Psychiatria Danubina, 2014; Vol. 26, Suppl. 3, pp 490-497 *Original paper*

OROFACIAL INJURIES REPORTED BY PROFESSIONAL AND NON-PROFESSIONAL BASKETBALL PLAYERS IN ZAGREB AND ZAGREB COUNTY

Davor Seifert[1], Nikolina Lešić[1] & Zvonimir Šostar[2]

[1]*Private Dental Practice Seifert, Zagreb, Croatia*

[2]*Andrija Stampar Teaching Institute of Public Health, Zagreb, Croatia*

SUMMARY

Background: *Injuries are common during sport activities, a part of which is also injuries to the stomatognathic system. According to the data from literature orofacial injuries are frequent, but relatively minor. World Dental Federation has listed basketball as a medium-risk sport in sustaining orofacial injuries. The purpose of this investigation was to determine incidence, type and severity of orofacial injuries during basketball and frequents of mouthguard use.*

Subject and methods: *The sample consisted of 195 athletes who actively participate in basketball, 60 amateurs/non-professional and 135 professionals.*

Results: *A total of 2 265 injuries to the stomatognathic system were documented in this research; 200 (8.8%) of those injuries refer to the non-professionals and 2 065 (91.2%) to the professionals. The most common injuries are lacerations and contusions of soft tissue (a total of 2 208 or 97.5%), followed by dental injuries (a total of 57 or 2.5%). Out of all recorded laceration injuries 59.8% lacerations of soft tissue occurred during practice (12.6% amateurs and 87.4% professionals), while 40.2% of them occurred during games (2.5% amateurs and 97.5% professionals). Of a total of 57 dental injuries recorded during an athletes career, in 78.9% it were the professionals who suffered an injury, and in 21.1% of them the amateurs. Out of a total of 195 basketball players only 1% (2 players - one professional and one amateur) frequently used mouthguard during practice and games, while 93.3% of them never tried to wear a mouthguard. Such low percentage of mouthguard use in basketball players reflects poor awareness and education of athletes and coaches, as well as insufficient role of dentists in education.*

Conclusions: *Orofacial injuries during basketball are not severe (80% lacerations), and therefore do not stimulate the use of a protecting devices even their use will totally diminish this type of injuries.*

Key words: *orofacial injuries - basketball players – professional - amateurs/non-professional*

* * * * *

INTRODUCTION

Based on continuous research many authors have come to the conclusion that the increased popularity of sports and exercising, apart from being beneficial to developing healthy habits, also results in a larger number of injuries (Torg et al. 1985, Powell et al. 1987, Helmrich et al. 1991, Sarna et al. 1993, Fentem et al. 1994, Kujala et al. 1994). The increased risk of sports-related injuries also results from an increase in the number of people participating in sports (Williams et al. 1998). Every sport is associated with its own specific injuries (Kujala et al. 1995), which includes injuries to the stomatognathic system (Jerolimov & Jagger 1997, Jerolimov & Carek 1997, Jerolimov & Seifert 1999). As early as in 1951, Cathcart (Cathcart 1951) described the necessity of protecting the stomatognathic system, not only during boxing or in American football, but also in other contact sports, such as: ice hockey, basketball and car racing. In the 1960s Moon and Mitchell (Moon & Mitchell 1961) stated that 10% of athletes in contact sports injured their stomatognathic system during just one season, while such injuries occurred in 33% to 56% of these athletes over the course of their entire career (Clegg 1969). Chapman (Chapman 1986), Braham et al. (Braham et al. 1997), Harmer (Harmer 2005) as well as dos Santos and Monte Alto (dos Santos & Monte Alto 2006) confirm this claim, emphasizing the possibility for prevention by wearing custom-made mouthguards. In 2003 Corwell et al. (Corwell et al. 2003) proposed that similar injury evaluations and the role of mouth-guards are extremely important in the development and implementation of guidelines for using protective equip-ment in basketball. Kumamoto and Maeda (Kumamoto & Maeda 2005) proposed that introducing mouthguard programs for athletes of all ages and genders who participate in basketball might help to reduce the incidence of dental trauma. Yeşil Duymuş and Gungor observed that in Turkey the use of mouthguards is rare, therefore it should be the joint duty of dentists, sports physicians, and coaches to encourage the use of mouth-guards during training and sport activities. Doctors and dentists need to recommend a more intensive education of students in sports medicine and sports dentistry (Yeşil Duymus & Gungor 2009).

