Action Sports

Subjects: Clinical Neurology

Contributor: Francesco Feletti , Matteo Bonato

In the last two decades, non-traditional sports activities characterized by elements such as speed, height, and exposure to natural forces knew a rapid increase in global participation. They are generally referred to as action sports (AS), with the terms adventure sports or extreme sports that could be used as interchangeable synonyms.

Concussion action sports adventure sports

1. Introduction

Action Sports (AS)[1][2][3][4]may involve risk of injuries [5]. The data from a review of the injuries sustained over 12 years, during the practice of seven popular AS featured at the X-Games (data from the National Electronic Injury Surveillance System: NEISS) confirm that teens and adolescents accounted for the highest percentage of injuries and concussion represented the 3.4% (n = 140,650) [6]. To this regard, it has been demonstrated that individuals sustaining mild traumatic brain injuries often report a constellation of physical, cognitive, emotional and behavioral symptoms referred as post-concussion symptoms. The most commonly reported post-concussion symptoms are headache, dizziness, decreased concentration, memory problems, irritability, fatigue, visual disturbances, and sensitivity to noise, judgment problems, depression and anxiety. Although, these post-concussion symptoms often resolve within one months, in some individuals can persists from months to year following injury and may even be permanent and cause disability [7]. Developmentally younger brains may present an increased vulnerability to a concussion, as well as longer recovery and different physiological response after this specific injury [4][8]. Moreover, a concussion may adversely affect future health due to post-concussion syndrome and result in re-injury in case of returning to AS without complete recovery [5]. It is valuable for all healthcare providers to be aware of these risks so they can adequately educate families, coaches, the athletes themselves and the institutions to adopt all the necessary measures to reduce the risk of concussions. At the same time, the awareness of the incidence of concussion among young participants in ASs may help physicians to develop specific strategies and guidelines for the treatment and rehabilitation of young athletes.

2. The Incidence of Pediatric and Adolescent Concussion in Action Sports:

The popularity of AS is rapidly increasing among children and adolescents. The fashionableness of AS among youths is favored by the progressive inclusion of AS in the Youth Olympic programs. As a result, the participation rates of young people in AS are increasing [4], and related concussions may be likely increasing as well.

Sharma et al. [6], in their study, including all age groups, reported a significant increase in the number of head and neck injuries in AS from 2000 to 2011. Specifically, they reported an incidence of concussion of 5.16 per 1000 person-year; a value ranging from 0.05 in mountain biking to 0.534 in snowboarding [9]. Seventy-four per cent of the recreation or sport-related concussion admitted to a paediatric level 1 trauma service were caused by high-velocity activities, among which were skiing, snowboarding, motocross, and skateboarding [10]. Again, in the paediatric population, concussion spans from 5.0 to 51.5% of all reported injuries in snowboarding, mountain biking and skiing [4], and represents 1.1–82.6% of the injuries reported in skateboarding [1][4]. Despite the existence of many series relative to the injuries reported to hospitals and trauma centers, in our review we found only a few studies providing an adequate denominator for the calculation of the true incidence of concussion among participants. The critical efforts profuse to the understanding of the descriptive epidemiology of injuries related to AS in general and youth participants in particular, there is a lack of quantitative data assessing injury incidence [1].

We estimated an overall incidence of concussion in children and adolescents aged ≤18 years involved in outdoor sports of 0.33/1000 DAEs. We speculate that DAEs represents an excellent way to represent the actual exposure to the risk related to the practice of AS. While in traditional sports, the recommendation is to report the incidence of injuries in terms of cases per 1000 h of practice [11][12][13], this approach may result challenging in AS due to the typically intermittent nature of these activities [14][15]. Indeed, in AS the injury rate is often presented using very specific denominators, such as injuries/1000 skydives [16] or 1000 BASE-jumps [17]. Therefore, the use of DAEs as a denominator to assess the incidence of injuries in outdoor sports may have some crucial justifications: it is referred to the specific population of interest, it allows a standard span and comparable of time, and finally, it amalgamates active practice and intervals that may have different characteristics in different activities.

Youth action sports participants, their coaches and families can become aware of the risk of suffering from a concussion in their specific sport. Parents are not satisfied by conjectures and want to know if AS are safe for their children [4][18]. While the general population may be aware of the concussion risk related to the practice of contact sports, the risk of sustaining a risk in sports such as sailing or motocross may be underestimated. Public health officials could use this information to address injury prevention strategies, especially in the organization of action sports events. Moreover, the awareness of the concussion risk in AS may improve concussion reporting and diagnosis, which is crucial because youth athlete is more susceptible to concussion and takes more time to recover [19]. The research about the protective effects of helmets against concussion is inconclusive. However, Luo et al. [20], reported that youth motocross riders that received professional help with helmet fitting had 41%decrease in reported symptoms of concussion (RR 0.59, 95% CI: 0.44–0.81). Other strategies such as specific guidelines and rules may be useful to reduce head injury incidence, but involve a delicate balance between safety, thrills, and any real danger, in order to preserve the exciting nature of AS [21]. Healthcare providers may use the data of the present study in guiding informed decision-making regarding appropriate medical care staffing and developing sport-specific management. In particular, with this systematic review and meta-analysis differences were observed in the injury rates and distribution between AS. Those epidemiologic data may be useful for steering future safety

research, to allow participants and governing bodies to develop relevant sport-specific safety policies concerning training, event organization, protective clothing, equipment, and other safety systems.

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