

INJURIES AND MEDICAL INCIDENCES DURING THE IFSC 2012 CLIMBING WORLD CUP SERIES

Volker Schöffl^{1,2,3 (A-F)}, Eugen Burtscher^{1 (A,B,D,E)}, Francesco Coscia^{1 (A,B,D,E)}

¹Medical Commission of the International Federation of Sport Climbing (IFSC)

²Department of Traumasurgery, Friedrich Alexander University Erlangen-Nuremberg, Nuremberg, Germany

³Department of Sportorthopedics – Sportsmedicine, Klinikum Bamberg, Bamberg, Germany

Abstract

Objective: To prospectively evaluate the injury risk and injury severity of climbers competing in the climbing World Cup series.

Methods: In 2012 the International Federation of Sport Climbing (IFSC) implied, on demand of their Medical Commission, a medical injury and incidence surveillance system for their international events. All injuries and incidences were recorded, analyzed and classified. Climbing time was collected and injury rate per 1000 hours of sports performance calculated.

Results: In total there were 1362 days (3405 h) of lead climbing, 1083 days (2707.5 h) of bouldering and 255 days (637.5 h) of speed climbing. Five injuries/medical incidences took place. All were grade 2 injuries. The overall injury/medical incidence risk was 0.74/1000 h of competition climbing. Both genders combined had a 0.29/1000 h injury/medical incidence risk for lead climbing, 1.47/1000 h for bouldering and zero for speed climbing.

Conclusion: Indoor Competition Climbing showed a minor injury rate and the few injuries which occurred were of minor severity.

Key words: rock climbing, sport climbing, climbing injury, sports injury, world cup

Introduction

Since the first international sport climbing World Cup 1989 in Snowmass, CO (USA) and the first official World Championships 1991 in Frankfurt (Germany) climbing competitions are gaining fast in popularity [1]. The first international event had only two disciplines, lead climbing and speed climbing. Bouldering, as a third discipline, started with its own World Cup in 1999. Organizing body of these international climbing events is the International Federation of Sport Climbing, which was founded in 2007 [1]. Sport climbing already was a demonstrating sport for the Olympics in Albertville 1992.

For an objective analysis of the climbing sport's risk prospective studies are necessary [2]. Up to date most analysis of rock climbing injuries are either retrospective or do not exactly differ between the various sub disciplines performed (e.g. indoor climbing, alpine or traditional climbing) [2,3]. Only three studies [4-6] focus purely on indoor climbing and one on competition climbing [7]. A further analysis is necessary to evaluate not only one single competition [7] but a whole World Cup season and is presented in this short report.

Methods

To gather exact information about the involved injury risk of competition climbing in the World Cup an injury surveillance system was implied through the IFSC Medical Commission in 2012. All international competitions of the IFSC are included. The competition doctor in charge needs to complete an injury report, which is included into the Jury President report. For all injuries or medical incidents an additional injury form

must be completed, with the full data for a further follow up of the patient (injury outcome). All reports are evaluated through the MedCom IFSC. For the present analysis all 2012 World Cup events and the 2012 World Championships were included. There were 10 events for lead climbing, 7 for bouldering and 5 for speed climbing. The climbing time for all events was collected through the official results from the IFSC (www.ifsc.org). From the collected number of competition days the climbing hours were calculated, estimating one competition day as 2.5 hours of climbing time. This estimation was already further explained and used in prior studies [7] and is based on the UIAA MedCom recommendation for injury classification [8]. The respective injury risk (including the risk of medical incidences) per 1000 h of sports performance was calculated and the injuries classified according to the UIAA MedCom classification [8]. Nevertheless, as some acute presenting conditions during a climbing competition are based on overstrain/overuse rather than on a real trauma the UIAA score was further extended and grade 2 injuries were distinguished into grade 2a: grade 2 injury based on an overuse and grade 2b: acute injury (climbing injury score, see below). Injury location was reported using the OSICS (Orchard Sports Injury Classification System) body area character [9].

