



Lap Belt and Air Bag Injuries to Children In Crashes

A study of injuries to children restrained in crashes provides more evidence of the effects of air bags and incorrect fit of lap/shoulder belts on young children. "Mechanisms of Lap Belt and Airbag Injuries in Children" was one of 11 papers presented at the 1999 Child Occupant Protection Session of the Conference of the Association for the Advancement of Automotive Medicine (AAAM) and IRCOBI, Barcelona, Spain, Sept. 22.

This paper reported the effects of children's interaction with air bags. In the first case, a 3-month-old infant riding rear-facing sustained serious head injuries. The researchers commented that the only reason the injuries were not even more serious was that the impact was on the front-left side. The infant restraint moved toward the left, so the air bag inflated around the right side of the CR, rather than directly against its back.

In two other cases of air bag deployment, 4-year-old children seated in the front seat were injured but recovered. In one, the child had the shoulder belt behind his back. In the other, the child had slack in the shoulder belt and it was routed under his arm. In addition, he was lying on his side with the seat back deeply reclined.

One case showed the devastation that can occur from a lap belt due to improper placement of shoulder belt. The forces in the crash were very high (estimated at 80 km/hour), because it was a head-on impact between two vehicles of similar size (1998 Nissan Maxima and 1998 Honda Accord). No braking had occurred. The driver of the Maxima was fully protected by the lap/shoulder belt and air bag. His arms were injured, primarily due to the extensive crushing of the front end. The left rear passenger was a 6-year-old girl who had put the shoulder belt behind her. She had a fracture of the second lumbar vertebra (Chance fracture) which caused paraplegia. The 4-year-old boy in the right rear also had put the shoulder belt behind his back. He, too, sustained severe spinal cord damage (T12) and is paraplegic.

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Proposal made on Trunk Entrapment Issue

Eleven children died after unintentionally locking themselves in vehicle trunks during the summer of 1998. NHTSA realized that an issue that had been smoldering had become a major concern. In January 2000, the agency issued a Notice of Proposed Rulemaking that would mandate all new vehicles be equipped with internal trunk releases by January 1, 2001.

This action followed the recommendation of a Blue Ribbon panel invited by NHTSA to examine the issue. Its recommendations, made public in June 1999, were:

- New cars should be equipped with internal trunk releases by 2001.
- Data should be collected about trunk entrapment incidents.
- Public education should be conducted.
- Auto manufacturers should develop retrofit kits for as many existing vehicle models as possible.
- The Society of Automotive Engineers (SAE) should issue a recommended practice regarding the design and performance of trunk safety features.

Before the recommendations were finalized, both General Motors Corp. and Ford Motor Co. had responded to the need. GM has begun to offer a retrofit sensor

that recognizes motion in the trunk and opens the lid. It can be used for most Saturn and other GM family vehicles. It is a dealer-installed option on new family vehicles. Ford began installing glow-in-the-dark release handles in March 1999.

The issue goes far beyond children's safety. For five years Janette Fennell has crusaded to make trunk releases standard equipment. She and her husband had been kidnapped in the trunk of their own car by robbers. They were lucky to be able to escape, but they were left with the horror that others have not survived. Fennell's organization, TRUNC, has discovered over 1,100 cases of entrapment of people of all ages during the past 20 years and nearly 250 deaths from suffocation, heat stroke, or hypothermia.

In a related campaign, Michele Struttman, cofounder of KIDS 'N CARS, is working to make parents aware of the serious consequences of leaving children alone in vehicles. This can be dangerous for the children or others. More to come.

Contacts

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KIDS 'N CARS, kydsncars@aol.com or <http://www.kidsncars.org>

Trunk Safety

What Parents Need to Know

1. Keep parked vehicles locked, windows closed, and keys out of a child's reach.
2. Forbid children from playing in or around vehicles. Children may think a trunk is an exciting place to explore and in which to hide.
3. Supervise children closely while they are around cars. Be extra careful when loading or unloading the trunk.
4. Do not to leave children unattended inside a vehicle for any length of time or for any reason.

Adapted from *CAREing*, the newsletter of Emergency Nurses Care, Summer 1999
EN CARE, 703/370-4050

Lap Belt Injuries, continued

Reference:

Proceedings (*Child Occupant Protection in Motor Vehicle Crashes*) by Professional Engineering Publishing Ltd., London, 1999, available in the US through the American Society of Mechanical Engineers, 973/882-1170 or www.asme.org for \$150 plus s/h.



