THE INCIDENCE OF OROFACIAL INJURIES IN HIGH-SCHOOL BASKETBALL PLAYERS

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Abstract:

Orofacial injuries are common in all sports. According to literature, sports injuries occur frequently but are relatively minor, except in hockey, rugby and American football. The aim of this preliminary study was to determine the frequency, type and severity of orofacial injuries in basketball, and the frequency of using protective requisites in the high-school population. The survey was conducted on 53 high-school male students playing basketball during their physical education class who were asked to fill in a specially designed questionnaire. The total of 160 orofacial injuries was reported, or 3.02 injuries per player. The most common injuries were lacerations and contusions of lips, cheeks and tongue (156 injuries, i.e. 97.5%), whereas other types of orofacial injuries amounted to 2.5%. Just a fraction of high-school students uses a mouthguard though its application could completely prevent the incidence of lacerations and contusions.

Key words: *orofacial injuries, basketball, male players, school sport, mouthguards*

DIE INZIDENZ VON OROFAZIALEN VERLETZUNGEN BEI DEN BASKETBALLSPIELERN IN DER MITTELSCHULE

Zusammenfassung:

Orofaziale Verletzungen sind in allen Sportarten üblich. Literaturgemäß kommt es oft zu verhältnismäßig geringfügigen Sportverletzungen, außer im Hockey, Rugby und amerikanischen Fußball. Das Ziel dieser Forschung war, die Inzidenz, den Typ und die Stärke der orofazialen Verletzungen im Basketball festzustellen, und wie häufig die Schüler die Schutzsportartikel benutzen. Die Studie umfasste 53 Schüler aus der Mittelschule, die während des Sportunterrichts Basketball spielten. Sie wurden gebeten, einen speziell entworfenen Fragebogen auszufüllen. Es wurden insgesamt 160 orofaziale Verletzungen angeführt, bzw. 3,02 Verletzungen pro Spieler. Die häufigsten Verletzungen waren Lazerationen und Kontusionen von Lippen, Wangen und der Zunge (156 Verletzungen, d.h. 97,5%), und 2,5% bezogen sich auf andere Arten der orofazialen Verletzungen. Nur ein Bruchteil der Schüler benutzt einen Mundschutz, obwohl seine Anwendung die Lazerationen und Kontusionen völlig verhindern konnte.

Schlüsselwörter: *orofaziale Verletzungen, Basketball, Basketballspieler, Schulsport, Mundschutz*

Introduction

Basketball is popular worldwide. The Fédération International de Basketball Amateur (FIBA) incorporates two hundred national basketball leagues all over the world, with over a hundred million active basketball players. Owing to the nature of the game, basketball is one of the most dynamic sports from the first till the last minute of the game. Accordingly, the players must show a whole spectrum of basic and specific cardiorespiratory fitness levels and motor abilities. The game is dominated by explosive power, coordination of specific motor functions and spatial coordination, agility in effective problem-solving, rapid neuromuscular reaction and rapid movements (Matković, Bo. & Matković, B.R., 1996). The increasing number of games, the demands for more dynamic and aggressive play, particularly during the defense part will increase the number of injuries in sports (Hill, Crosher, & Mason, 1985; Berg, Berklej, Tang, Altman, & Londere, 1998; Jerolimov & Carek, 1997; Diangelis & Bakland, 1998; Ishijima, Saitoh, Asahina, Kanazawa, & Imamura, 1998). In his 1952 article, Cathcart states the need for protecting the orofacial system, not only in boxing and American football, but also in other sports

such as ice hockey, basketball and automobile racing. The rules and tactic of basketball have changed which has lead to the increased number of injuries (Guyette, 1993). The basketball court is relatively small resulting in frequent contacts among players. Frequent contacts in the midst of game cause unintentional and intentional injuries (Gjuric, 1989). According to the taxonomy of the World Dental Federation (FDI), basketball is a medium-risk sport as regards orofacial injuries (FDI Technical Report, 1990). Contrary to the standpoint of the World Dental Federation (FDI), Morrow and Kuebker (1986) have pointed out that the incidence of orofacial injuries is higher in basketball and football than in American football which is, according to the FDI taxonomy, a high-risk sport. The research reveals that 40% of all orofacial injuries occur in basketball and baseball (McNutt, Shanon, Wright, & Feinstein, 1989). This is also supported by the research of Leshoier, Gallagher, & Guger (1990) and Lee-Knight, Harrison and Price (1992) who, during the Canadian Games in 1989, detected that wrestlers were at the top of the scale followed by basketball players as regards the frequency of orofacial injuries. The same study revealed that female basketball players were the most frequently injured female competitors. The analysis of sport injuries reveals that in 51% of cases, injuries are caused by the sportpersons themselves. These are triggered by lack of attention, fatigue, poor training record and poor technique. Other participants or, the opposing players in team sports cause injuries intentionally or unintentionally in 28% of cases and these, more often than not, include serious knee injuries, bone fractures or head injuries. 21% of injuries can be attributed to other causes such as gymnastics apparatus, sports grounds, clothes, footwear, etc. (Gjurić, 1989).