Basketball is considered to be one of the most dynamic sports considering intensity throughout the entire forty minutes of the game, so basketball players need to possess a wide range of basic and specific functional and physical skills. Playing the game requires explosive strength, coordination in the execution of specific physical tasks, spatial orientation, agility in efficient dealing with new situations, the speed of the neuromuscular reaction and the speed of the movements

themselves (http://www.inet.hr/~ivdzolic, Matković & Matković 1996). Basketball is played on a relatively small court with constant contact among the players. Frequent contacts in the heat of the game often result in both intentional and unintentional injuries (Grujić et al. 1989). According to Whiteside, Zaricnyj et al. and Zelisko et al. (Whiteside 1980, Zaricznyj et al. 1980, Zelisko et al. 1982) the incidence of head, neck and orofacial injuries in basketball players varies from 10.3% to 12.7%. The FDI World Dental Federation places basketball into the category of medium-risk sports as far as the incidence of injuries to the stomatognathic system is concerned (FDI 1990). Contrary to the position of the FDI World Dental Federation, Morrow and Kuebker (Morrow & Kuebker 1986) have established that the incidence of injuries to the stomatognathic system is greater in basketball and soccer than in American football, which is, according to the FDI, a high-risk sport. In another research Newsome and associates (Newsome et al. 2001) demonstrate that dental injuries do not occur only in contact sports, such as rugby and hockey, but also in sports that may at first seem less dangerous, such as basketball. Garon et al. (Garon et al. 1986) point out that a large number of injuries to the stomatognathic system as well as a large number of concussions occur during baseball, basketball and amateur American football games, whereby they also state that 52% of injuries to the stomatognathic system result from taking part in some other sport, besides American football. Many authors (Backx et al. 1989, McLain & Reynolds 1989, Chan et al. 1993, Teo et al. 1995, Love et al. 1998, Stevenson et al. 2000) have compared injuries to the stomatognathic system in basketball with injuries in other sports and have noticed that the incidence of injuries is greater in basketball than in other sports. Their conclusion is further elaborated by McNutt et al. (McNutt et al. 1989) who have collected data on sports-related injuries over the course of three years and have subsequently matched the injuries to the stomatognathic system with different kinds of sports. They state that 40% of injuries refer to dental injuries of athletes practicing basketball and baseball, sports where there is no mandatory use of mouthguards. This is supported in research by Lee-Knight et al. (Lee-Knight et al. 1992) who recorded the largest percentage of injuries to the stomatognathic system during the Canada Games in wrestlers and basketball players, as well as in female athletes participating in basketball and field hockey. None of the athletes who injured their stomatognathic system during the competition wore a mouthguard. The analysis of sports-related injuries shows that in 51% of the cases, the responsibility for the injury rests with the athlete. This is mostly the result of carelessness, fatigue, bad physical shape or poor technique.

Someone else, an opposite team player, intentionally or unintentionally causes an injury in 28% of all cases. These are mostly severe knee injuries, bone fractures or head injuries. Other causes, such as equipment, field conditions, footwear, clothes and others will result in an injury in 21% of the cases (Grujić et al. 1989).

There is insufficient data on the injuries to the stomatognathic system in the Republic of Croatia, which is why the purpose of the research is to establish the representation and the severity of the injuries to the stomatognathic system in a selected sample of basketball players from the City of Zagreb and Zagreb County.

SUBJECTS AND METHODS

The sample consists of 195 athletes who actively participate in A1 and A2 basketball league in Croatia, including members of the National Basketball Team, as well as basketball amateurs/non-professionals. All of the athletes are male, aged between 16 and 49 years and all of them come from the City of Zagreb or Zagreb County. Before a questionnaire survey was conducted, the athletes were given instruction and direction for the purpose of the survey. The athletes filled out the questionnaire in person, with the help of a researcher. All of the questioned athletes were placed into categories of amateurs and professionals. In total, 60 amateurs and 135 professionals were interviewed (Table 1). Amateurs and professionals do not differ in terms of age in a statistically significant manner; the amateurs are in average 20.3 years old, whereas the professionals are 21.3 years old. Also, the average number of years spent actively playing basketball does not differ significantly, either. Until this survey was conducted, the amateur players had played basketball for 7.0 years, while the professionals had been playing for a statistically insignificantly longer period of 8.2 years. (Table 2).

