čine oko 2 do 6% svih orofacijalnih ozljeda, a rezultat su makrotrauma i mikrotrauma donje čeljusti, čeljusnog zgloba i okolnih anatomskih struktura. Posljedice takvih trauma raznovrsne su simptomatologije, koje mogu biti uzrokom privremenog ili trajnog prekida bavljenja sportom.

Većina ozljeda u sportu, pa tako i onih orofacijalnih te temporomandibularnih poremećaja, nastaje iz predvidivih razloga i na njih se može preventivno utjecati. U preventivne mjere spada korištenje različitih oblika zaštitnih sredstava: ekstraoralnih, interdentalnih (intraoralnih) i kombiniranih štitnika za usta i zube. Najširu uporabu imaju interdentalni štitnici, a oni mogu biti gotovi, polugotovi ili individualno izrađeni. Imaju raznovrsne uloge u sprječavanju ozljeda orofacijalnih tkiva u sportu, a korištenjem takvih štitnika učestalost se i težina orofacijalnih, odnosno temporomandibularnih, ozljeda znatno smanjuje.

Sportske ozljede, pa tako i one orofacijalnog sustava, bez obzira na to nastaju li u rekreativnom ili natjecateljskom sportu, zahtijevaju multidisciplinarni pristup, kako pri dijagnostici i liječenju, tako i u provođenju preventivnih mjera. Sportski liječnici, treneri, sportski djelatnici, roditelji i sami sportaši trebali bi se trajno educirati i upućivati u iznimnu važnost preventivnih mjera, pri čemu je uloga stomatologa u sportu nezaobilazna.

Ključne riječi: sport; temporomandibularne ozljede; temporomandibularni poremećaji; prevencija; individualni interdentalni štitnici.

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