Data regarding orofacial injuries in high--school basketball in the Republic of Croatia are scarce. Hence, the aim of our study was to identify the frequency and severity of orofacial injuries on the basis of a selected sample of the 3rd and 4th grade high-school basketball players from Zagreb and the surrounding area.

Methods

The survey was conducted on the basis of a short questionnaire given to 53 high-school male students, 13 third-graders and 40 fourth--graders, playing basketball during physical education classes in high school (Table 1). Reported data refer to the period of four years. Prior to filling in the questionnaire, all the participants received instructions and explanations regarding the aim and the purpose of the survey and gave the informed consent. The questionnaires were filled in individually with the help of the researchers.

Table 1. Structure of the sample

3rd graders	13
4th graders	40
Total	53

Results

The data obtained by the survey reveal a total of 160 orofacial injuries (an average of 3.02 injuries per player) (Table 2 and 3). The most common injuries were lacerations and contusions of lips, cheeks and tongue (a total of 156). Thirteen third-graders reported 7 lacerations of lips, cheeks and tongue, i.e. 0.54 injury per player, while 40 fourth-graders reported 149 injuries of lips, cheeks and tongue, i.e. 3.73 injuries per player. This can be attributed to a higher bodily weight in the transition stage between junior and senior players, i.e. to a more rapid physical development and a relatively uncoordinated agility caused by a sudden increase in body mass and the length of the extremities. Four cases of loose, knocked out and/or broken teeth were reported (2 loose and 2 broken). The therapy of broken teeth included one crown and one endodontic therapy as a consequence of trauma.

Injuries in basketball also depend on the position on a team. The five-position concept of playing positions was utilized in the study. The most frequently injured players were the power forwards (position 4) with an average of 10 injuries during their basketball career. They were followed by the point guards (position 1) with an average of 5.5 injuries, the small forwards (position 3) with an average of 1.71 injuries, and the shooting guards (position 2) with an average of 1.35 injuries, whereas the least frequently injured were the centers (position 5) with an average of 1.14 injuries during their basketball career (Table 4).

Players have reported pain while opening/ closing the mouth 37 times. Five injuries of temporomandibular joints and 20 cases of pains and stiffness in facial muscles have been reported (Table 5). Three players have indicated that they have tried to use mouthguards, but only one of them uses it on a regular basis (Table 6).

Table 2. Lacerations and contusions of lips, cheeks and the tongue

Players	Lacerations and contusions					
	Lips		Cheeks		Tongue	
	Practice	Game	Practice	Game	Practice	Game
3rd graders	1	5	1	0	0	0
4th graders	76	41	6	3	22	1
Total	77	46	7	3	22	1

Table 3. Dental injuries and therapy

Players	Teeth				How many crowns were made	Endo-dontics
	Loose		Broken			
	Practice	Game	Practice	Game		
3rd graders	0	0	1	0	1	0
4th graders	0	2	0	1	0	1
Total	0	2	1	1	1	1

Table 4. Lacerations and contusions of lips, cheeks and the tongue across the playing position

Playing position	Number of players	Lacerations and contusions						Total	Avarage number of injuries
		Lips		Cheeks		Tongue			
		Practice	Game	Practice	Game	Practice	Game		
Point guard (1)	10	29	25	1	0	0	0	55	5.5
Shooting guard (2)	17	9	4	0	0	10	0	23	1.35
Small forward (3)	7	3	1	1	0	7	0	12	1.71
Power forward (4)	5	29	10	5	1	4	1	50	10
Center (5)	14	7	6	0	2	1	0	16	1.14
Total	53	77	46	7	3	22	1	156	

Table 5. Injuries of muscles and temporomandibular joints

Players	Pain and stiffness of facial muscles	Pain during opening/closing of the mouth	Injuries of temporomandibular joints
3rd graders	11	15	0
4th graders	9	22	5
Total	20	37	5

Table 6. The frequency of mouthguard application

Players	Mouthguards	
	Occasional use	Regular use
3rd graders	1	0
4th graders	1	1
Total	2	1

Discussion and conclusions

In the study conducted by Jerolimov, Seifert and Carek (2001), the most frequently injured players were the centers with an occurrence average of 9.57 injuries during their basketball career, followed by the guards with 6 injuries, whereas the least frequently injured players were the forwards with 3.75 injuries. Pursuant to the data collected by Meeuwisse, Sellmer and Hagel (2003), the most frequently injured were the centers, followed by the guards, whereas the least frequently injured were the forwards. The results of our study discussed herein are in accordance with the results stated in the literature which points to the fact that the most frequently injured players are the centers, followed by the guards and the forwards. The difference between other scientific data and the data from this study lies in a different player categorization, and, ostensibly, in the smaller number of interviewees.