Table 1. Structure of sample

Athletes	Number of players
Amateurs	60
Professionals	135
Total	195

Table 2. Average age and years of pracitcing basketball non-professionals and professionals

Athletes	Age	Year of practice
Amateurs	20.3	7.0
Professionals	21.3	8.2

RESULTS

A total of 2 265 injuries to the stomatognathic system were documented in this research; 200 (8.8%) of those injuries refer to the amateurs and 2 065 (91.2%) to the professionals. The most common injuries are lacerations and contusions to the oral soft tissues (a total of 2 208 or 97.5%), which amounts to an of average 11.32 lacerations per athlete per career, followed by dental injuries (a total of 57 or 2.5%) (Table 3). As far as lacerations to oral soft tissues are concerned, the most common injuries are lip lacerations 1 424 (64.5%), followed by 418 (18.9%)

Table 3. Injuries of the orofacial system

Athletes	Laceration	Dental injuries	Total
Amateurs	188	12	200
Professionals	2020	45	2065
Total	2208	57	2265

lacerations to the inner lining of the cheek, and 366 (16.6%) tongue lacerations (Table 4). The results of this research show that there is a difference between the total number of lacerations to oral soft tissues in the amateurs category, 8.5%, which is in average, 3.13 injuries per amateur per career (Table 5) and the professional category, 91.5%, which is an average of 14.96 laceration injuries per professional per career. Out of 135 professionals only 27.4% of them have not suffered a lip laceration during practice and 32.6% during a game. Only 44 athletes suffered an injury to the inner lining of the cheek during practice and 32 of them during a game, whereas 44 of them injured their tongue in practice and 35 of them in a game. It should be noted that among the interviewed professionals none of them had been injured on only one occasion, and only one amateur had been injured only once. During the course of his career one athlete had suffered as many as 80 lacerations to oral soft tissues (Table 6).

Out of all recorded laceration injuries 59.8% lacerations to oral soft tissues occurred during practice, while 40.2% of them occurred during games. Furthermore, during practice the amateurs suffered 12.6% of the lacerations to oral soft tissues, and the professionals 87.4%, while during games the amateurs suffered 2.5%, and the professionals 97.5% of lacerations.

A total of 57 dental injuries were recorded in this investigation, which were distributed as follows: 78.9% of the injuries occurred in professionals, and 21.1% in amateurs. More dental injuries occurred during practice 54.4% than during games 45.6%. A total of 44 of dental injuries were reported in this investigation, out of which 23 were tooth fractures occurring during practice, and 21 during games. One interviewee had a fracture of no less than four teeth on a single occasion, while 12 basketball players have each had one tooth fracture during the course of their career (Table 7). Out of 64 medically treated injuries to the stomatognathic system, as many as 48 (75%) of them were dental injuries treated by doctors of dental medicine, while 16 (25%) of them were treated by doctors of medicine (Table 8). Out of a total of 195 basketball players 93.3% of them had never tried to wear a mouthguard, while only 6.7% (13 players – 4 amateurs and 9 professionals) had at some

Table 4. Laceration of soft tissue

Athletes	Lip lacerations		Internal cheek lacerations		Tongue lacerations		Total	
	N	%	N	%	N	%	N	%
Amateurs	119	63.3	27	14.4	42	22.3	188	100.0
Professionals	1305	64.6	391	19.4	324	16.0	2020	100.0
Total	1424	100.0	418	100.0	366	100.0	2208	100.0

N - number of athletes

Table 5. Number of lacerations reported by amateurs on practice and games during career

Number of injuries		Laceration of soft tissues on amateurs athletes					
		Lips (p)	Lips (g)	Cheeks (p)	Cheeks (g)	Tongue (p)	Tongue (g)
0	N	39	51	51	60	48	59
	%	65.0	80.0	85.0	100.0	80.0	98.3
1	N	6	3	3		2	1
	%	10.0	5.0	5.0		3.3	1.7
2	N	3	3	3		4	
	%	5.0	5.0	5.0		6.7	
3	N	1		1		1	
	%	1.7		1.7		1.7	
4	N	3	3			2	
	%	5.0	5.0			3.3	
5	N	1		1		2	
	%	1.7		1.7		3.3	
6	N	2					
	%	3.3					
10	N	4		1		1	
	%	6.7		1.7		1.7	
14	N	1					
	%	1.7					

