

## CAN SPORTS BE SAFE? REALITY, CONCEPTS AND REGULATIONS

Didur MD<sup>1</sup>✉, Vykhodets IT<sup>2</sup>, Khokhlina NK<sup>2</sup>, Zhuravleva AI<sup>3</sup>, Polyayev BA<sup>2</sup>

<sup>1</sup> N. P. Bekhtereva Institute of Human Brain, Saint Petersburg, Russia

<sup>2</sup> Department of Medical Rehabilitation, Faculty of Continuing Professional Education, Pirogov Russian National Research Medical University, Moscow, Russia

<sup>3</sup> Department of Physiotherapy, Sports Medicine and Medical Rehabilitation, Russian Medical Academy of Continuing Professional Education, Moscow, Russia

A safe sport is a bit of an oxymoron: competition puts a severe strain on the vital systems of the organism that may be dangerous or uncontrollable, does not come in small doses and entails unpredictable results. Sports injury surveillance aims to estimate the impact of different factors that increase the risk of injuries and to elaborate wise and efficient measures to curb this risk. Accurate data on mortality rates in athletes help to improve approaches to health screening. Injury surveillance systems that also report injury-related deaths in athletes exist in many developed countries. This article talks about sports injuries in Russia and provides rationale for creating a nation-wide system of sports injury surveillance.

**Keywords:** sports, safety, injury, sudden death, statistics, risk factors

✉ **Correspondence should be addressed:** Mikhail Didur  
ul. Akademika Pavlova, d. 9, Saint-Petersburg, Russia, 177376; didour@mail.ru

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## БЕЗОПАСНЫЙ СПОРТ? РЕАЛИИ, ПОНЯТИЙНЫЕ И НОРМАТИВНЫЕ АСПЕКТЫ

М. Д. Дидур<sup>1</sup>✉, И. Т. Выходец<sup>2</sup>, Н. К. Хохлина<sup>2</sup>, А. И. Журавлева<sup>3</sup>, Б. А. Поляев<sup>2</sup>

<sup>1</sup> Институт мозга человека имени Н. П. Бехтеревой, Санкт-Петербург

<sup>2</sup> Кафедра медицинской реабилитации, факультет дополнительного профессионального образования, Российский национальный исследовательский медицинский университет имени Н. И. Пирогова, Москва

<sup>3</sup> Кафедра физической терапии, спортивной медицины и медицинской реабилитации, Российская медицинская академия непрерывного профессионального образования, Москва

Словосочетание «безопасный спорт» противоречиво: победа в соревновании требует напряжения систем жизнеобеспечения организма, но такое напряжение опасно, поскольку неконтролируемо, недозировано и потому непредсказуемо. Статистический учет спортивных травм позволяет оценивать действие различных факторов риска получения повреждения и принимать взвешенные и эффективные меры по управлению ими. Оценка смертности спортсменов помогает совершенствовать подходы к скринингу здоровья атлетов. Такие системы получения информации о травмах и гибели спортсменов существуют во многих развитых странах. В статье анализируется ситуация по проблеме, сложившаяся в России, и обосновывается необходимость создания национальной системы учета спортивного травматизма.

**Ключевые слова:** спорт, безопасность, травматизм, внезапная смерть, статистический учет, факторы риска

✉ **Для корреспонденции:** Дидур Михаил Дмитриевич  
ул. Академика Павлова, д. 9, г. Санкт-Петербург, 177376; didour@mail.ru

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"Safe Sport" is an established term widely used by professionals or various backgrounds. Russian legislation cites it, too, but this term finds different definitions in scientific, medical and sport circles.

Federal Law no. 329-FZ *On Physical Culture and Sport in the Russian Federation* defines sport as a social and cultural activity encompassing various sports and implying competitions training people for them [1]. The law prescribes ensuring safety of life and health of the participants of such competitions and states that it is not just the organizers who should put effort into that but sportsmen themselves as well: they must regularly undergo medical examinations and obey medical regulations when competing [2, 3]. Here lies the insoluble contradiction between the actual practice of sport and the basic laws of medicine [4]. Winning a competition always requires maximum

effort, which puts body under an uncontrollable strain with possible unpredictable consequences. It is impossible to predict the number of situations when athletes practicing competitive and contact sports risk injury. It is also impossible to predict the outcome of a competition and the response a person's body may exhibit to a maximum load at any given time.

