



Pathology & Biology Section – 2004

G13 Accidental Parachuting Death Due to Equipment Failure

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After attending this presentation, attendees will understand the importance of an integrated approach to determining cause and manner of death in skydiving related fatalities.

This presentation will impact the forensic community and/or humanity by emphasizing the importance of a multidisciplinary approach to death investigation.

The goals of this research project are to recognize the importance of a multidisciplinary approach to the investigation of parachute deaths, with an emphasis on the importance of scene investigation and equipment analysis.

Skydiving carries a low but significant risk of harm for participants. Between 1992 and 2002, there have been between 27 and 44 skydiving deaths per year in the United States, with an average of approximately 35 deaths per year. As compared with other high risk sports, skydiving has a relatively low mortality rate (25 deaths per 100,000 participants, versus SCUBA diving, 25 per 100,000 and boxing, 50 per 100,000 participants). Human error is the most important cause of mortality in skydiving. Equipment failure is considered rare.

Case Report: A 47-year-old male with no significant medical history began his dive at 13,000 feet. He deployed his main parachute at 5000 feet. The position of his body at the time of deployment of the parachute was head down. Witnesses observed the parachute deploy properly, but the subject did not steer. The subject began to spin, thus tangling his lines. The subject was not observed to make an attempt at cutting the lines and deploying the reserve parachute, which would have been the correct course of action. The subject fell to Earth in a grassy field some distance from his designated drop zone. At the time of his impact, his body was traveling at somewhat less than terminal velocity, since his parachute was deployed, but deployed imperfectly. Fire-rescue was called, but resuscitation was unsuccessful and he was pronounced at the scene.

External examination showed a mildly obese male with several abrasions, lacerations and contusions. In particular, the left neck had a transverse, linear, patterned mixed abrasion and contusion. Internal examination demonstrated scant subarachnoid hemorrhage without skull fractures or cerebral contusions. The organs of the neck underlying the transverse abrasion/contusion had extensive acute hemorrhage. The atlanto-occipital joint was several dislocated, without transection of the brainstem or proximal spinal cord, but with significant impingement on the brainstem and spinal cord structures. Several ribs were fractured. The heart had a full thickness laceration of the right ventricle with hemopericardium. The coronary arteries did not have any atherosclerosis. The lungs were contused but not lacerated. The liver and spleen were extensively lacerated.

Examination of the parachute harness demonstrated a torn vertical nylon strap on the left side, which connected the horizontal chest strap to the leg straps. The vertical strap doubles over through a metal ring to allow for adjustment to the harness length between the chest strap and the leg strap. The edges of the nylon strap were frayed in close proximity to the metal ring. The company owned several other similar harnesses of the same type, which showed significant wear pattern in the same location.

Integration of data collected from the scene, autopsy and analysis of the harness allowed us to surmise that the nylon strap had snapped when the parachute deployed, thus causing the freely mobile chest strap on the left to be violently pulled caudally by the deploying parachute, forcefully abrading and contusing the left side of the neck while snapping the head backward. This caused the atlanto-occipital dislocation, disabling the subject and making self-rescue impossible. The disturbed flight characteristics of the limp and unbalanced human form caused the parachute to spin and tangle, hastening the subject's descent. The death was ruled an accident.

Equipment failure as a cause of parachute death is rare, but potentially preventable. This case underscores the critical importance of equipment evaluation by a competent analyst.

Skydiving Death, Parachute Equipment, Scene Investigation