N - number of athletes; p – during practice; g – during games

Table 6. Number of lacerations reported by professionals on practice and games during career

Number of injuries		Laceration of soft tissues on professional athletes					
		Lips (p)	Lips (g)	Cheeks (p)	Cheeks (g)	Tongue (p)	Tongue (g)
0	N	37	44	91	103	90	100
	%	27.4	32.6	67.4	76.3	66.7	74.1
1	N	11	20	11	6	10	10
	%	8.1	14.8	8.1	4.4	7.4	7.4
2	N	18	11	8	6	13	11
	%	3.3	8.1	5.9	4.4	9.6	8.1
3	N	13	17	8	5	7	4
	%	9.6	12.6	5.9	3.7	5.2	3.0
4	N	1	5	3	2	2	3
	%	0.7	3.7	2.2	1.5	1.5	2.2
5	N	17	15	2	3	7	2
	%	12.6	11.1	1.5	2.2	5.2	1.5
6	N	4	4	1	3	2	1
	%	3.0	3.0	0.7	2.2	1.5	0.7
7	N	3	1				
	%	2.2	0.7				
8	N	3		1			
	%	2.2		0.7			
9	N	1	1				
	%	0.7	0.7				
10	N	13	8	6	5	1	1
	%	9.6	5.9	4.4	3.7	0.7	0.7
12	N	1	1				
	%	0.7	0.7				
15	N	4	3	3	1	2	2
	%	3.0	2.2	2.2	0.7	1.5	1.5
20	N	5	3				
	%	3.7	2.2				
30	N	1		1	1	1	1
	%	0.7		0.7	0.7	0.7	0.7
35	N	1					
	%	0.7					
50	N	1	1				
	%	0.7	0.7				
80	N	1	1				
	%	0.7	0.7				

N - number of athletes; p – during practice; g – during games

Table 7. Dental injuries

Athletes	Broken teeth		Loosened teeth		Avulsed teeth		Total
	Practice	Game	Practice	Game	Practice	Game	
Amateurs	7	2	0	2	1	0	12
Professionals	16	19	6	2	1	1	45
Total	23	21	6	4	2	1	57

Table 8. Treatment of injuries

Athletes	Doctor of Dental Medicine	Doctor of Medicine	Total
Amateurs	11	2	13
Professionals	37	14	41
Total	48	16	64

Table 9. Mouthguard use

		Practice		Games	
		N	%	N	%
Try to wear a mouthguard	Yes	12	6.2	9	4.6
	No	183	93.8	186	95.4
	Total	195	100.0	195	100.0
Regularly use of mouthgurad	Yes	2	1.0	1	0.5
	No	193	99.0	194	99.5
	Total	195	100.0	195	100.0

N - number of athletes

point tried to wear a mouthguard (Table 9). In addition to that, out of a total number of players (195) no less than 99% do not use a mouthguard on a regular basis, and only 1% (2 players – one professional and one amateur) use a mouthguard regularly during practice and games. The players who did use a mouthguard mostly used a type II mouthguard– boil and bite mouthguard (10 players – 3 amateurs and 7 professionals), while the type III – custom-made mouthguard, was only seldom used (3 players: 1 amateur and 2 professionals).

DISCUSSION

A great number of lip lacerations can be easily explained by anatomical reasons. At the point of receiving a direct blow to the stomatognathic system the lips are the first to be affected; this is further aided by the shape of the lips (slightly protruding outwards), their structure (delicate and soft mucous membrane of the lips, friable tissue) and their positioning (leaning against the teeth), whereby the layout of teeth and the position of the incisal edge to the lips result in different kinds of lip lacerations. Wearing a fixed orthodontic appliance in general causes even more laceration injuries in athletes, unless they are wearing a mouthguard (Kvittem et al. 1998, Salam & Caldwell 2008). Internal cheek lacerations mostly result from a bite to the inner lining of the cheek during a blow to the lower jaw. Tongue lacerations are less frequent, although these occur on average 1.9 times throughout an athlete's career, which implies that the tongue is also subject to injuries as shown in Table 4. The most common mechanism of tongue injury is a tongue bite, which results in heavy bleeding, and pain.

The significantly larger number of injured professionals can be explained by a longer time practicing sports, a larger number of practices during a season/career as well as many more games played. The longer the period spent playing a sport, the greater the possibility of an injury. The significant difference in the number of lacerations to oral soft tissues between the amateurs and the professionals can also be explained by their attitude towards their sport. For professional athletes sport is a means of earning a living, which affects their approach to the game as well as their desire to prove themselves and achieve professional success (i.e. earn more money), all of which leads to more injuries.