Namely, there are five players on a basketball team taking the following positions on the playing court: position 1 – the point guard, position 2 – the shooting guard, position 3 – the small forward, position 4 – the power forward,

and position 5 – the center. Some studies have classified basketball players into three groups: the guards (positions 1 and 2), the forwards (position 3) and the centers (positions 4 and 5). If this categorization is applied to our research, then our results will be: the most frequently injured position are the centers (positions 4 and 5) with 3.47 injuries during their basketball career, followed by the guards (positions 1 and 2) with 2.89 injuries, and the forwards (position 3) with 1.71 injuries, which means that our research has produced similar results as the mentioned studies. The centers (positions 4 and 5) are the tallest players on a team who play near the basket. They are in continuous contact with the opposing players, and the aim of their play is to prevent direct scoring in the defensive, and to score or set a screen for teammates in the offensive part of the game. From a technical-tactical perspective, rebounding predominates in their play. It implies vertical movement with sudden rotations making the players extremely vulnerable to injuries. The guards' play (positions 1 and 2) is predominated by scoring and initiation of offensive play with horizontal movement and sudden changes of direction with a possible collision with other players. Accordingly, the guards are also more exposed to injuries. The forwards (position 3) combine all of the above-mentioned positions which is why these players are regarded as the most proficient ones. From a technical-tactical perspective their play is dominated by rebounds, penetration and scoring which also determines the combination of injuries they can be exposed to.

Some players state that they use mouthguards due to previous lacerations and contusions of lips caused by using fixed orthodontic appliances. Fixed orthodontic appliances increase the risk of sports injuries in all sports, including basketball (Kvittem, Hardie, Roettger, & Conry, 1998). Although most of the players believe that a mouthguard prevents orofacial injuries, only 6% of them use it. According to scientific data, just a fraction of players has tried to use a mouthguard or uses it on a regular basis, except in those sports where wearing a mouthguard is mandatory. What motivates a player to use a mouthguard is either his previous injury or the injury of his co-player. A mouthgard is used and procured voluntarily and individually, i.e. without prior advice from the dentist. In their research, Maestrello-deMoya and Primosch (1989) pointed out that from a total of 1,020 interviewed players only 4.2% used a mouthguard while playing basketball. The latter group reported only two minor injuries that needed no further medical attention. However, 32% of the remaining 977 players who did not wear a mouthguard reported orofacial injuries. This indicates that the incidence of injuries is 6.7 times higher if a mouthguard is not used. In basketball the use of mouthguards is not mandatory, and according to Flanders and Bhat's study (1995), orofacial injuries make up 62% of all injuries during a basketball game. The results regarding the usage of a mouthguard detected in our study correspond to the findings of other scientific studies. Hence, it can be concluded that the application of a mouthguard should be made mandatory for basketball players. However, in order to change the rules and accept a mouthguard as a mandatory protection of basketball players, it is necessary to educate and inform the dentists in order to encourage them to familiarize coaches and players with the problems of protecting the orofacial system. Lacerations and contusions can be almost completely eliminated by the use of mouthguards. This is extremely relevant because the orofacial system is exposed mostly to these two types of injuries. Our study needs to be expanded, especially to include those players who participate in professional leagues because Croatian high-school players represent just a segment of all basketball players.

The incidence of orofacial injuries among the 3rd and 4th grade high-school students who play basketball during their physical education class is relatively high (160 injuries). The most common orofacial injuries are lacerations and contusions of lips, cheeks and tongue, and they represent 97.5% of all orofacial injuries. These, as well as other injuries, depend on the position on a basketball team. According to the results obtained, the most frequently injured players are the centers (positions 4 and 5), followed by the guards (positions 1 and 2), whereas the least injured players are the forwards (position 3). According to the taxonomy of the World Dental Federation, basketball is a medium--risk sport for developing orofacial injuries, and, accordingly, the use of mouthguards is not mandatory. This study shows that there is a huge number of orofacial injuries that might be minimized, mitigated or prevented by the use of mouthguards. The research should be expanded to include professional and non-professional basketball players for the purpose of obtaining more comprehensive data.

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INCIDENCIJA OROFACIJALNIH OZLJEDA KOD SREDNJOŠKOLSKIH KOŠARKAŠA

Sažetak

Uvod

S obzirom na prirodu igre, košarka je jedan od najdinamičnijih sportova. Igrači moraju pokazati čitav spektar bazičnih i specifičnih funkcionalnih i motoričkih sposobnosti. Sve veći broj utakmica, zahtjevi za dinamičnijom i agresivnijom igrom, posebno tijekom faze obrane, bitan su čimbenik porasta broja ozljeda u ovoj sportskoj igri. Prema taksonomiji Svjetske stomatološke federacije (FDI), košarka se ubraja u sportove srednjeg rizika za razvoj orofacijalnih ozljeda pa, prema tome, korištenje štitnika za usta nije obavezno. Ipak, neka su istraživanja pokazala da je incidencija orofacijalnih ozljeda u košarci i nogometu veća nego u američkom nogometu, koji je, prema taksonomiji FDI-a, klasificiran kao sport visokog rizika..

