



NEUROLOGIC, CARDIOVASCULAR AND MUSCULOSKELETAL INJURIES IN WEIGHTLIFTING

Physical Education

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ABSTRACT

BACKGROUND: Lifting a heavy weight during weightlifting exerts high level of stress on physical, physiological and psychological states of an athlete. This kind of stress can cause injuries if go beyond the tolerance level. The kinds of injuries which are associated with weightlifting are- Neurologic, Cardiovascular and Musculoskeletal injuries.

AIM: To identify and analysis of injuries related to Weightlifting through scientific databases.

METHODS: Searches were conducted on electronic databases: PubMed, Medline, Springer link, Elsevier, and Google Scholar. The searching keywords were: Brain and Weightlifting; Brain functions during Weightlifting; Brain injury due to Weightlifting; Brain damage through Weightlifting.

FINDINGS: Neurologic injuries include- Subarachnoid haemorrhage, Brainstem injury, Acute paraplegia, and Type IV arteriovenous malformation. Cardiovascular injuries related with the dissection of Aorta, Internal carotid artery, Coronary artery, Celiac artery, Vertebral artery, and Craniocervical hyperpneumorrhachis. Muscle strain, muscle cramp, sprain, fracture, and dislocations are associated with musculoskeletal injuries.

CONCLUSIONS: After reviewing the above scientific literature, it was identified that weightlifting events are prone to neurologic, cardiovascular and musculoskeletal injuries. The causes of injuries in Weightlifting might be faulty technique, overload, infrastructure, valsava maneuver (respiratory straining), etc.

KEYWORDS

Weightlifting; Neurologic injury; Cardiovascular injury; Musculoskeletal injury

INTRODUCTION

Sports field posses' maximum uncertainty with respect to the injury of an athlete and weightlifting is not out of that (Kite et al. 2015). Lifting a heavy weight exerts high level of stress on physical, physiological and psychological states of an athlete. The kinds of injuries which are associated with weightlifting are- Neurologic, Cardiovascular and Musculoskeletal injuries (Fred, 2014; Parikh et al. 2014; Germino et al. 2013; El-Sherief et al. 2011; Rosenow, 2000; Risser, 1990; Riles and Lin 2011; Kalra, 2009; Hatzaras et al. 2007; Ragucci & Thistle, 2004; Felten, 2002; Tuxen et al. 1983). Neurologic injuries includes Subarachnoid haemorrhage (Fred, 2014), Brainstem injury (Fred, 2014; Tuxen et al. 1983), Acute paraplegia (Parikh et al. 2014; Fred, 2014), and Type IV arteriovenous malformation (Rosenow, 2000). Cardiovascular injuries related with the dissection of Aorta (Hatzaras et al. 2007; Ragucci & Thistle, 2004), Internal carotid artery (Kalra, 2009), Coronary artery (El-Sherief et al. 2011), Celiac artery (Riles and Lin 2011), Vertebral artery (Felten, 2002), and Craniocervical hyperpneumorrhachis (Germino et al. 2013). Muscle strain, muscle cramp, sprain, fracture, and dislocations are associated with musculoskeletal injuries (Risser, 1990).

Weightlifting is one of the events introduced in very first modern Olympic Games. It is a competitive sport where a weightlifter has to lift a heavy weight from the ground to overhead. It contains two items- i. Snatch, and ii. Clean & Jerk (International Weightlifting Federation, Technical & Competitive Rules). The objectives of this study were to identify and analysis of injuries related to weightlifting through scientific databases.

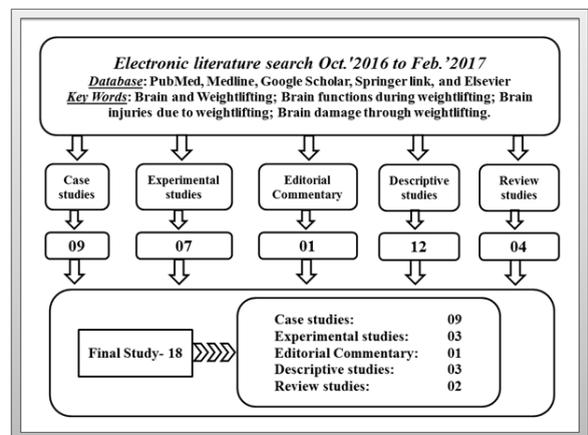
METHODS

Search strategies- PubMed, Medline, Springer link, Google Scholar and Elsevier databases were systematically searched using following key words: Brain and Weightlifting; Brain functions during Weightlifting; Brain injuries due to weightlifting; Brain damage through weightlifting. The researcher identified case studies, experimental studies, editorial commentary, descriptive papers and review studies from the above mentioned databases.