The difference between the incidence of injury during practice and injury during games can be explained by a greater number of hours spent practising as opposed to the hours spent playing scheduled games. The incidence of injury is increased by the progressive increase of fatigue and the subsequent lack of concentration during practice. A more leisurely and less concentrated approach to tasks by some players during practice may also lead to injuries. Such a large number of injuries during practice is not normally expected, firstly because during practice the game is played against a "known" opponent, and secondly because there is no pronounced rivalry among the players or between the teams. A lesser incidence of injuries during amateur games shows that amateurs tend to pay more attention while playing, and exercise a greater avoidance of the opponent and the injuries themselves. The likelihood of repetition of an injury is greater in athletes who have been injured at least once over the course of their career, regardless of whether this happened during practice or at a game. Although laceration injuries are relatively minor injuries, the total number of 2208 injuries is significant and calls for mandatory mouth protection for basketball players. Wearing an intraoral custom-made mouthguard would eliminate almost all internal cheek and tongue injuries, as well as lessen the number of lip lacerations.

The distribution of dental injuries such that professional players suffer more injuries can again be explained by a longer time playing the sport and by more practice hours during a season as well as by the fact that professional players play more scheduled games. The reason for a higher incidence of dental injuries during practice sessions is the greater amount of time spent in practice than playing scheduled games, where the usual ratio is 6:1 in favour of the practice. A lack of concentration during practice leads to more dental injuries, while at games players need to be more concentrated in order to achieve the best result possible. What is disconcerting is the number of broken teeth in basketball players. Tooth fracture is considered to be a major injury. Most of the dental injuries could have been mitigated with mouthguard use, and most of them would have probably even been prevented, since a mouthguard absorbs the energy of the blow and therefore reduces the possibility of hard and soft tissue damage by creating a mitigating effect on the direct blow to the teeth and dispersing the force which would have led to tooth fracture or luxation.

According to the literature, more than half of the injuries to the stomatognatic system occurring during sports activities refer to lacerations to oral soft tissues, mostly lip lacerations. Dental injuries are statistically in second place, while all other injuries are relatively poorly represented (Škrinjarić 1995). Diab and Mourino (Diab & Mourino 1997), Flanders and Bath (Flanders & Bath 1995) and Maestrello-de Moya and Primosch (Maestrello-de Moya & Primosch 1989) have noted almost identical results to those collected this investigation. Major injuries, or 22% of all injuries recorded in this investigation required medical attention. In research by Jerolimov et al. (Jerolimov et al. 2001) a total of 124 injuries to the stomatognathic system were recorded in a selected sample of basketball players, where 69.3% of these injuries refer to lacerations to oral soft tissues, while other injuries account for the remaining 30.7%. The difference in the percentage of lacerations to oral soft tissues is the result of a larger number of injuries studied by Jerolimov and associates and a smaller sample size. While dental injuries comprise 20.16% of all injuries in the research of Jerolimov et al., in our research dental injuries account for 2.5% of all injuries observed. Jerolimov et al. used a selected sample (professional basketball players – National Basketball Team), while our research encompasses a wider population of people participating in basketball (amateurs and professional basketball players). In other research, Dilberović et al. (Dilberović et al. 2004) recorded 160 injuries to the stomatognathic system in a sample of 53 basketball players. In this case lacerations to oral soft tissues accounted for 97.5%, and dental injuries for 2.5% of all injuries, which is a result similar to the one in this research.

Diab and Mourino (Diab & Mourino 1997) recorded similar results regarding the treatment of injuries observed in their research. Such a large number of medically treated dental injuries indicate their severity. Jerolimov et al. (Jerolimov et al. 2001) recorded that medical assistance was given in 35 cases. Medical treatment was provided in all cases of loosened or avulsed teeth, all injuries to or pain in the temporomandibular joint and all jaw fractures. Medical treatment was provided for 50% of all broken teeth, 55% of the lacerations to oral soft tissues and only in 25% of concussions. This research recorded more medically treated injuries to the stomatognathic system in professional athletes (79.7%) than in amateur athletes (20.3%). This is the result of a larger number of laceration and dental injuries suffered by professionals, the severity of these injuries that required medical assistance and the access to medical care. Out of 44 fractured teeth 56.8% of them were type III fractures – tooth crown fracture (enamel and dentine involvement) with a pulp opening. Such injuries require root canal treatment which constitutes a complicated dental injury. As many as 16 crowns were made as a result of these tooth fractures, and 7 bridges were fabricated in cases of avulsed teeth or subsequent tooth extractions due to serious fractures caused by heavy blows to the stomatognathic system. In the case of one basketball player alone a series of 4 teeth required root canal fillings.

