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Ocular injuries after bungee jumping: A case report and literature review

Min-Tsang Hsieh, I-Ting Sun¹, Chih-Hsin Chen²

Abstract:

We report a case of ocular injury after bungee jumping. A 29-year-old woman presented with bilateral subconjunctival hemorrhage and periorbital petechiae after bungee jumping. Her best-corrected visual acuity was 20/20 in both eyes. Ocular examinations revealed no other intraocular hemorrhages. She received conservative treatment. One week later, the subconjunctival hemorrhage and periorbital petechiae resolved spontaneously. Her vision remained stable, and no detectable ocular complications were found during the follow-up. In conclusion, bungee jumping can cause ocular injuries. Further studies are required to identify their causes and potential risk factors.

Keywords:

Bungee jumping, periorbital petechiae, subconjunctival hemorrhage

Introduction

Bungee jumping originated in the South Pacific Island of Pentecost as an ancient manhood initiation ceremony. It has recently become a popular recreational activity worldwide. Although this activity has a potential to cause bodily injury, for example, the musculoskeletal and neurological injuries, it still attracts many thrill seekers.^[1] Ocular injuries associated with bungee jumping have rarely been reported in literature. This case report documents uncommon ocular changes in a patient following bungee jumping.

Case Report

A 29-year-old woman without any underlying systemic diseases presented to the clinic with a 2-day history of painless redness in both the eyes and several tiny red dots in the periorbital areas. She developed these symptoms immediately after bungee jumping while traveling in Macao. She also had nausea without vomiting for a while after bungee jumping. She had not taken oral

contraceptives, nutritional supplements, anticoagulants or antiplatelet agents, and had no previous history of easy bruising or spontaneous bleeding. She did not have ocular surgery or ocular trauma before.

The patient was hemodynamically stable and had stable vital signs. Her blood pressure was within the normal limits. Laboratory data showed no bleeding disorders. Her best-corrected visual acuity was 20/20 in both the eyes. Intraocular pressure was 9.9 mmHg in the right eye and 11.8 mmHg in the left eye. Her extraocular movements and pupillary responses to the light were also normal. However, diffuse subconjunctival hemorrhage and periorbital petechiae were found in both the eyes [Figure 1]. Slit-lamp examination revealed deep and clear anterior chambers and fundoscopic examination revealed normal disc and retina without detectable retinal hemorrhage or vitreous hemorrhage in both the eyes. She received conservative treatment with artificial tears (Alcon Laboratories, Inc., Fort Worth, TX, USA) and 0.02% fluoromethalone solution (Winston Medical Supply Co., Ltd., Tainan, Taiwan). One week later, her best-corrected visual

Department of Ophthalmology, Ditmanson Medical Foundation Chiayi Christian Hospital, Chiayi City, ¹Department of Ophthalmology, E-DA Hospital, I-Shou University, ²Department of Ophthalmology, Chang Gung Memorial Hospital Kaohsiung Medical Center, Chang Gung University College of Medicine, Kaohsiung, Taiwan

Address for correspondence:

Dr. Chih-Hsin Chen,
Department of Ophthalmology,
Chang Gung Memorial Hospital-Kaohsiung Medical Center, 123, Dapi Road, Niasong District, Kaohsiung City 833, Taiwan.
E-mail: ahsin1016@gmail.com

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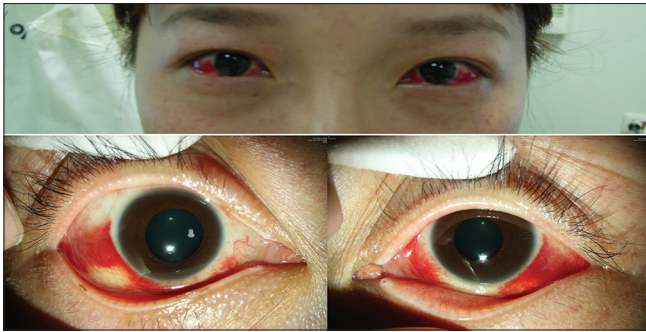


Figure 1: Periocular petechiae and diffuse subconjunctival hemorrhage found in both the eyes

acuity remained stable at 20/20 in both the eyes. The subconjunctival hemorrhage and periorbital petechiae also resolved spontaneously. No detectable ocular complications were found during follow-up.

