Child Safety Seat Counseling: Three Keys to Safety

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The number one cause of death for children younger than 14 years is vehicular injury. Child safety seats and automobile safety belts protect children in a crash if they are used correctly, but if a child does not fit in the restraint correctly, it can lead to injury. A child safety seat should be used until the child correctly fits into an adult seat belt. It is important for physicians caring for children to know what child safety seats are available and which types of seats are safest. Three memory keys will help guide appropriate child safety seat choice: (1) Backwards is Best; (2) 20-40-80; and (3) Boost Until Big Enough. “Backwards is Best” cues the physician that infants are safest in a head-on crash when they are facing backward. “20-40-80” reminds the physician that children may need to transition to a different seat when they reach 20, 40, or 80 lb. “Boost Until Big Enough” emphasizes that children need to use booster seats until they are big enough to fit properly into an adult safety belt. (Am Fam Physician 2005;72:473-8,479-80. Copyright© 2005 American Academy of Family Physicians.)

Correct Safety Belt Fit

Automobile safety belts are designed for adults, and they must fit correctly to work properly for children. Until a child fits correctly in the safety belt, a child safety seat should be used. The safety belt fit is correct when (1) the lap belt portion is low and tight across the hips or upper thighs; (2) the shoulder portion crosses the mid sternum and the mid clavicle; and (3) the child can sit back against the seat back with legs bent over the front of the seat.11

Correct Child Safety Seat Installation

Installing a child safety seat securely can be difficult because child safety seats, automobiles, and safety belt systems differ. The Lower Anchors and Tethers for CHildren (LATCH) restraint system, a feature of all safety seats in automobiles manufactured since September 1, 2001, has made it easier to install seats (Figure 1). Caregivers should be encouraged to read the safety seat manual, but it may be written at a grade level higher than the average person can read.13 However, this marker may not apply for all children; therefore, the above criteria should be used to determine a safe fit.
a certified child passenger safety technician. Stations and technicians can be located through the National Highway Traffic Safety Administration (NHTSA) online at http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.9f8c7d6359e0e9bbbf30811060008a0c or by calling 888-DASH-2-DOT; or through SeatCheck online at http://www.seatcheck.org or by calling 866-SEAT-CHECK.

**Types of Child Safety Seats**

Children need different types of child safety seats as they grow. There are four main types of seats: infant seats, convertible seats, forward-facing or combination seats, and booster seats (Table 1 and Figures 2 through 5). Children with special health care needs may require different restraints. Information about safety seats for children with special needs can be found on the Web site of the American Academy of Pediatrics (AAP) at http://www.aap.org/healthtopics/carseat.cfm.

Individual child safety seats are designed to fit children of specific heights and weights. If the child is too big, the seat could fail (e.g., harness system ripping, buckle breaking, plastic shattering). Federal Motor Vehicle Safety Standard 213 requires that all child safety seats be labeled with height and weight limits. Parents should be instructed to look for this label and change the seat when the child outgrows it. If the label is no longer readable, the parent can call the manufacturer or check the instruction manual. Patient information about safety seat use and recalls can be found on the Web sites of the AAP (http://www.aap.org), the American Academy of Family Physicians, (http://familydoctor.org), and the NHTSA (http://www.nhtsa.gov).

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**Figure 1.** The Lower Anchors and Tethers for CHildren (LATCH) restraint system provides lower anchors in the bight of the seat to attach the child safety seat. In addition, there are top anchors in the vehicle to attach a tether strap to the seat. Most older cars do not have these anchors, so the safety belt secures the safety seat.
Three Keys to Safety

Physicians not only need to know the types of child safety seats, but also the principles on how to choose which seat is best. Three memory cues help guide parental counseling: (1) Backwards is Best; (2) 20-40-80; and (3) Boost Until Big Enough.

BACKWARDS IS BEST
An infant should ride backwards (rear facing) as long as possible. Facing the rear minimizes the risk of head and neck injury in the event of a crash. In a frontal crash, the back of the safety seat supports the child’s head and neck. If an infant is facing