Levin et al. (Levin et al. 2003) agree with the results of this research and state that, in Israel, 98.1% of basketball players do not use mouthguards, although 30.2% of them are aware of the advantages of using a mouthguards. Only 1.9% wear a mouthguard while playing basketball. Ferrari and Ferreria de Mederios (Ferrari & Ferreria de Mederios 2002) obtained similar results; they noted that 97.9% of basketball players do not use mouthguards, although 57.3% of them are aware of the advantages of using one. Only 2.1% of players wear a mouthguard during practice and at games. The results obtained by Maestrello-deMoya and Primosch (Maestrello-de Moya & Primosch 1989) show that 43 (4.2%) basketball players wore a mouthguard during the 1986/87 season, so it follows that in their research only 2 (4.7%) of the recorded lacerations to oral soft tissues did not require medical treatment, while in the 977 basketball players who did not wear a mouthguard, as many as 313 (32%) injuries were recorded. This illustrates that there is a 6.8% greater incidence of injury when a mouthguard is not used. All of the basketball players who wore a mouthguard did so voluntarily. In comparison with this study, an additional 3.2% of athletes wore a mouthguard while practicing basketball, even though the small number of basketball players in Maestrello-de Moya and Primosch's (Maestrello-de Moya & Primosch 1989) research who did wear a mouthguard while practicing basketball presented fewer injuries to the stomatognathic system. The research conducted by Jerolimov et al. (Jerolimov at al. 2001) shows that out of a total of 18 basketball players 10 of them had attempted to wear a mouthguard, and 9 of them wore one regularly. The results of Jerolimov et al. research differ from the results of this research in the type of the athletes interviewd, and the sample size. Most of those surveyed in investigation of Jerolimov and associates played in clubs abroad, outside the Croatian league so they are better informed about mouthguards, which is evident from the greater number of players using mouthguards.

It is possible to prevent injuries to the stomatognathic system by using intraoral custom-made mouthguards. Garon et al. (Garon et al. 1986) agree with the results of this research and recommend mandatory use of protective mouthguards in all sports with a larger number of players and a greater percentage of oral injuries. Maestrello-de Moya and Primosch (Maestrello-de Moya & Primosch 1989) and Diab and Mourino (Diab & Mourino 1997) also recommend mandatory wear of mouthguards for basketball players. The results of this research are consistent with the results obtained by McNutt et al. (McNutt et al. 1989) which demonstrate a significant percentage of injuries to the stomatognathic system present in unorganized American football, baseball and basketball, while at the same time there is an almost negligible number of players using

mouthguards. Morrow et al. as well as Ma (Morrow et al. 1991, Ma 2008) believe that doctors of dental medicine ought to emphasize the necessity of use of protective mouthguards in all sports where there is a possibility of suffering injuries to the stomatognathic system, and where is a greater incidence of injuries to the stomatognathic system.

CONCLUSIONS

It has been demonstrated that there is a significant incidence of injuries to the stomatognathic system related to practicing basketball (a total of 2 265 injuries). More injuries to the stomatognathic system were recorded in professional athletes (91.2%) than in amateur athletes (8.8%). The most common injuries are lacerations and contusions of the lips, cheeks and tongue 97.5% (8.5% amateurs and 91,5% professionals), followed by dental injuries, which account for the remaining 2.5% (21,1% in amateurs and 78,9% in professional players). Out of a total of 195 players only 1% (2 players – one professional and one amateur), frequently wear a mouthguard during practice and games, while only 6.7% (13 players - 4 amateur and 9 professional players) of them have attempted to wear a mouthguard. If basketball players frequently used intraoral mouthguards, there would be no injuries to the stomatognathic system or these injuries would be mitigated. It is therefore necessary to encourage more education and provide more information and guidance on protective mouthguards for basketball players, and also for the coaches, parents and dental professionals in order to increase their use.

