



A172 Epidemiological and Biomechanical Studies of Falling Fatalities in Taiwan

Kai-Ping Shaw, PhD, Hung-Lin Lai, MS, and Chih-Hsin Pan, MD, Institute of Forensic Medicine, Ministry of Justice, Taiwan, 166-1, Sec. 2, Keelung Road., Taipei, 106, TAIWAN, ROC*

After attending this presentation, attendees will learn to use the legitimate measures of horizontal distance and height to calculate the initial velocity and to speculate the falling patterns and the manner of death.

This presentation will impact the forensic science community by determining the falling pattern by measuring the height and horizontal distance.

Due to lack of information, falling from a height can be difficult to determine the manner of death. The point of trajectory, the horizontal distance and the impact point are closely related to the initial velocity, angle and height. Prospective study of 18052 forensic cases were reviewed, 1,144 falling fatalities with 794 male (69.4%) and 350 female (30.6%) during 1994 to 2007 in Taiwan's Institute of Forensic medicine, Ministry of Justice are collected. Biomechanical study of the standing jumps of swimmers during the initially jump were estimated at the angle of $36.35 \pm 3.62^\circ$ using Phantom V4.3 high speed digital image system connected with IEEE1394 computer, and calculating results according to the Shaw and Hsu's equation (J Forensic Sci 1998; 43(4):765-771). The Manners of death of accidental, suicidal and homicidal cause are 69.2%, 19.8% and 4.2%, respectively. The heights of accidental, suicidal and homicidal falls are 13.9 ± 11.5 (n=107), 25.8 ± 15.9 (n=67) and 15.6 ± 8.8 meters (n=9), respectively. The initial velocity (at the angle of 36°) of accidental, suicidal and homicidal falls are 1.1 ± 0.6 , 1.9 ± 0.9 , and 0.7 ± 0.4 meters/second, respectively. By defining the initial velocity above 2.3 meters/second implies jump with running acceleration, the initial velocity of jump with vs. without acceleration of suicidal jump are 3.1 ± 0.9 vs. 1.5 ± 0.3 meters/second. These results indicate that horizontal distance and height are legitimate measures to speculate the falling pattern and the manner of death. Speculating the initial velocity (meter/second) at the angle of 36° after converted with height and horizontal distance, can become the criterion of the falling cases during the medico-legal investigation.

Fatal Fall, Standing Jump, Biomechanical Study