Inappropriate Restraint Use in Pediatric Patients Involved in Motor Vehicle Collisions

EM Urréchaga[1], MK Allen[2], AC Cioci[1], Rebecca A. Saberi[1], Gareth P. Gilna[1], AG Turpin[2], EA Perez[1], HR Ford[1], JE Sola[1], CM Thorson[1]

[1] Dewitt-Daughtry Family Department of Surgery, Divisions of Pediatric Surgery & Trauma and Acute Care Surgery, University of Miami Miller School of Medicine

[2] University of Miami Miller School of Medicine, Miami, FL

Background:
Motor vehicle collisions (MVC) have long been the leading cause of unintentional death among children and adolescents. Although improved outcomes from use of restraints has been well established, public awareness and use of the appropriate restraint recommendations is perceived to be deficient in the pediatric population. The objective of this study is to identify the prevalence of inappropriate pediatric restraint use in our catchment area.

Methods:
After obtaining IRB approval, we retrospectively queried the registry of an urban Level 1 trauma center for pediatric (0-18yrs) patients involved in MVC from October 2013 to December 2018. Demographic and clinical variables were recorded. Data regarding appropriate restraint use by age group, including seatbelt, car seat, booster, and seating position, were examined.

Results:
434 cases of pediatric MVC were identified. Overall, 53% were improperly or unrestrained. 62% of toddlers/infants of car seat age and 51% of booster size were either improperly restrained or unrestrained altogether. 59% of children of backseat-riding seatbelt age were improperly or unrestrained, with 26% riding in the front. Of 267 adolescents who could sit in either seat, 51% were not wearing a seatbelt. Black non-Hispanic children were more often improperly or unrestrained compared to Hispanic children (63% vs 48%, p=0.001). Improperly/unrestrained children were more likely to have severe injury (ISS>25, 10% vs 4%, p=0.021), require OR/IR (33% vs 19%, p=0.001), and be discharged to rehabilitation or skilled nursing facility (5.2% vs 1.5%, p=0.033) than restrained children. Mortality in teenagers was higher if unrestrained compared to appropriately restrained (5.2% vs. 0.8%, p=0.034).

Conclusions:
While efforts to improve adherence to vehicle restraint regulations have greatly increased in the last decade, more than half of children involved in MVC are still inappropriately restrained in our community. Close collaboration with our injury prevention colleagues and community outreach is essential to educate the most vulnerable populations, especially infant and toddlers, on adequate motor vehicle safety measures.

Table 1: Improper restraint use by type, N (%)

	Total	**Car Seat**	**Booster**	**Back Seat Belt**	**Front Seat Belt**
	434 (100)	**64 (15)**	**76 (18)**	**27 (6)**	**267 (62)**
Improperly/Unrestrained	**230 (53)**	**40 (63)**	**39 (51)**	**16 (59)**	**135 (51)**
No seatbelt	187 (81)	19 (48)	23 (59)	10 (63)	135 (100)
Riding improperly in front	24 (10)	9 (23)	8 (21)	7 (44)	-
No car seat/booster	37 (16)	22 (55)	15 (38)	-	-

Car seat/booster improperly placed	12 (5)	11 (28)	1 (3)	-	-

*American Academy of Pediatrics (AAP) recommends (1) rear-facing car seat until age 2 yrs, (2) forward facing car seat with harness until ~65 lbs, (3) booster until appropriate age [~8-12 yrs] and height [4'9"], (4) children < 13 yrs should be back-seat occupant, and (5) lap belt for all others