Futura Answers Several Real-World Needs

The new Fisher-Price forward-facing CR, the Futura, is well named. It is a futuristic answer to several specific needs. Its price is remarkably low (about \$70-80), given its functionality. This CR provides:

- a harness for a fidgety toddler weighing over 40 pounds and too young to stay put in a belt-positioning booster
- a restraint for a child over 40 pounds that can be used with a lap-only belt position
- a belt path that works well with many belts anchored forward of the seat bight
- a seat that can be secured well in vehicles in which tether anchorage is difficult or impossible

The Futura is for children over age 1, weighing from 20 to 60 pounds. It is NOT a combination child restraint/booster seat; the harness must be used until the child outgrows the seat at 60 pounds. A tall preschooler (or one with a long torso) could outgrow the upper harness slots before reaching that weight.

How can the Futura meet federal standard No. 213 without a tether and with a harness up to 60 pounds? First, the seat is lower than typical convertible models. Second, the belt path is unusual; the safety belt wraps around one side, behind the back of the center part of the shell, and then around the other side (see illustration). This also allows it to work well with most forward-anchored belts.

The solid installation feature of the Futura means that the benefits of a tethered CR can now be achieved in older vehicles that have neither designated tether anchor points nor tether kits available. For vehicles with lap-only belts in the rear seat, this seat can be used instead of a belt-positioning booster.

One drawback is that the pads need to be put on the CR by the consumer, but the instruction booklet is quite clear and has lots of illustrations to help the owner. Another is that, at this time, Fisher-Price is making only a "four-point harness" model with a split crotch strap and two shoulder straps. It is attached to a flat tray-shield. The company does not yet provide a five-point harness version. The pad of the shield can be removed leaving a hard surface in front of the child.



Rear view of Futura, showing unusual belt path. Illustration courtesy of Fisher-Price.

Sophisticated 6-Year Dummy Introduced

A new test dummy has been officially added to the Hybrid III dummy family, joining a 50th percentile male dummy. Other dummies that are being developed include 5th percentile adult female, a 3-year-old, and a 12-month-old dummy. This family of dummies is more representative of the human body than existing Hybrid II dummies. They will be used for air bag testing.

The dummies currently used to evaluate child restraints are Hybrid II models. That type is not sophisticated enough to be used to evaluate the types of injuries that can occur to unbelted or out-of-position children when struck by air bags.

The Hybrid III dummies can measure neck responses because they have a multi-segmented, highly instrumented neck. Neck injury is one of the main causes of fatal injury from air bags. They also are instrumented to assess injury to the chest, lumbar spine, pelvis, and upper legs.

The new 6-year-old dummy has been used in research for several years, but final design and performance specifications had to be completed before it could be used for certification of products. The work required to adopt a dummy for certification tests can take many years.

Safety Improvement Campaign

Century Breverra Premier and Contour booster seats

The buckle of the harness system of these booster seats made between February 1995 and July 10, 1998, can crack during use. Over 927,000 seats are involved. Contact Century for a free replacement buckle, 800/445-6881 or 9600 Valley View Rd., Macedonia, OH 44056.

Recall

Fisher-Price Safe Embrace*

Fisher-Price Safe Embrace Convertible Car Seats model 79700 manufactured between May 19, 1997, and March 29, 1998: owners are urged to contact Fisher-Price to obtain a free modification kit and install a newly designed harness adjuster. Approximately 54,500 of the Safe Embrace convertible seats are involved.

The current harness adjuster may malfunction if a spring breaks or dislocates from the correct position. Until the kit arrives, parents are advised to inspect their convertible car seat each time it is used to make sure that the harness belts remain locked in place.

Before placing the child in the car seat, pull on the harness adjuster strap (the single strap located at the foot of the car seat) to tighten the shoulder belts. Then, with both hands, firmly pull the shoulder belts toward you. Watch the harness strap. It should NOT slide or retract into the seat as you pull the shoulder belts; it should lock in place. If it retracts as you pull, then your car seat has a malfunctioning harness adjuster and Fisher-Price should be contacted immediately. For assistance, or to order a modification kit, call 800/355-8882 or write Fisher-Price Consumer Affairs, 636 Girard Ave., East Aurora, NY 14052.

*NOTE

This recall was issued earlier in 1999 but was not included in SRN previously.



Technician News

Revised Standardized CPSTraining Materials Distributed

New instructor manuals have been mailed out and participant manuals are expected to go out shortly to certified technicians.

All certified people will also be sent a copy of the manual *Tethering Child Restraints*.

All instructors will receive a copy of the LATCH video (see p. 7, col. 3).