Thus, the legislative requirement to ensure safety of life and health of athletes is always violated. If this is the case, does it not make the "safe sport" phrase a dangerous illusion cherished by lawmakers that does not allow professional response to the problems of sports-related injuries? We believe that understanding the level of such injuries and reasons behind them can help build a foundation for safer competitions and sports in general.

### Systematic registration and analysis of sports injuries

Competitions are always dangerous. This is a fact recognized by experts in all nations participating in international sports events. These experts have been studying the risk factors for over 50 years now; they distinguish between modifiable (controllable) and unmodifiable (uncontrollable) factors, as well as factors that cannot be accurately predicted at all [5, 6].

Sports injuries make up 2 to 5 % of all injuries suffered by people, including domestic, professional injuries etc. When determining the injury rate for this or that sport, it is common to calculate it for a thousand athletes practicing it. Such an approach allows offsetting the effect its general popularity produces on the value. This is the so-called intensive injury rate, which equals 188 for rugby, for example, and 18 for bodybuilding [7]. Foreign researchers also determine injury risks by calculating the number of injuries per a thousand training sessions or competitions/events (athlete exposure). In the US, this indicator brings box (5.2) and rugby (3.8) to the top of the list. The figures were obtained in 2003, when a study analyzed the examination data of 20.1 million athletes gathered in 2002 [7].

All foreign researchers acknowledge that sport is a dangerous activity; both on professional and state levels, they work to determine and measure the effect of controllable injury risk factors and minimize that of uncontrollable factors. For example, in 2007, the National Collegiate Athletic Association of USA (NCAA) provided data on 182,000 injuries from more than 1 million sports events reports submitted in seasons 1988/1989 to 2003/2004 (16 years). NCAA has been collecting standardized data on injuries suffered by student athletes in relevant competitions and training sessions since 1982. It was established that injury-wise, competitions mean greater risk (13.8 per 1,000 events) than training sessions (4.0 per 1,000 events); the difference is statistically significant [7]. Lower extremities suffered over half of all such injuries, and 15 % of those were sprained ankles.

Reports filed by medical institutions also help analyze sports injuries. In 2001–2012, emergency aid stations through the US received 3.42 million calls that had to do with brain injuries associated with sports activities [8]. Men suffered such injuries twice as often as women; almost 70 % of such patients were under 19 years of age. Cycling, football and basketball competitions and training sessions generated most of those injuries. Women commonly suffered them when practicing cycling and competitive sports. 89 % of men and 91 % of women received outpatient treatment at emergency aid stations. Another research paper analyzed calls to over 900 US hospitals (approximately 30 million people per year) that occurred in 2010–2013; the researchers found the number of competition-related eye injuries to be 120,847 [9]. 81.3 % of calls were made by men that got injured playing basketball, baseball or softball.

School reports is a yet another source of data. Online reports filed by US high schools in 2005–2014 present 59,862 sports injury cases [10]. Most of those that resulted in prolonged suspension from training activities occurred at competitions (60.4 %). The highest injury rate was seen in American football (26.5 per 100,000 athletes), then came gymnastics (18.6) and wrestling (17.9). In competitive sports, most injuries came through contacts (48.2 % of cases); knee joint suffered more often than other parts of body (33.7 % of cases).

Robust statistical tools allow effective monitoring of sports injuries and making adequate managerial and professional decisions. The above examples show the operation of sports

injuries registration and analysis system developed in one of the leading sporting power, the US; the situation there is in stark contrast to that in Russia. The Sports Injury Notice (Form 092-u) was abolished more than 30 years ago. Since then, the sports injury statistics were not collected in our country in a centralized manner.