Inclusion and Exclusion criteria- The studies selected in this review work had to meet the following inclusion criteria: Case studies and Experimental studies, participants were involved in weightlifting practice with acute and chronic intervention period and reported different kinds of physical, physiological and psychological problems.

The Editorial Commentary, Descriptive paper and Review studies were also included to provide the information related to different kinds of injury associated with weightlifting and its causes.

Our initial searches identified 9 Case Studies; 7 Experimental studies; 1 Editorial Commentary; 12 Descriptive papers; and 4 Review studies. Out of the total 33 studies, 10 studies were excluded after reading the abstracts, and 6 studies failed to provide sufficient information. The present study reported 9 Case studies, 3 Experimental studies, 1 Editorial Commentary, 3 Descriptive papers and 2 Review studies to complete its requirement.



FINDINGS

Weightlifting is a heavy sporting event which can lead to catastrophe (sudden damage) (Fred, 2014). Weightlifting related injuries can be classified into 3 basic categories- 1. Neurologic injuries, 2. Cardiovascular injuries, and 3. Musculoskeletal injuries.

1. Neurologic injuries-

Neurologic injuries are very uncommon in context to weightlifting practice but still there are chances of getting attacked (Fred, 2014). The researcher found some case studies which brought forward few neurologic injuries such as- Subarachnoid haemorrhage (Fred, 2014), Brainstem injury (Fred, 2014; Tuxen et al. 1983), Acute paraplegia (Parikh et al. 2014; Fred, 2014), and Type IV arteriovenous

malformation (Rosenow, 2000). Subarachnoid haemorrhage occurred in the subarachnoid space of the brain due to aneurysm burst (Hunt, 2014). Brainstem injury was examined with dysarthria and ataxia immediately following near maximal attempt of weightlifting. Within 8 hours, he also experienced photophobia and vomiting. After resolving of these symptoms and with no weightlifting, he experienced bilateral nerve deafness, tinnitus and vertigo but resolved within 2 days (Tuxen et al. 1983). The athlete with acute paraplegia noticed an absence of femoral pulses, unequal blood pressure in left and right arm, loss of motor and sensory functions below 6th thoracic vertebra of the spinal cord (Parikh et al. 2014). Type IV arteriovenous malformation was also a case study where a 27 years old man experienced occipital headache with cervical radiation and examined subarachnoid haemorrhage (Rosenow, 2000).

2. Cardiovascular injuries-

Cardiovascular injuries due to weightlifting were reported by the researchers through case studies (Germino et al. 2013; El-Sherief et al. 2011; Riles and Lin 2011; Kalra, 2009; Hatzaras et al. 2007; Ragucci & Thistle, 2004; Felten, 2002). Cardiovascular injuries which were found by the researchers were- Aortic dissection (Hatzaras et al. 2007; Ragucci & Thistle, 2004), Internal carotid dissection (Kalra, 2009), Coronary artery dissection (El-Sherief et al. 2011), Celiac artery dissection (Riles and Lin 2011), Vertebral artery dissection (Felten, 2002), and Craniocervical hyperpneumorrhachis (Germino et al. 2013). The main cause for these kinds of injury is associated with vascular stress. The intra-arterial blood pressure rise as high as 450/350 mmHg to 480/380 mmHg at the time of maximal weightlifting effort (Fred, 2014; Dickerman et al. 2002; MacDougall et al. 1985; Tuxen et al. 1983). The other reason found by the researcher for these injuries was valsalva maneuver i.e. respiratory straining (Fred, 2014; Pott et al. 2002).

3. Musculoskeletal injuries-

The musculoskeletal injuries reported frequently by the researchers (Fred, 2014). The orthopaedists evaluated and found variety of musculoskeletal injuries which includes muscle strain, muscle cramp, sprain, fracture, and dislocation (Risser, 1990). Though weightlifters has to lift heavy weights overhead to complete his/her weightlifting attempt, this overhead lift causes fracture and dislocation. Forearm and wrist fracture occurred when the lifters lost his/her control of the barbell and it falls backward behind his/her head. The same cause is also responsible for the dislocation of the shoulder girdle. Aggressive use of the major lifts causes muscle strain, muscle cramp, and sprain to the lower back and lower limb (knee and ankle) (Risser, 1990).

CONCLUSION

After reviewing the above scientific literature, it was identified that weightlifting events are prone to neurologic, cardiovascular and musculoskeletal injuries. The major causes of these injuries were identified as- overload or excessive training, insufficient rest period, lack of qualified professionals, poor conditioning or techniques, inadequate strength or endurance, improperly selected resistance, insufficient warm-up or stretching, loss of balance, fatigue, valsalva maneuver (respiratory straining), insufficient equipment, unsafe environment, and mental stress.

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