Vehicle Characteristics Associated with LATCH Use and Correct Use in Real-World Child Restraint Installations

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Lower Anchors and Tethers for Children (LATCH)
Previous studies of LATCH use in the United States

- Observation surveys show 63 percent of child restraints installed with LATCH in LATCH-equipped seat positions
- About half of forward-facing restraints installed with top tethers
- Many parents report that LATCH is difficult to use
Usability of vehicle LATCH systems

• Identify LATCH characteristics associated with correct use
  – Surveyed characteristics of LATCH hardware and rear seat geometry in over 100 model year 2010-13 passenger vehicles
  – Laboratory studies of child restraint installations by volunteers

• Validate important LATCH characteristics in real-world sample
  – Child restraint installations inspected on arrival at Safe Kids child seat checkups during 2010-12
  – Study vehicles were those surveyed in usability studies

• Develop vehicle LATCH rating system
Lower anchor accessibility
Toyota Sienna vs. Dodge Grand Caravan
LATCH features that predicted correct use of lower anchors in laboratory study

- Clearance angle greater than 54°
- Attachment force less than 40 lbs
- Lower anchor depth less than 2 cm
Use of lower anchors at Safe Kids checks
Percent of child restraint installations

<table>
<thead>
<tr>
<th></th>
<th>(n = 14,360)</th>
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<tbody>
<tr>
<td>lower anchors used</td>
<td>78</td>
</tr>
<tr>
<td>lower anchors used correctly</td>
<td>52</td>
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</tbody>
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Percent of installations with correct lower attachment by attachment type
Estimated percent of lower anchor use and correct use by number of easy-installation criteria met.
Percent of vehicles checked with lower anchors meeting all easy-installation criteria

By vehicle type
Tether anchor locations
Tether anchor confusing hardware

Honda CR-V
LATCH features predictive of use and correct use of tethers in laboratory studies

- No hardware present that could be confused with tether anchor
- Tether anchor location
  - Tether use highest when anchor on rear deck (typical in sedans)
  - Correct tether use higher when anchor on rear deck or mid-seatback
## Use of tethers with forward-facing restraints at Safe Kids checks

Percent of child restraint installations

<table>
<thead>
<tr>
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<th>(n = 2,880)</th>
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<tbody>
<tr>
<td>tether used</td>
<td>49</td>
</tr>
<tr>
<td>tether used correctly</td>
<td>39</td>
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</tbody>
</table>
Percent of tether use and correct use in forward-facing restraint installations by attachment type
Estimated percent of tether use and correct use by tether anchor location
Estimated percent of tether use and correct use by presence of confusing hardware

![Bar chart showing estimated percent of tether use and correct use by presence of confusing hardware. The chart has two bars for each category: no confusing hardware and confusing hardware. The use and correct use percentages are higher when there is no confusing hardware.]
Conclusions

- Converging evidence from laboratory studies and real-world child restraint installations that specific vehicle features are associated with correct LATCH use

- Examining feasibility of vehicle LATCH rating system based on research
  - Hardware that is easily identified
  - Hardware that is easy to use correctly
  - Increased number of seating positions with LATCH hardware, including rear center
Dedicated to reducing deaths, injuries, and property damage on the highway

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