

Factors involved in the occurrence of body and head injuries among children of Cluj county practicing ball sports

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Abstract

Background. Sports dentistry has become very popular lately as the trend of a healthy life increases. Many families are raising their children from an early age in the spirit of a healthy life, and enroll them in team sports in order for them to practice physical activities on a regular basis. Injuries in different parts of the body are encountered in children practicing team sports and more often occur in ball games.

Aims. The objective of this study was to assess the frequency of occurrence of injuries in a group of children practicing ball games (sports group) in Cluj and to compare them with a control group.

Methods. The questionnaire and documents regarding informed consent were distributed to the 1273 families with children practicing basketball and to 1273 families with children that were not involved in regular sports activities.

Results. Our results were comparable with the results in the literature in regard to distribution related to gender, age, number of days of practice, years of experience, hours of rest, location of injuries in the body. Regarding practice days, a lower incidence (6.48%) was found in the sports group (Sg) for children with under 3 days of practice per week compared to children of the Sg with over 3 days of practice (8.4%). For the injured cases, the length of the period of resting time in training influenced the occurrence, not significantly, but nevertheless higher scores for injuries were encountered (49.11%) when no sufficient resting time was granted (50.89%). Another factor influencing the rate of injuries was the sleep duration, for which in children of the Sg, values ranged between 5.49% - 33.93% and 60.66% for 8-9 hours, 7-8 hours and 6-7 hours of sleep, respectively.

Conclusions. We can state that the results are similar to similar studies in the literature, in regard to gender distribution and injury distribution related to different body parts. We found out that the injury rate increased with age and experience in the basketball group, where lower limbs, followed by upper limbs and head were the most injured parts of the body. Insufficient knee and elbow protections were worn, but nevertheless in a higher proportion of cases than mouth guards.

Keywords: ball games, children, injuries, occurrence.

Introduction

People are motivated for a physically active life as different kinds of activities ensure, in addition to maintenance and improvement of fitness and health, socialization, pleasure, relaxation, competition. The disadvantage of practicing different types of sports is the assumed risk for injuries, which may, in some cases, lead to permanent disability (Newsome et al., 2001; Padilla & Balikov, 1993).

An injury has been defined as an incident occurring during a match or training in the club, causing the player to miss at least one match or one training session (Yde & Nielsen, 1989).

Dental trauma associated or not with injuries of the stomatognathic system in sports is the main connection

between sports and dentistry. Traumatic dental injuries have become a public dental health problem and sports accidents are included in this category, alongside injuries caused by violence and traffic accidents (Andreasen & Andreasen, 1994).

Sports dentistry has become very popular lately as the trend of a healthy life increases. A physically active lifestyle is important for all age groups (Bijur et al., 1995). Different types of indoor or outdoor activities involve various ages, from children and young adults to persons up to the 6-7 decades of life. Many families are raising their children from an early age in the spirit of a healthy life, and enroll them in team sports in order for them to practice physical activities on a regular basis (Kracher & Smith, 2017; Saini, 2011).

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Protective gears have improved over time and they have become more comfortable, user-friendly, and safe (Nielsen & Yde, 1989). Sports dentistry ensures different kinds of treatments for orofacial injuries, as well as prevention of those injuries through different methods (e.g. face shields, mouth guards).

Hypothesis

We started from the null hypothesis in our study, namely that there is no difference between the prevalence of dentofacial injuries in a group of children practicing sport (sports group - Sg) in Cluj county compared to a control group consisting of children that do not have organized sports activities (control group - Cg).

Material and methods

The present research was approved by the Ethics Committee of the University of Medicine and Pharmacy Cluj-Napoca. Parents provided a written informed consent.

Research protocol

a) Period and place of the research

The research took place in Cluj-Napoca during February and March 2020.

b) Subjects and groups

The participants were children aged 5-12 years practicing ball games (football, basketball, handball, volleyball) in Cluj county (ball group – Sg), and children with no regular sports activities (control group - Cg) of the same age (5-12).

c) Tests applied

Because the age of the children ranged between 5 and 12 years, the parent or guardian of the child filled in the questionnaire and provided an informed consent on behalf of the child. The questionnaire and documents about the informed consent were distributed to 1273 families with children practicing basketball and to 1273 families with children that were not involved in regular sports activities (control group). The respondents were 1219 basketball players and 1001 control subjects. Children practicing multiple sports ($n=59$) were excluded from this study. The questionnaires with missing data ($n=79$ for ball players and $n=118$ for the control group) were also excluded. The final population comprised in this study included 1081 children for the sports group and 883 for the control group.