Contact

Lori Miller, NHTSA Office of Occupant Protection, 202/366-9835 or lmiller@nhtsa.dot.gov

National CPS Tech Database Encourages Networking with Peers

The list of CPS technicians and instructors is compiled by AAA. It contains the names of certified people who have signed a waiver stating that they want to be listed. The database is sent to NHTSA periodically for posting on its website.

Contact

<http://www.nhtsa.dot.gov>

Replacing Restraints After a Crash

Q: How do we know if a child safety seat needs to be replaced after a collision?

A: There is no set minimum speed in a collision when replacement of a child safety seat is recommended. Always call the manufacturer of the car seat and get the opinion of a customer service representative. The short answer is: when in doubt, replace the seat.

The question of when a CR must be replaced has been discussed for years. While CR manufacturers and NHTSA say that a CR could suffer unnoticeable damage if used in a crash and should be replaced, many insurance companies do not cover replacement.

California is the first state in the nation to mandate that automotive insurance providers cover the cost of replacing a CR in use during a collision.* That law became effective Jan. 1, 2000. It was sponsored by the Emergency Nurses Association (ENA) of California and authored by state Senator Liz Figueroa.

Kacey Hansen, the chairwoman of the Injury Prevention Subcommittee of the ENA of California, points out that the new law states NO parameters for severity of the crash in order to qualify for CR replacement. Her group searched for data to back up a minimum threshold, however it was unable to find anything definitive. Because there were no data and the replacement cost of a CR is low while the potential risk is high, the law was written without a threshold. There are many possible variables, such as angle of the crash, forces on the seat, weight of the occupant, impact from intrusion, or the force of another occupant thrown against the CR.

According to Hansen, Britax is the only CR manufacturer that does not call for replacement after use in any crash. Britax calls for replacement after a severe crash, which is classified as distortion of the vehicle body.

* It is seldom necessary to replace a seat that was unoccupied during a crash.

Q. What about replacing belt-positioning boosters, which do not restrain the child?

A. Restraint is provided by the safety belts themselves, not the booster. Safety belts are capable of restraining a full-sized man.

Q: Should a tether anchor bolt and bracket be replaced after a collision?

A: That equipment is part of the vehicle and should be examined and replaced as would any other part, according to Howard Willson of DaimlerChrysler Corp. In his experience, if the tether anchor itself is damaged, the vehicle is usually totally destroyed as well, so repair is not an issue.

Center Rear vs. Side Position?

Q. How should parents decide which child should be put in the outboard seat if there are three seating positions and two or three children?

A. The center rear seat is farthest from the points of potential impact. A side impact can be deadly for anyone since a person would be thrown toward the impact, not away. Even in the center position, one could become injured in a severe side impact.

How do you choose among your children? The only way is to look at the whole picture. A forward-facing child's head usually comes out of the "wings"—only useful for sleeping, rarely for safety in a side impact—and swivels toward the intruding object. At the very least, the child is likely to hit the glass at a significant speed. With a rear-facing seat, however, the back of the seat will swivel toward the impact. What is the chance of survival? A bit better.

Other factors also affect safety. If the older child is in a belt-positioning booster, it is likely that he would have to sit in the outboard position to have access to a lap/shoulder belt and be properly protected. The younger child's CR may be able to be properly installed in the center rear lap belt. Is there space in the rear outboard seat for the rear-facing infant seat to be placed without moving the front seat too far forward and putting the front seat passenger in jeopardy from the air bag? Which position will give the tightest installation of each CR? A parent must lean into the vehicle to place a baby in the safety seat, while the older child often can scramble into the center herself and then be buckled in. This means the parent is more likely to use the seats on every ride. Having access to the baby's CR from the sidewalk side of the car is also important.

Child passenger safety is not dogma; it takes professional skill to weigh all of the variables. There can be no single rule that is always right. During training, students need to understand all the factors that must be considered in reaching a decision on an issue such as this one.

by Stephanie Tombrello

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Retrofitting Shoulder Belts

Q. Why would liability be an issue for a dealership for retrofitting shoulder belts in the rear seat of my older van?

A. Retrofit kits for shoulder belts for rear seats of many pre-1990 passenger cars have been available from auto manufacturers for many years. They vary widely in design and cost. Dealership personnel rarely know about the kits and may simply prefer not to handle them.

Representatives of vehicle manufacturers tell advocates that no liability falls on the dealership when it installs a part provided by the manufacturer for a particular model, as long as dealership personnel follow the installation instructions. This would be analogous to brake drums specified for particular models.

