

Name *	John Pienta
Email *	john-pienta@uiowa.edu
Educational Level *	Undergraduate
If Selected Other	
College *	College of Medicine
Department *	Emergency Medicine
Title of Research *	Dangerous Toys: Adult-size ATVs Can Eject Children Resulting in Deaths and Injuries
Other Authors *	Charles Jennissen, MD Gerene Denning, PhD
Introduction & Purpose *	One in four all-terrain vehicle (ATV)-related deaths and one in three injuries are among children and teens under the age of sixteen. A major risk factor for these deaths and injuries are adult-sized vehicles too large for a youth to handle safely. The goal of this project was to understand the factors that can contribute to ejecting a youth from an ATV. To achieve this goal, we used mathematical modeling of a real-life ATV event.
Experimental Design *	A YouTube video was selected that illustrated a specific mechanism for a pediatric ATV crash. Measurements from the video were used in a kinematic model to calculate the conditions that would result in ejection of the youth from the ATV upon sudden deceleration. The mass and grip strength of the youth along with the velocity and deceleration distance were determined. A speed was then calculated for the force necessary to break the grip and result in ejection.
Results *	The rider was determined to be a female of approximately 11 years of age with an estimated grip strength of 350 Newtons. The deceleration distance was estimated at 1 meter. The velocity range of the vehicle during the video was determined to be from 3-5 meters/sec (6.7 to 11.2 mph). Based on these parameters, we calculated that sufficient force to break the child's grip (>350 Newtons) during deceleration would be achieved at the relatively low speed of 10 mph.
Conclusions *	Videos provide a natural experiment for studying ATV crashes and injuries. Kinematic modeling can then be used to determine threshold values beyond which the crash and injury will occur. Results from these studies will be valuable for educational and engineering approaches designed to prevent ATV crashes and/or reduce their impact.

Created
2 Apr 2012
 8:26:25 AM

PUBLIC