Our self-designed questionnaire contained the following questions: Age? Gender? Have you suffered injuries (in Cg and Sg)? What is your school level? What is your team level (Sg)? What is your playing experience (in years)? How many days of practice do you have per week (Sg)? How many breaks do you have during a practice? How many sleeping hours do you have during the week? If injured, in which body part (Sg and Cg)? What kind of head injuries did you suffer (Cg, Sg)? Did you wear any protection gear (Sg)?

The questionnaire excluded some data in the case of the control group (for example: years of practice/experience, team level, number of practice days per week) and was more comprehensive for the sports group: questions related to: age, gender, years of

practice/experience (under 1, 1 to 5, over 5), weight, team level (local/ district competitions), number of practice days per week (under 3/ over 3), time for rest (breaks) during practice (sufficient/insufficient), number of sleep hours/24 h (over 5, between 5-8, 8.5-9, over 9), types of injuries in the upper limbs/lower limbs/dento-facial injuries, types of dento-facial injuries: fractures of the upper or lower jaw/ soft tissue/ tooth injuries.

d) Statistical processing

The collected data were systematized in Microsoft Excel tables and employed for descriptive univariate statistical procedures.

Results

A number of 814 boys and 267 girls took part in the study in the sports group (1081 boys and girls). Gender distribution in the control group was: 392 boys (44.3%) and 491 (55.60%) girls (Fig. 1, Fig. 2).

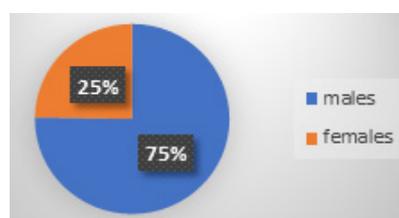


Fig. 1 – Gender distribution in the sports group.

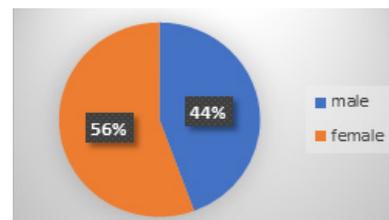


Fig. 2 – Gender distribution in the control group.

Age distribution for the sports group was as follows: 5-6 years, 396; 7-8 years, 311; 9-10 years, 255; 11-12 years, 119. Age distribution for the control group was the following: 211 (25%) children aged 5-6 years, 263 (31%) children aged 7-8 years, 196 (30%) children aged 9-10 years and finally, 113 children (14%) aged 11-12 years (Fig. 3, Fig. 4).

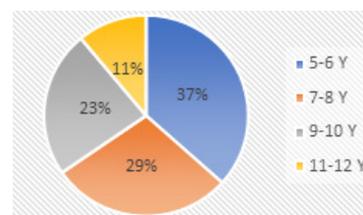


Fig. 3 – Age distribution in the sports group.

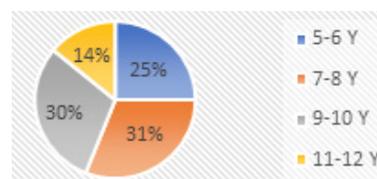


Fig. 4 – Age distribution in the control group.

In the sports group, out of 814 boys, 697 (85.62%) were uninjured and 117 (14.38%) had various injuries. In the control group, the rate of injuries was 9.62% (n=85 out of 883) (Fig. 5, Fig. 6).

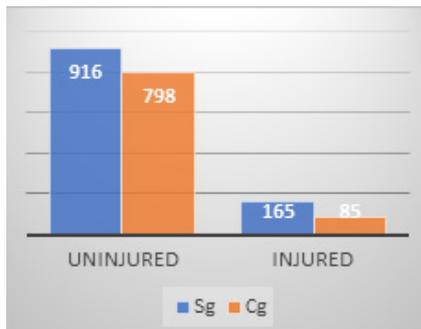


Fig. 5 – Injured - uninjured rate in the sports group and in the control group.