Podaci o orofacijalnim ozljedama igrača u srednjoškolskoj košarci u Republici Hrvatskoj su oskudni. Stoga je cilj ovog preliminarnog istraživanja bio identificirati učestalost i ozbiljnost orofacijalnih ozljeda na temelju izabranog uzorka košarkaša trećih i četvrtih razreda srednjih škola iz Zagreba i okolice.

Metode

Ispitivanje je provedeno na temelju kratkog upitnika koji su ispunila 53 učenika srednjih škola, 13 učenika 3. razreda i 40 učenika 4. razreda koji treniraju košarku tijekom nastave tjelesnog odgoja u srednjoj školi (tablica 1). Prije ispunjavanja upitnika, svi su ispitanici dobili upute i objašnjenja vezana uz cilj i svrhu istraživanja..

Rezultati, rasprava i zaključak

Podaci dobiveni istraživanjem pokazuju ukupno 160 orofacijalnih ozljeda u razdoblju od četiri godine (prosječno 3.02 ozljede po igraču) (tablica 2 i 3). Najčešće ozljede su laceracije (razderotine) i kontuzije (nagnječenja) usana, obraza i jezika (ukupno 156). To je moguće pripisati relativno slabijoj koordinaciji i agilnosti uzrokovanoj naglim porastom tjelesne mase i dužine ekstremiteta u razdoblju na kraju puberteta.

Ozljede u košarci ovise i o igračkom mjestu u ekipi. U ovom smo istraživanju dobili da su između pet pozicija u košarkaškoj ekipi najčešće ozlijeđeni igrači snažno krilo (igračka pozicija 4), s prosječno 10 ozljeda, zatim bek organizator igre (pozicija 1), s prosječno 5,5 ozljeda, krila (pozicija 3), s prosječno 1,71 ozljedom, te bek šuter (pozicija 2), s prosječno 1,35 ozljeda, dok su najmanje ozljeđivani centri (pozicija 5), s prosječno 1,14 ozljeda tijekom promatrane četiri godine (tablica 4).

U dosadašnjim istraživanjima rezultati su malo drugačiji (Jerolimov, Seifert i Carek, 2001; Meeuwisse et al., 2003) pokazuju da su najčešće ozljeđivani igrači centri, zatim bekovi, dok se najrjeđe ozljeđuju krila. Ovdje obrađeni rezultati istraživanja u velikom se stupnju podudaraju sa spomenutim rezultatima navedenim u znanstvenoj literaturi ako se upotrijebi tročlana klasifikacija igračkih pozicija u košarci. Tako se i u našem istraživanju dobiva da su najčešće ozljeđivani centri sa 3,47 ozljeda, slijede bekovi sa 2,89 ozljeda te krila sa 1,71 ozljedom.

Igrači su 37 puta naveli da su osjećali bol prilikom otvaranja/zatvaranja usta. Navedeno je 5 ozljeda temporomandibularnog zgloba i 20 slučajeva boli i ukočenosti mišića lica (tablica 5). Navedena su i 4 slučaja klimavih, izbijenih i/ili slomljenih zuba (2 klimajuća i 2 slomljena). Tri su igrača naznačila da su pokušala koristiti štitnik za usta, ali ga samo jedan od njih redovito koristi (tablica 6).

Iako većina igrača vjeruje da štitnik sprečava orofacijalne ozljede, samo ga 6% koristi, premda su Maestrello-deMoya i Primosch (1989) u svom istraživanju istaknuli da je incidencija ozljeda 6,7 puta veća ako se ne upotrebljava štitnik. Prema istraživanju Flandersa i Bhata (1995), orofacijalne ozljede čine 62% svih ozljeda tijekom košarkaške utakmice. Rezultati dobiveni ovim istraživanjem, vezani uz korištenje štitnika za usta, odgovaraju nalazima drugih znanstvenih istraživanja. Stoga možemo zaključiti da bi korištenje štitnika za usta kod košarkaša srednjoškolske dobitrebalo postati obavezno. Korištenjem štitnika mogle bi se gotovo u potpunosti eliminirati laceracije i kontuzije, dvije vrste ozljeda kojima je orofacijalni sustav najviše izložen.

Istraživanje bi trebalo proširiti uključivanjem amaterskih i profesionalnih košarkaša radi prikupljanja opsežnijih podataka.