Few vans have kits available. The kits were generally made only for passenger cars, because all cars made since 1972 were required by federal regulation to have strong upper anchor points in the rear seat, though shoulder belts were not required. Light trucks, including vans, were not required to have built-in upper anchor points and, therefore, have no kits. To install shoulder belts made by an outside supplier would require finding a suitable place to drill and bolt in the anchors, a complex task that dealerships are not willing to undertake. That is the circumstance in which the liability issue would arise.

Generic lap/shoulder belts can be purchased from some auto supply stores. Van conversion businesses may be able to install them for you, but you must feel comfortable that their personnel know how to locate a suitable anchor point.

Resource

For a free copy of a NHTSA pamphlet (DOT HS 807 811, 11/92) listing all the available retrofit kits, contact SafetyBeltSafe U.S.A., PO Box 553, Altadena, CA 91003, 800/745-7233 or www.carseat.org. Ask for pamphlet 428. Chrysler kits are listed on www.childsafety.org.

Center vs. Side, continued

Resources

SBS USA website, <http://www.carseat.org>. To join the CPS e-mail listserve, go to <http://www.childsafety.org/cpslist.html>.

NHTSA News

Child Passenger Safety Awareness Week Targeted Booster Seat Use

“Don’t Skip a Step” was the theme of National CPS Awareness Week, Feb. 13-19. The focus of the national publicity effort was on booster seat use for children 40-80 pounds.

During the week, U.S. Department of Transportation secretary Rodney Slater announced \$7.5 million in grants to 47 states, the District of Columbia, territories, and Indian nations to promote CPS.

Booster Seat Projects Funded

Six projects have been funded to demonstrate effective ways to promote booster seat and safety belt use by children age 4-15. They were given to North Dakota Department of Health; Harborview Injury Prevention & Research Center, Seattle, WA; Winthrop University Hospital, Mineola, NY; Hasbro Children’s Hospital, Providence, RI; Texas Children’s Health Plan, Houston, TX; and Phoenix Children’s Hospital, Phoenix, AZ.

NHTSA Holds Public Hearing on Rating Child Restraints

NHTSA held a public meeting on Feb. 9 to obtain comments about identifying and publicizing the relative safety performance of child restraints. Testimony covered voluntary standards, improved labeling, and possible ways of rating child restraint performance. The meeting followed a letter from Ricardo Martinez MD, then NHTSA administrator, in September 1999 to child restraint manufacturers. Martinez urged them to engineer their seats for a level of safety above technical compliance with government standards and to order recalls more willingly.

Fire & Rescue CPS Curriculum Updated and Expanded

The “Buckle Up Kids” curriculum for fire and rescue personnel has been updated by NHTSA in conjunction with the Maryland Fire and Rescue Institute. The curriculum, now is called SKIP (Saving Kids through Injury Prevention), is a 12-hour course. It has been expanded to include a six-hour module on bicycle, pedestrian, and school bus safety. It focuses on in-

Michigan Law Upgraded for Kids

Michigan parents will have a stricter child passenger safety law to adhere to, beginning March 10, 2000. The new provisions eliminate the loophole that allowed children age 1 and over to ride in the back seat with only a safety belt.

Now children up to age 4 will be required to use a CR. In addition, police can now stop a vehicle if any passenger in the front seat is unrestrained or if a child under age 16 is unrestrained in either the front or back seat.

A recent Michigan survey of restraint use showed that, in some areas, restraint use by children 4-15 was as low as 42-51 percent.

NHTSA News, cont.

creasing awareness of emergency personnel regarding child transportation safety and giving them skills to institute a community safety program.

Contact

Gabriel Cano, Office of Communications and Outreach, NHTSA, 202-366-9712.

Pamphlet about Child Safety Features of MY 2000 Vehicles Published

NHTSA has published its newest pamphlet, “Buying a Safer Car for Child Passengers 2000.” It is available now in quantity for events. The pamphlet lists vehicles with these safety features: adjustable upper shoulder belt anchor in rear seat, center rear lap/shoulder belt, air bag on/off switch, built-in child restraints, and top tether anchors.

Contact

Darlene Curtin with the quantity needed, date, address: (fax) 202-493-2290 or dcurtin@nhtsa.dot.gov.

Video of “LATCH” Anchorage Method Released

NHTSA has prepared a short training video about the “LATCH” method of anchoring a CR. For a copy, contact Lori Miller, NHTSA Office of Occupant Protection, 202/366-9835 or lmiller@nhtsa.dot.gov.