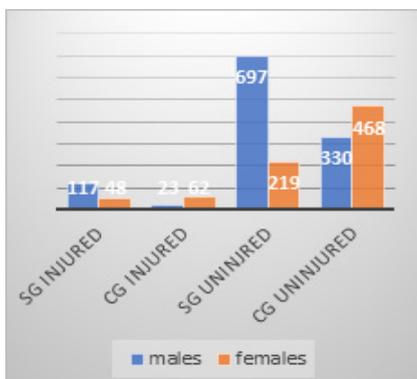


Fig. 6 – Injured - uninjured rate related to gender in the sports group and the control group.

In the sports group, out of 267 girls, 219 (82.02%) were uninjured and 48 (17.98%) had injuries.

The distribution of injuries related to gender in the control group was >23 girls (27.06%) and 62 boys (72.94%).

Out of 1081 children in the sports group, 937 (86.67%) were in elementary school and 144 (13.33%) were in secondary school. The distribution of the control group was 368 (41.67%) in secondary school and 515 in elementary school (58.32%) (Fig. 7).

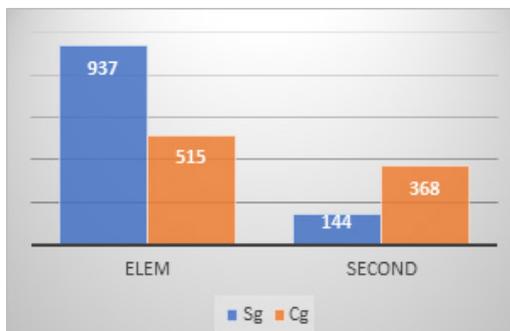


Fig. 7 – School level distribution in Sg and Cg.

Regarding the team level, a 14.1% injury rate was encountered in children taking part in inter-regional competitions, while 83.9% of the injuries occurred in local trainings/competitions (Fig. 8).

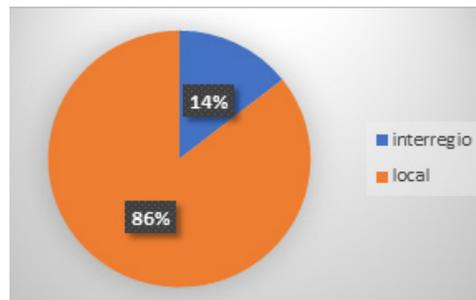


Fig. 8 – Distribution in the sports group related to the team level.

The experience of the players was also an important factor from our point of view. The children were divided into children with less than 1 year of practice, 1-5 years of practice and over 5 years of practice. Injuries occurred for the first category in 12.7% of the cases, and 87.3% of the children from this category were uninjured. In the 1-5 year experience category, 85.1% were uninjured, while 14.9% had injuries (Fig. 9).

Out of the children involved in sports for over 5 years, 84.7% were uninjured, while 15.3% had injuries (Fig. 9).

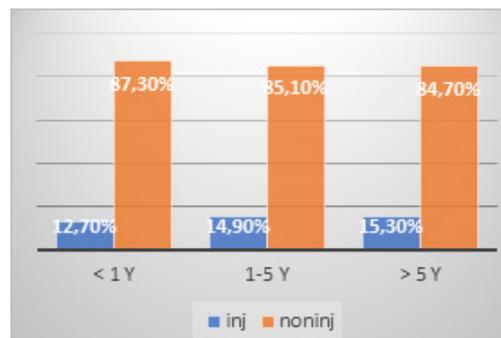


Fig. 9 – Distribution of injured / uninjured children related to the playing experience in Sg.

Another important factor was the number of practice days. Out of the 1081 children in the sports group, 165 had injuries. In 6.84% of the cases (74 children), injuries occurred in children with less than 3 days of practice per week and in 8.4% of the cases (91 children), in those with more than 3 days of practice per week (Fig. 10).