### Sports-related sudden deaths registration and prevention

The world statistics knows of several thousand deaths that occurred during sports events, which conclusively proves the current life-threatening conditions prevention systems is ineffective. One of the first cases of sudden death of athletes dates back to 1976, when two basketball players from one of the American colleges died 8 weeks apart. One of them suffered from the Marfan syndrome, the other's condition was hypertrophic cardiomyopathy. Sudden deaths of athletes in subsequent years made the problem much more visible: the list includes names like Pete Maravich, Reggie Lewis, Corey Stringer, Jason Collier, Thomas Errion. Attention paid by professionals to sports-related deaths lead to better understanding of demographical factors, conditions and reasons behind those deaths, which include a variety of genetically determined cardiovascular diseases (most often — hypertrophic cardiomyopathy), blunt trauma or myocardial contusion, etc. A number of initiatives were launched; those initiatives aimed to develop consensus guidelines governing admission to sports activities and pre-professional screening designed to detect unforeseen cardiac abnormalities. Within three decades, the research efforts resulted in collection of great volumes of data, but they did not resolve all the contradictions in this area [11].

Screening for sudden death risk factors has originally been developed for athletes under 35, but recently attention has also been paid to the rapidly growing group of older athletes. The cardiac arrest risk they run in connection with physical activity is 10 times greater; its main cause is the coronary artery disease. Systematic review of 1,737 studies containing data on the effectiveness of various coronary artery disease imaging methods applied to athletes 35 and older showed that such sportsmen should also undergo CT angiography, echocardiography and MRI, otherwise the data to assess calcification of arteries and myocardial perfusion may be incomplete [12].

Efficacy of the sudden death prevention screening programs was appraised in a study carried out in Veneto (Italy). The study compared athletes and ordinary people aged 12–35; during the study, the number of sudden cardiovascular deaths among screened athletes was 55 (1.9 cases per 100,000 person-years) and that among unscreened ordinary people was 265 (0.79 cases per 100,000 person-years). The annual incidence of sudden cardiovascular death in athletes decreased by 89 %, from 3.6 cases in 1979–1980 to 0.4 cases per 100,000 person-years in 2003–2004 ( $p < 0.01$ ). This is the result of introduction of mandatory athletes screening on the national level. Mainly, the number of sudden deaths caused by cardiomyopathies has decreased. This is a positive example of a professional approach to identifying life-threatening conditions in athletes and a real reduction in the number of sudden deaths.

Abroad, there are also special databases collecting data on all deaths occurring at the events organized by national sports associations [14]. Analysis of those data allows assessing mortality rates as they relate to specific reasons. For example, NCAA data analysis revealed that athletes belonging to the association run a high risk of sudden cardiac death, and male

athletes, black sportsmen and basketball players are exposed to a significantly higher risk of death [14].

### Sports injuries management in Russia

Regretfully, the national sports injuries registration system at the level of Ministry of Health was lost almost 30 years ago. Statistical data provided by medical and sports clinics and departments are disembodied; they do not cover all sports and sporting events, never undergo systematization at the national level and, therefore, do not reflect the real state of affairs. There are no national registers of serious injuries and deaths resulting from sports activities. At the same time, official reports issued by the Russian Ministry of Sport state that the number of people going in for sports is constantly growing. National healthcare institutions have made a number of attempts to set up state-level regulation routines aimed at prevention of sudden cardiac death and other diseases in athletes. A decree issued by the Ministry of Health of Russia [3] prescribes that a person can only be allowed to train when he or she yields a medical examination note permitting practicing the sport in question. The note is a mandatory requirement for everyone, regardless of the specific sport chosen or sports school/club attended. At the same time, such medical examinations lack in substance and quality, and international admission screening

recommendations produced no effect on the national laws so far.

The aforementioned decree issued by the Ministry of Health of Russia does have value, though: it is the first regulation to set standards for medical teams at sports events, prescribe the number of ambulance teams and doctors that should be present at competitions while taking into account the given sport's nature (injury-wise, too), number of participants and spectators.

We believe it is necessary to develop the national sports injuries registration system and follow the best international practices in this field.

### CONCLUSIONS

Sports should be acknowledged as hazardous activity. The statistics clearly shows that injuries and deaths are inherent to sports nowadays, and their frequency will never dive below a certain level because it is impossible to reliably predict physical response to sport activities. However, foreign studies indicate that professional assessment of real injury and sudden death risks based on objective statistical data allows efficient control over them. It is necessary to restore the Russian sports injuries registration system that was lost several decades ago.

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