

HIGHS AND LOWS: AN EXPLORATION INTO FALLS SUSTAINED WHILST OUTDOOR ROCK CLIMBING, AND THE ASSOCIATED INJURIES

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BACKGROUND

Rock climbing has massively increased in popularity over the past decade (1), and has recently been added to the sports included in the Olympics.

Rock climbing has a perceived high risk profile, with a number of ways in which an accident can occur. Despite this, little analysis into the injuries associated with outdoor climbing exist (2).

AIMS

To discover how common falls are amongst outdoor climbing accidents, and to explore the injuries sustained from falls whilst climbing. We aim to start to establish risk factors for injuries sustained due to falls whilst rock climbing outdoors.

METHOD

We identified published literature via search of the pubmed database, using the framework as follows:

Population: human population, age 19+, climbing related fall injury

Intervention/exposure: fall related injury sustained whilst climbing outdoors

Outcome: Reports of injury incidence, prevalence, mechanism, severity, type, anatomical location, risk factors, treatment, or outcomes specifically related to climbing falls.

Study design: Observational studies (cohort, case-control, cross-sectional), case studies and series, RCTs, systematic reviews/meta-analyses.

Other: year 2000-2025, English language

RESULTS

Paper	Study type	Falls	Deaths	Other injuries/further information on falls	Other
DeLoughery et al. (2)	retrospective observational study	1903	856	52% of mountaineering related accidents resulting in fatality were from falls. 68% of the recorded accidents were falls.	Average height of fatal fall was 151m; 49 m for a nonfatal fall
Bernard et al. (3)	retrospective observational study	40	1	external soft tissue (55%), spine (49.7%), head (43%), chest (39.1%), and lower extremity (38.4%) injury.	80% were male, 23% were intoxicated. Climbers more likely to sustain upper extremity and external surface injury than non-climbers
Rugg et al. (1)	retrospective observational study	894	110	Mostly involved the ankle (n = 181; 25.5%) or the head (n = 110; 15.5%; Figure 2). Injuries to the lower leg (n = 61; 8.6%) and the foot (n = 69; 9.7%). 523 fractures.	
Lack et al. (4)	retrospective observational study	106	19	56.5% sustained 1 or more injuries. Of the nonfatal injuries, those affecting a lower extremity (n=71; 29.5%) head (n=42; 17%), spinal (n=30; 12.5), and upper extremity injuries (n=6; 2.5)	Unroped climbing was dominant cause of fatality
Gasser et al. (5)	retrospective observational study	1347	228	head and trunk injuries - around 5% each, upper extremities - 50%, lower extremities with around 40%	76.2% male. Decrease in number of fall related emergencies and injury severity over time
Bernard et al. (6)	retrospective observational study	301	3	140 external soft tissue injury, 165 leg injury, 98 head injury, 10 neck injury, 48 abdomen injury, 38 face injury, 107 arm, 112 spine	Helmets used by 19% - not shown to be protective
Magnan et al. (7)	Case study	1	0	Upper extremity	
Abraham et al. (8)	Case study	1	0	Lower extremity	
Bell et al. (9)	Case study	1	0	Lower extremity fracture	
Abraham et al. (10)	Case study	1	1	facial fracture. Head injury -traumatic brain injury	

DISCUSSION

Falls have been found to be the most common cause of accident whilst climbing outdoors (2). Falls sustained resulted in a range of injuries, ranging from soft tissue injuries, fractures, and in the most extreme cases; fatalities.

A number of factors influences the injury sustained from falls whilst rock climbing outdoors including height of fall (2), age (5), and type of climbing (4). Interestingly Bernard et al. found helmets were not protective but hypothesise this is due to fewer climbers falling presenting to medical services (6).

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