

CASE REPORTS

Vehicles reversing or rolling backwards: an underestimated hazard

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Abstract

Objectives—A retrospective analysis of injuries caused by vehicles that were reversing or rolling backwards to establish guidelines for prevention was performed. **Patients and methods**—Medical records and questionnaires completed by parents for 32 children admitted to the Department of Pediatric Surgery, Graz, within the past eight years, were analysed.

Results—The median age was 2.1 years (1.0–14.0 years). Fourteen of 32 of the cars were driven by family members (43.8%); three were rolling backwards without a driver (9.4%). The median injury severity score was 3 (1–27) and the most common injuries were contusions (40.6%), fractures (31.3%), and lacerations/burns (21.9%). Most incidents occurred in driveways (37.5%) or farmyards (21.9%). Altogether 70.3% of children sustained “run-over” injuries, 29.6% were hit by the rear bumper or injured by a breaking window. **Conclusions**—Toddlers playing in driveways or farmyards are at risk of an injury caused by reversing vehicles/vehicles rolling backwards.

(*Injury Prevention* 2001;7:327–328)

Keywords: driveway; farmyard; pedestrian; reversing car

Table 1 Age and sex distribution of children injured by reversing vehicles (n=32)

Age (years)	Female	Male	No (%)
0–1	1	0	1 (3.1)
1–2	4	9	13 (40.6)
2–3	1	3	4 (12.5)
3–4	0	4	4 (12.5)
4–5	1	1	2 (6.3)
5–10	1	1	2 (6.3)
10–14	4	2	6 (18.8)

a computerised trauma database for identification of pedestrian injuries.⁷ Age, gender, mechanism, type of injury, and injury severity score (ISS) were recorded.⁸ All injuries caused by motorized passenger vehicles or trucks reversing or rolling backwards were included. Injuries caused by agricultural machines or non-motorized vehicles were excluded. A “run-over” injury was assumed when a part of the child’s body was crushed between vehicle and ground surface.

A questionnaire was sent to the parents inquiring about mode, location of the injury, and car type involved. Vehicle types were categorized as small, medium, executive, four wheel drive, or utility. The values presented are median and ranges.

Results

Over the eight years under consideration 32 children were injured by reversing vehicles or those that were rolling backwards. Their age and sex distribution is shown in table 1.

LOCATION OF THE INJURY

Over half of the injuries occurred in residential driveways (37.5%) or in farmyards (21.9%). The remainder occurred on sidewalks or car parks. In three cases the location had not been recorded.

Table 2 Main injuries of children injured by reversing vehicle (n=32)

Main injury	No
Long bone fracture	7
Contusion of head, face, trunk, or extremity	12
Laceration to face/extremity	6
Pelvic fracture	2
Lung laceration/contusion, pneumothorax	2
Liver contusion	1
Open vault fracture	1
Second degree burn of face	1

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The childhood annual pedestrian death rate in Austria is 0.66 deaths per 100 000 of those aged from 0–14 years.¹ Only a small number of investigations from Australia, New Zealand, and the United States have evaluated crush injuries in young children as a result of being hit by a car in their driveway.^{2–6} This study examines the causes and sequels of those injuries in order to elaborate injury prevention guidelines.

Patients and methods

Child pedestrians admitted to the Department of Pediatric Surgery, Graz for treatment of injuries related to a reversing vehicle/vehicle rolling backwards collision comprised the study group. The Department of Pediatric Surgery serves the County of Styria with a population of 193 806 children. The medical records of those children who attended the department between 16 April 1993 and 15 April 2001 were reviewed retrospectively, using



Figure 1 The blind angle.

Figure 1 shows a left hand drive car and child on the driver's (blind) right side.

Discussion

Nearly half of the injuries in our series were caused by adult family members. When comparing questionnaires to police reports we noted that 15.3% of these injuries had not been reported to the police. The analysis coroner's office datasets from 1989–99 revealed no fatalities among children up to age 14 related to reversing vehicles.

Toddlers playing in driveways or farmyards are at risk of a "run-over" injury caused by reversing vehicles. Physical barriers limiting the child's access to residential driveways may prevent some of these injuries.⁵ Greater use of infrasonic park distance monitoring systems installed at the rear bumper is a promising preventive strategy.^{2,6}

This study was funded in part by a control research grant from the Austrian Traffic Safety Fund.

DRIVERS

In nearly half of the cases (43.8%) the cars were driven by adult family members and in 37.5% by persons not related to the child. Three children were injured by a rolling car without a driver (9.4%). One child had knocked his father's car out of gear injuring his sister when she tried to stop the car from rolling downhill. The median ISS was 3 (1–27) and the main injuries are shown in table 2.

Twenty seven questionnaires were returned.

MODE OF INJURY

Altogether 70.4% were "run-over" by reversing vehicles or vehicles rolling backwards: 10 were injured by rear wheels, three by front wheels, five crushed by the car floor, and one was burned by the exhaust pipe. Of those hit by cars (29.6%), 63.0% by were hit by medium size and 22.2% by executive type cars.

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Burger restaurants being changed

In June, Burger King announced that it was replacing the netting that encloses playgrounds at about 650 of its restaurants across the US after a 4 year old boy became entangled in the play equipment and died this spring. Burger King will install "no-climb" nets, which have one quarter inch holes, on the sides of the play structures accessible to children. Burger King restaurant playgrounds built after 1996 already have the new nets around the entrance and exit tubes, but older locations use netting with two inch holes that children can grab on to according to a company spokeswoman.

On 29 April, Raymond King, 4, got stuck between a net and a tube in the indoor play area of a Burger King in St Louis. The boy hung upside down and stopped breathing. Ray's 6 year old brother, Nathan, alerted their mother, who was working as the restaurant's cashier and had taken her three sons to work. King later died at a hospital.

Anara Guard who contributed this item comments: "This story strikes me as one that has several levels to it: a recreational injury death; another consumer product injury associated with a fast food chain restaurant; and a death occurring when a working parent brings their children into the workplace, even one as child friendly as containing a playground. Obviously, the children were not being supervised by the working parent".