Acknowledgements: None.

Conflict of interest : None to declare.

References

1. *Backx FJK, Erich WBM, Kemper ABA & Verbeek ALM: Sports injuries in school-aged children. An epidemiologic study. Am J Sports Med 1989; 17:234-40.*
2. *Braham RL, Roberts MW & Morris ME: Management of dental trauma in children and adolescents. J Trauma 1997; 17:857-65.*
3. *Cathcart J: Mouth protection for contact sports. Dent Digest 1951; 57:346-8.*
4. *Chan KM, Yuan Y, Li CK, Chien P & Stang G: Sports causing most injuries in Hong Kong. Br J Sports Med 1993; 27:263-7.*
5. *Chapman PJ: Prevention of orofacial injuries in children and young adolescents. Aust J Med Sport 1986; 18:3-6.*
6. *Clegg J: Mouth protection for the rugby football player. Br Den J 1969; 127:341-3.*
7. *Corwell H, Masser LB & Speed H: Use of mouthguards by basketball players in Victoria, Australia. Dent Traumatol 2003; 19:193-203.*
8. *Diab N & Mourino AP: Parental attitudes toward mouthguards. Pediatr Dent 1997; 19:455-60.*
9. *Dilberović N, Seifert D & Jerolimov V: The incidence of orofacial injuries in high-school basketball players. Kinesiology 2004; 36:233-8.*
10. *dos Santos AP & Monte Alto LA: Orofacial injury in a Brazilian professional basketball player: case report. Dent Traumatol 2006; 22:169-71.*
11. *FDI tehnical report: N°38/1990 guidelines for dental protection during sporting activities.*
12. *Fentem PH: Benefits of exercises in health in diseases. Br Med J 1994; 308:1291-5.*
13. *Ferrari CH, Ferreria de Mederios JM: Dental trauma and level of information: mouthguard use in different contact sports. Dent Traumatol 2002; 18:144-7.*
14. *Flanders RA & Bhat M: The incidence of orofacial injuries in sports: a pilot study in Illinois. J Am Dent Assoc 1995; 126:491-6.*
15. *Garon MW, Merkle A & Wright JT: Mouth protectors and oral trauma: a study of adolescent football players. J Am Dent Assoc 1986; 112:663-5.*
16. *Grujic Z, Hlavka M et al.: Ozljede u sportu. Zagreb: Sportska tribina, 1989.*
17. *Harmer PA: Basketball injuries. Med Sport Sci 2005; 49:31-61.*
18. *Helmrich SP, Ragland DR, Leung RW & Paffenbarger RS: Physical activity and reduced occurrence of non-insulin-dependent diabetes mellitus. N Engl J Med 1991; 325:147-52.*
19. *http://www.inet.hr/~ivdzolic*
20. *Jerolimov V & Carek V: Orofacijalne ozljede u sportu. Medix 1997; 15/16:36-9.*
21. *Jerolimov V & Jagger R: Orofacial injuries in waterpolo. Kinesiology 1997; 29:30-1.*
22. *Jerolimov V & Seifert D: Zaštita stomatognatskog sustava u sportu. Medix 1999; 23:61-3.*
23. *Jerolimov V, Seifert D & Carek V: Ozljede orofacialnog sustava na izabranom uzorku košarkaša. Hrvat Športskomed Vjes 2001; 3:81-4.*
24. *Kujala UM, Kaprio J & Sarna S: Osteoarthritis of the weight bearing joints of the lower limbs in former elite male athletes. Br Med J 1994; 308:231-4.*
25. *Kujala UM, Taimela S, Antti-Poika I, Orava S, Tuominen R & Myllynem P: Acute injuries in soccer, ice hockey, volleyball, basketball, judo and karate: analysis of national registry date. BMJ 1995; 311:1465-8.*
26. *Kumamoto D & Maeda Y: Are mouthguard necessary for basketball? J Caff Dent Assoc 2005; 33:463-70.*
27. *Kvittem B, Hardie NA, Roettger M & Conry J: Incidence of orofacial injuries in high school sports. J Public Health Dent 1998; 58:288-93.*
28. *Lee-Knight CT, Harrison EL & Price CJ: Dental injuries at the 1989 Canada Games an epidemiological study. J Can Dent Assoc 1992; 58:810-5.*
29. *Levin L, Friedlander D & Geiger SB: Dental and oral trauma and mouthguard use during sports activities in Israel. Dent Traumatol 2003; 19:237-42.*
30. *Love RM, Carman N, Carmichael S & MacFadyen E: Sport-related injury claims to the New Zealand Accident Rehabilitation & Compensation Insurance Corporation, 1993-1996: analysis of the 10 most common sports, excluding rugby union. N Z Dent J 1998; 94:146-9.*