IFSC Climbing Injury Score (extended UIAA MedCom score [8])

0 No injury or illness

1 Mild injury or illness, no medical intervention necessary, self-therapy (e.g. bruises, contusions, strains)

Table 1. *Injuries and medical incidences of the 2012 Sport Climbing World Cup*

Number	Gender	Discipline	Injury	OSICS [9]	IFSC Climbing Injury Score
1	M	Lead	chin contusion, skin laceration	H	2b
2	F	Boulder	ankle sprain	A	2b
3	F	Boulder	dehydration	X	2b
4	F	Boulder	suspected ACL tear	K	2b
5	M	Boulder	ankle sprain	A	2b

(M = male, F = female, ACL = anterior cruciate ligament)

2a Moderate severe injury based on overuse/overstrain.

Conservative therapy or minor surgery, outpatient therapy, heals without permanent damage (e.g. tendonitis, epicondylitis, capsulitis, impingement syndrome)

2b Moderate severe acute injury or illness, not life threatening, prolonged conservative or minor surgery, outpatient therapy, doctor attendance within a short time frame (days), injury related work absence, heals without permanent damage (e.g. undisplaced fractures, tendon ruptures, pulley ruptures, dislocations, meniscal tear, minor frostbite)

3 Major injury or illness, not life-threatening, hospitalization, surgical intervention necessary, immediate doctor attendance necessary, injury-related work absence, heals with or without permanent damage (e.g. dislocated joint, fractures, vertebral fractures, cerebral injuries, frostbite with amputations)

4 Acute mortal danger, polytrauma, immediate pre-hospital doctor or experienced trauma paramedic attendance if possible, acute surgical intervention, outcome: alive with permanent damage

5 Acute mortal danger, polytrauma, immediate pre-hospital doctor or experienced trauma paramedic attendance if possible, acute surgical intervention, outcome: death

6 Immediate death

Results

Overall 22 World Cups events took place in 2012 (lead: 10, bouldering 7 and speed 5). In total there were 1362 days (3405 h) of lead climbing, 1083 days (2707.5 h) bouldering and 255 days (637.5 h) of speed climbing. All disciplines together had 2700 climbing days, which calculates to 6750 climbing hours. 5 injuries/events took place, which were 4 injuries and one medical incidence (see Table 1). It is noticeable that in incidence no.1 the climber fell in the first qualification round and hit the wall with his chin. He was treated in a hospital and received stitches to his chin wound. Afterwards he was able to continue the competition; which he actually won.

The overall injury/medical incidence risk was 0.74/1000 h of competition climbing. It was 0.54 in male and 0.97/1000 h in female climbers. Both genders

combined had a 0.29/1000 h injury/medical incidence risk for lead climbing, 1.47/1000 h for bouldering and zero for speed climbing. No higher than grade 2b injuries occurred.

Discussion

Climbing and mountaineering sports are gaining more and more public interest [2]. While outdoor climbing has its great number of athletes also indoor climbing is a constantly raising sport, with many climbers never ever even climbing outdoors. Various previous studies analyzed the injury risk for different climbing activities [2,3,6,10-18]. Objective reporting of injury site and severity varied in most studies according to the injury definition and methodology used [2,3,8,10]. This creates differences in the injury and fatality results and conclusions, which in turn makes inter-study comparisons difficult. In 2011 the UIAA Medical Commission published its injury score as a consensus paper, which will help to increase inter-study comparability [8]. The new score was already used in the study of Neuhofer et al. [10] and Schöffl et al. [6] and is part of several other ongoing studies. To further differ between overuse injuries and acute injuries this score was extended for the present evaluation. While most climbing studies demonstrated a minor injury risk for sport climbing in comparison to alpine climbing, little research is presented on indoor, and especially on competition climbing [2,3,6].