Discussion

In literature, few studies report the occurrence of ocular injuries associated with bungee jumping. In Clemett's survey of 73 New Zealand ophthalmologists from 1989 to 1991, only one case of ocular injury in a bungee jumper, presenting with subconjunctival hemorrhage, was reported.^[2] In the recent years, several case reports have documented a variety of ocular injuries caused by bungee jumping.^[3-9] In most of these cases, the patients had an initial presentation of blurred vision, whose severity ranged from mildly reduced visual acuity of 20/30 to dramatically deteriorated vision of counting fingers.^[6-8,10] Most of them had favorable visual outcomes under conservative treatment and regular follow-up.

The reported clinical complications associated with bungee jumping include periorbital bruising, subconjunctival hemorrhage, and intraocular bleeding. Intraocular bleeding can include single or multiple retinal hemorrhages that may involve the foveal or parafoveal area and may be accompanied by macular edema.^[6] The hemorrhage can also be preretinal, subhyaloid, or intravitreal.^[6,7,10]

The mechanism of ocular injuries caused by bungee jumping remains unclear; however, several causes have been postulated. Most authors have suggested that subconjunctival or intraocular hemorrhage is caused by the sudden increase in intravenous and intrathoracic pressures. Chan suggested that the manifestation of subconjunctival and retinal hemorrhages could be associated with the sudden change in the hydrostatic pressure in the ciliary and retinal circulations, respectively, in relation to the wide change in gravitational force during the jump.^[5] Further studies

concur with the finding that gravitational force is the most important cause of these retinal hemorrhages.^[6] The gravitational force (G force) on a body is its acceleration relative to the free fall. Although the human body can tolerate high positive and negative gravitational forces, a rapid deceleration within a short duration, such as 3G, is sufficient to cause ocular injuries. Simons and Krol demonstrated that, during the free fall in bungee jumping, the hydrostatic pressure of the ocular blood vessels increases and is highest at the lowest point in the jump.^[9] The gravitational force has been estimated to be 2.5–3.0 g and could be as high as 7.0–8.0 g.^[8]

Innocent and Bell demonstrated that breath-holding and tensing of the abdominal muscles are the main causes of the sudden increase in intrathoracic and intravenous pressures, which gives rise to intraocular hemorrhages.^[8] Habib and Malik reported a case of hemorrhagic detachment of the subinternal limiting membrane in the foveal region after bungee jumping, which was probably caused by a spontaneous rupture of the retinal superficial capillaries due to the sudden increase in intravenous pressure.^[7] Furthermore, Hassan *et al.* suggested the effect of the Valsalva phenomenon on the eye which should be considered to be another pathophysiological factor causing ocular injuries in bungee jumpers.^[4]

Most of the reported ocular injuries associated with bungee jumping included retinal hemorrhages. However, fortunately, the patient in the present case had only periorbital petechiae and subconjunctival hemorrhage without retinal hemorrhages, which was different from most previous reports. Moreover, her best-corrected visual acuity was maintained at 20/20 after bungee jumping. She also had a favorable outcome, with both the periorbital bruising and subconjunctival hemorrhage receding spontaneously without any detectable ocular complications during the follow-up period.

Conclusion

Bungee jumping can cause ocular injuries; therefore, participants must be aware of the risks involved. More studies are necessary to identify the cause of and potential risk factors for such injuries and to estimate the true occurrence of ocular injuries associated with bungee jumping.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will

be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

The authors declare that there are no conflicts of interests of this paper.

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