31. *Ma W: Basketball players experience of dental injury and awareness about mouthguard in China. Dent Traumatol 2008; 24:430-4.*
32. *Maestrello-deMoya MG & Primosch RE: Orofacial trauma and mouth-protector wear among high school varsity basketball players. ASDC J Dent Child 1989; 56: 36-9.*
33. *Matković B & Matković BR: Analiza rezultata funkcionalno dijagnostičkog testiranja košarkašica. U: Zbornik radova. Dijagnostika u sportu. Zagreb: Fakultet za fizičku kulturu Sveučilišta u Zagrebu, 1996; 111-5.*
34. *McLain LG & Reynolds S: Sports injuries in high school. Pediatrics 1989; 84:446-50.*
35. *McNutt T, Shannon SW Jr, Wright JT & Feinstein RA: Oral trauma in adolescent athletes: a study of mouth protectors. Pediatr Dent 1989; 11:209-13.*
36. *Moon DG & Mitchell DF: An evaluation of a commercial protective mouthpiece for football players. J Am Dent Assoc 1961; 62:568-72.*
37. *Morrow RM & Kuebker WA: Sports dentistry: A new role. Dent Sch Q 1986; 2:11-13.*
38. *Morrow RM, Bonci T, Seals RR & Barnwell GM: Oral injuries in southwest conference women basketball players. J Nat Athletic Trainers Assoc 1991; 26(4):344-5.*
39. *Newsome PR, Tran DC & Cooke MS: The role of the mouthguard in the prevention of sports-related dental injuries: a review. Int J Paediatr Dent 2001; 11:396-404.*
40. *Powell KE, Thompson PD, Caspersen CJ & Kendrick JS: Physical activity and the incidence of coronary heart disease. Annu REV Public Health 1987; 8:253-87.*
41. *Salam S & Caldwell S: Mouthguards and orthodontic patients. J Orthod 2008; 35:270-5.*
42. *Sarna S, Sahi T, Koskenvuo M & Kaprio J: Increased life expectancy of world class male athletes: Med Sci Sports Exerc 1993; 25:237-44.*
43. *Stevenson MR, Hamer P, Finch CF, Elliot B & Kresnow M: Sport, age, and sex specific incidence of sports injuries in Western Australia. Br J Sports Med 2000; 34:188-94.*
44. *Škrinjarić I: Orofacialne ozljede u športu i štitnici za usta: vrste štitnika, tehnika izvedbe i zaštitno djelovanja. U: Pećina M, Heimer S. Sportska medicina. Zagreb: Naprijed, 1995; 263-72.*
45. *Teo CS, Stokes AN, Loh T & Bagramian RA: A survey of tooth injury experience and attitudes to prevention in a group of Singapore schoolboys. Ann Acad Med Singapore 1995; 24:23-5.*
46. *Torg JS, Vegso JJ, Sennelt B & Das M: The national football head and neck injury registry. J Am Med Assoc 1985; 254:3439-43.*
47. *Whiteside PA: Men's and women's injuries in comparable sports. Physician Sportsmed 1980; 8:130-5, 138.*
48. *Williams JM, Wright P, Currie CE & Beattie TF: Sports related injuries in Scottish adolescents' aged 11-15. Br J Sportmed 1998; 32:291-6.*
49. *Yeşil Duymuş Z, & Gungor H: Use of mouthguard rates among university athletes during sport activities in Erzurum, Turkey. Dent Traumatol 2009; 25:318-22.*
50. *Zaricznyj B, Shattuck LJM, Mast TA, Robertson RV & D'elia G: Sports-related injuries in school-aged children. Am J Sports Med 1980; 8:318-24.*
51. *Zelisko JA, Noble HB & Porter M: A comparison of men's and women's professional basketball injuries. Am J Sports Med 1982; 10:297-9.*

Correspondence:
Nikolina Lešić, DMD, MSc
Private Dental Practice Seifert
Trg Francuske Republike 8, 10 000 Zagreb, Croatia
E-mail: nikolina.lesic@gmail.com