Characterization of Video-Recorded Falls Involving Children in a Childcare Setting

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Background

A fall is the most common falsely reported injury scenario when a young child presents for medical care (i.e. to pediatrician, Emergency Department, etc.) and the caregiver is concealing abuse. It is often difficult for clinicians to differentiate injuries resulting from accident vs. abuse, especially in non-verbal children.[1, 2] Additionally, there is a lack of reliably witnessed falls with known outcomes, including fall characteristics and injury outcomes, to aid in this distinction. The objectives of this study were to characterize video-recorded short distance falls involving young children, to identify injury outcomes, and to identify the body regions impacted during the fall where potential injury or evidence of impact may occur.

Methods

To accurately capture fall events for detailed analysis of children aged 12-25 months, two childcare classrooms and a playground were each equipped with 3 digital video cameras. Subjects were characterized by age and gender. Video recordings involving falls were extracted for analysis. Falls were characterized by describing the following categories: fall type; initial condition; fall initiation; fall dynamics; landing position; impact surface; body region impacted; planes of the body impacted; injury outcomes; and whether or not objects or other persons were involved. These characterizations were analyzed to determine frequencies for each category. Injury outcomes with documented reports for recorded falls were collected. Primary impacts to body regions, defined as the region qualitatively judged to dissipate the greatest amount of fall energy as the child impacted the surface, were determined. Descriptive statistics were performed on outcome measures.

Results and Discussion

100 video-recorded falls involving 8 children, age 17-25 months (mean ± SD: 20 ± 2 months) were characterized. 65% of children were boys, 35% were girls. More falls occurred indoors in a classroom (n=64) than outdoors on the playground (n=36). No injuries occurred in any fall. To visually demonstrate the body regions most commonly involved in the primary impact of fall events, normalized frequencies were projected onto a body impact map with a threshold of 0.1 (i.e., 10% of falls) (Figure 1). Conclusions: This study provided insight into the dynamics of pediatric falls in a childcare setting. The majority of falls were ground-based, and most did not involve head impact. Furthermore, no falls produced injury. Most primary impacts of the falls involved impact to the anterior plane of the body, and most falls involved the extremities. Because primary impact regions can be thought of as those that would most likely be injured or have evidence of impact, the body impact maps are a useful tool for describing potential impact patterns in short-distance falls. This knowledge can potentially aid in the differentiation between accidental and abusive injuries.