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>Types of Child Safety Seats and Restraint Systems</th>
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<tr>
<td><strong>Type of restraint</strong></td>
<td><strong>Intended occupant size</strong></td>
</tr>
<tr>
<td>Infant seat (see Figure 2)</td>
<td>For children weighing up to 20 to 22 lb (9 to 10 kg) and up to 26 to 29 in (66 to 74 cm) tall; infants outgrow this seat when they are over the seat’s weight maximum or when their heads are within one inch of the top.</td>
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<tr>
<td>Convertible seat (see Figure 3)</td>
<td>Most accommodate infants and toddlers weighing 20 to 40 lb (9 to 18 kg) and up to 40 in (102 cm) tall (some seats are designed for larger children, check the label); for infants younger than one year but heavier than 20 lb, select a seat with a high enough rear-facing weight limit.</td>
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<tr>
<td>Forward-facing seat or combination seat (see Figure 4)</td>
<td>Most are for children weighing 30 to 40 lb (14 to 18 kg); the height limits vary from 50 to 57 in (127 to 145 cm).</td>
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<tr>
<td>Booster seat, high-back booster, and backless booster (see Figure 5)</td>
<td>Used when child no longer fits in other child safety seats but is not big enough for the safety belt; should be used until the safety belt fits properly</td>
</tr>
<tr>
<td>Lap and shoulder automobile safety belt</td>
<td>Used when the child fits correctly in them (usually when child is 4ft. 9in. in tall); correctly fits when the child is tall enough to have legs bent over the seat when back is against the seat, shoulder belt fits across the midclavicle and midsternum, and lap belt is low and tight across the thighs</td>
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LATCH = Lower Anchors and Tethers for Children (see Figure 1).

*—See child safety seat instruction manual or seat labels for exact details of the seat’s height and weight limits.
forward, the harness restrains the body, but the head and neck remain unrestrained and whip forward in rapid flexion, potentially causing injury.

To reduce the risk of cervical spine injury in a crash, the AAP recommends children ride backwards, at least until they are both one year of age and weigh 20 lb (9 kg). Children who weigh more than 20 lb but are younger than one year need a safety seat that accommodates facing backward for heavier weights. For optimal protection, infants should continue to ride backward until they reach the seat’s height and weight limits. For infants, the AAP recommends children ride backwards until they reach the seat’s height and weight limits. For optimal protection, infants should continue to ride backward until they reach the seat’s height and weight limits. Adult safety belt systems do not fit children who weigh less than 80 lb or are shorter than 57 inches, necessitating a booster seat until the child fits into the safety belt. Height limits are as important as weight limits when determining if a child safety seat is appropriate. For example, tall, thin children usually exceed the height limit before the weight limit. So the “20-40-80” memory key only reminds physicians of usual transition times for when a child may need a new seat. At these times, parents should be advised to look for specific height and weight limits on the label and use these limits to decide when to transition to a new seat.

20-40-80

There are three weights at which children most likely need to transition from one child safety seat to another: 20 lb (9 kg), 40 lb (18 kg), and 80 lb (36 kg). Most infant seats have a size limit of 20 lb or 26 inches (66 cm). Most forward-facing seats and convertible seats have limits of 40 lb or 40 inches (102 cm). Most adult safety belt systems do not fit children who weigh less than 80 lb or are shorter than 57 inches, necessitating a booster seat until the child fits into the safety belt.

Boost until big enough

A booster seat should be used until children are big enough to fit in an adult safety belt. Booster seats raise a child up in the seat so that the safety belt fits correctly, better protecting the child from crash and safety belt injury. In a crash, if a child who is too small uses a safety belt alone, injury may result. For example, the child can slip out of an incorrectly fitting belt during a crash; or, if the shoulder belt

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is on the neck, it can cause neck injury. The child also can slip under the lap belt, and this can lead to abdominal injuries such as liver laceration or splenic rupture.\textsuperscript{11}

State laws vary regarding when to use a booster seat. For example, in Oregon there is a “6 and 60” law\textsuperscript{16} that requires children younger than six years and lighter than 60 lb (27 kg) to ride in a child safety seat. NHTSA lists state child restraint laws online at http://www.nhtsa.dot.gov/people/injury/airbags/OccupantProtectionFacts/appendixc.htm. It is important to realize that laws may not represent the safest practice. Physicians should be aware of pertinent laws and be prepared to educate parents on why it may be unsafe to use an adult safety belt alone before it fits.

Many parents incorrectly believe that their child is too old for a child seat or a booster seat.\textsuperscript{17} Physicians must remember there is no specific age, weight, or height at which it is safe for all children to use an adult safety belt system. Education should be directed toward teaching parents when their child can transition to a safety belt.

**After the Child Safety Seat**

Once the child is large enough for the safety belt to fit correctly, a belt system with a shoulder and lap belt is ideal. Lap belts alone are better than no restraint, but because they offer no upper body protection, they are inferior to those with a shoulder and lap belt. Shoulder and lap safety belts are designed to work as a system. The shoulder belt should not be placed behind the back because the upper body will not be restrained, and the belt may not work in this configuration. The shoulder belt portion should never be placed under the arm because the force of a crash could cause the belt to fracture ribs, cause brachial plexus injury, or result in other chest wall and upper extremity injury. To reduce safety belt injury, parents should be instructed to avoid these common misuses of adult safety belts.
Safety Seats

Figure 5. Booster seats. Backless booster seat (A). High-back booster seat (B).


Author disclosure: Nothing to disclose

REFERENCES