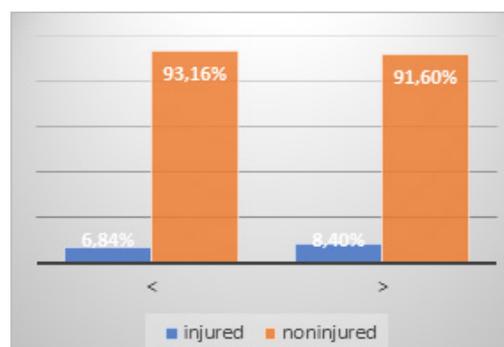


Fig. 10 – Distribution of injured/uninjured children related to the number of practice days of the players in Sg.

The time for breaks was also considered and was related to the occurrence of potential injuries. An assessment was made, and positive or negative answers (yes/no) were possible. The results showed a proportion of 50.89% (n=85) of cases with injuries that occurred when there was no sufficient resting time and a 49.11% (n=82) incidence when there was sufficient time for resting during the practice (Fig. 11).

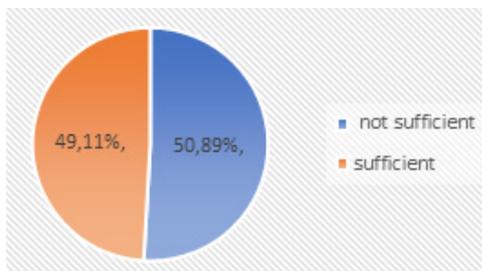


Fig. 11 – Assessment of break time during training in Sg.

The degree of rest is another factor that can determine injuries, so we assessed the sleep time per day in number of hours. We found out that for the sports group, injuries occurred in 60.60% (n=100) of the cases in children with less than 6-7 sleep hours, in 33.93% (n=56) of the cases in children sleeping between 7-8 hours, and in 5.45% (n=9) of the cases in children with 8-9 hours of sleep. For the control group, the prevalence was 55.40% (n=49) for children who usually slept less than 6-7 hours per day, 28.30% (n=25) for those who slept 7-8 hours, and 12.45% (n=11) for those who usually slept 8-9 hours per day (Fig. 12).

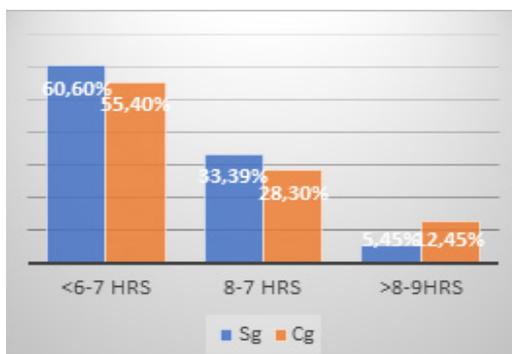


Fig. 12 – Distribution of injuries related to sleep hours in Sg.

In the sports group, where 165 children were injured, 58 had upper limb fractures, 77 had lower limb injuries, and 30 had head injuries. In the control group, 52 children had upper limb injuries, 22 had lower limb injuries and 11 had head injuries (Fig. 13).

We divided the head injuries for both groups into the following categories: lower /upper jaw fractures and skull injuries, tooth injuries and soft tissue injuries, and we found out that there were 2 cases of fractures and skull injuries, 7 cases of tooth injuries and 21 cases of soft tissue injuries. In the control group, most injuries were fractures of the lower limbs, 25.88% (22 children), 60% (52 children) had upper limb fractures, and the rest of 14.11% (11 children) had head injuries (Fig. 13). Head

injuries were divided as follows: 8 soft tissue injuries, 2 tooth injuries and 1 jaw and skull injury (Fig. 14).

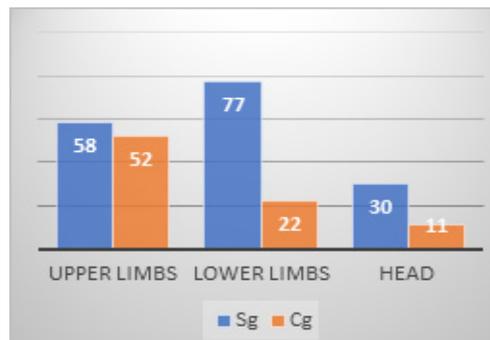


Fig. 13 – Distribution of injuries in the ball group vs the control group.