Wright et al. [14] evaluated the frequency of overuse injury during the indoor 1999 World Climbing Championship ($n=295$) where 44% of the respondents had sustained an overuse injury, 19% at more than one site. Wright [14] found an independent correlation to increased injuries ($P < 0.01$) when: climbing harder routes, bouldering or leading versus top rope climbing, and climbing >10 years. Multivariate analysis removed the effect of sex as an independent predictor. Jones et al. [12] similarly found increased numbers of overuse injuries or injuries caused by strenuous moves, and less from fall related injuries than in traditional and outdoor sport climbing [15,17,19,20]. Three large-scale studies [4-6] analysed indoor climbing injuries. Limb's survey reported 55 accidents, from 1.021 million climbing wall visits, and no fatalities [5]. Schöffl and Winkelmann prospectively surveyed 25.163 registrants at ten climb-

ing walls [4]. Only four significant injuries (NACA 3) were found and no fatalities; the injury-risk per visit was 0.016% or 0.079 injuries/1000 h of performance [4]. Just recently Schöffl et al. published their data on a prospective analysis of 515.337 indoor climbing wall visits in 5 years [6]. Thirty climbing injuries were recorded, 22 were in male and 8 in female climbers with a total mean age of 27.5 ($\pm$ 10.6) years. Injuries happened in 6 cases while bouldering, in 16 cases while lead climbing, in 7 cases while top roping and in one case as a third person (not climbing or belaying) while watching another climber. Fifteen injuries were UIAA MedCom grade 2, 13 grade 3 and 2 grade 4 injuries. The overall injury rate was 0.02 injuries per 1000 h of climbing activities.

In summary, these indoor climbing studies demonstrated a very minor injury risk and severity in comparison to traditional climbing and various other sports [2,3,6]. Overuse injuries were commonly reported in upper limbs, with the finger most affected [2,3].

Only one study analysed competition climbing, but only at one single event. Schöffl and Küpper recorded injuries and injury rates at the 2005 World Championships [7]. They found an injury rate of 3.1/1000 h. Eighteen acute medical problems were treated (including 13 cases of skin bruising). They did not yet grade these injuries yet according to the UIAA MedCom score, as this study was prior to the scores publication. In analysing their injury at this point of time all the 13 cases of skin bruises are only UIAA grade 1 injuries. Grade 1 injuries are very minor injuries, which are self treatable and are normally not included in the evaluation of the significant injuries [2-4,8,10]. Neglecting these there were only 4 injuries (all UIAA grade 2b) and one medical incident (grade 2b). These numbers are similar to the present evaluation of the 2012 Climbing World Cup. Only one study reported a fatality rate, which was zero in 515.337 indoor climbing wall visits in 5 years [6]. The present evaluation also showed a zero fatality rate, which is similar to the previous years of World Cup Climbing Competitions (retrospective data, IFSC, www.ifsc.org). Nevertheless this study is the first that evaluates a whole season of World Cup competition climbing completely. Competition climbing (World Cup) showed a very minor injury risk, with the injury severity being also minor. Nevertheless the potential risk of a fatal injury always remains. These results may not necessarily represent all competition climbing, as safety standards may be lower in local or regional level competitions. Further prospective analysis is necessary and the monitoring of all Climbing World Cup events through the IFSC Medical Commission will continue.

Declaration of interest

The authors report no conflicts of interest.

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Address for correspondence:

Volker Schöffl
Klinikum Bamberg, Bugerstr. 80,
96049 Bamberg, Germany
Volker.schoeffl@me.com
Tel. 004995150312241, fax 004995150312249

Eugen Burtscher: eugen.burtscher@vol.at
Francesco Coscia: f.coscia@email.it

Authors' contribution

A – Study Design

B – Data Collection

C – Statistical Analysis

D – Data Interpretation

E – Manuscript Preparation

F – Literature Search

G – Funds Collection