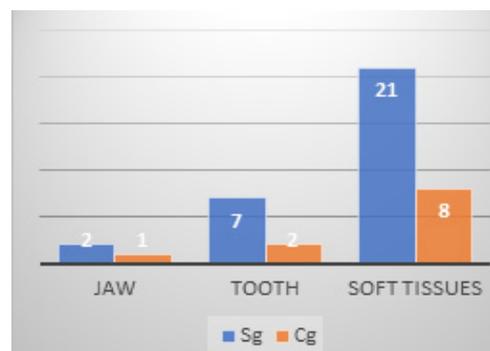


Fig. 14 – Distribution of head injuries in the ball group and the control group.

In the sports group, with respect to wearing the protection gear, knee- and arm-rests for the lower/upper limbs and mouth guards for the dento-facial area, it was found that out of the 58 children with hand injuries, 42 did not wear arm-rests. Out of the 77 leg injuries, children did not wear knee protections only in 12 cases (65 had knee protections) and out of the 30 cases with head injuries, only 2 wore mouth guards, as a protection for soft tissues and teeth (Fig. 15).

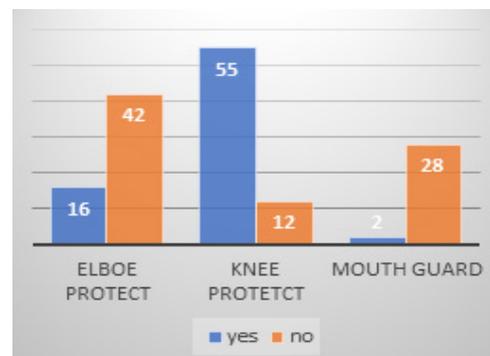


Fig. 15 – Distribution of injuries in Sg related to association or lack of association with protection gears (knee, elbow protection, mouth guards).

Discussions

The incidence of injuries (injuries per 1000 playing hours) in adolescents' ball games is encountered mainly during games, but injuries also occur during practice (Yde

& Nielsen, 1990). Yde and Nielsen found the following distribution of injuries in various sports (Table I):

Table I
Distribution of injuries in various sports

No of years		<10	< 14	<18
Injured players out of 1000	Football	65	43	44
	Handball	21	24	49
	Basketball	9	13	34
	Total	95	80	117

(Yde & Nielsen, 1990)

The mechanism of injuries is complex, through: falls, kicks from another player, kicks from the ball, collisions, and is encountered in different proportions depending on the type of ball game and the importance of the play (training or competitions) (Nielsen & Yde, 1989).

It has been found that if lower limb injuries are considered all together: ankle, knee and hip injuries, they give the highest percentage of injuries compared with other body parts (Azodo et al., 2011).

In ball players, the most common injuries are: shoulder/arm, hand/finger/ thigh/leg, knee, ankle and foot injuries.

Contact sport athletes have up to 10% more probability of suffering orofacial injuries when compared to non-practitioners (Stephens et al., 1985) and a 33-56% risk of suffering a facial injury during their career. Contact sports have maintained a relevant place in causation of orofacial trauma because the face is the most vulnerable and least protected area of the body (Bemelmans & Pfeiffer, 2000; Tulunoglu & Ozbek, 2006). Orofacial sports-related injuries are known to occur across a wide range of both organized and unorganized sports (Tesini & Soporowski, 2000). When screening 15 types of sports (Hootman et al., 2007), head-neck injuries reach a rate of 9.8-12.8% during practice and during games.

Studies also show that 13–39% (Sane, 1988) of all dental injuries are sports-related and of all sports accidents reported, 11-18% are maxillofacial injuries. Males are traumatized twice as often as females, with the maxillary central incisor being the most commonly injured tooth (Meadow et al., 1984). In children, sports activities were found to be responsible for 13% of overall oral trauma (Winters, 1996).

Conclusions

1. Within the limits of our study, we can state that the results are similar to those of similar literature studies regarding gender distribution and injury distribution related to the body parts.

2. We found out that the injury rate increased with age and experience in the basketball group, where the lower limbs, followed by the upper limbs and the head were the most injured parts of the body. Insufficient knee and elbow protections were worn, which were however found in a higher proportion of cases than mouth guards.

3. The authors suggest the need for further studies, in various population and age groups, in order to generate reference data for the general population.

Conflicts of interest

Nothing to declare.

Acknowledgement

All four authors have equal contributions to this study.

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