Child restraints for children with additional needs

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Abstract

Introduction:

Children with additional needs often require special consideration when being restrained in motor vehicles. AS/NZS 4370:1996 *Restraint of children with disabilities in motor vehicles* provides guidelines for the prescriber in recommending child restraints for children with additional needs.

VicRoads, on behalf of the Department of Human Services, undertook a review to address concerns about the compatibility of the restraints with motor vehicles in Australia; and compliance of the restraints with the intent of the AS/NZS 1754 *Child restraint systems for use in motor vehicles*.

Methods:

VicRoads review assessed each restraint for compatibility with motor vehicles in Australia, and compliance with the intent of AS/NZS 1754, including an assessment of current practices and the legislative and regulatory environment.

In addition, the Murdoch Children's Research Institute implemented an online survey of occupational therapists (OTs) to understand challenges and learning needs for prescribing.

Results:

All of the restraints are supplied from overseas. Certification and testing to the requirements of AS/NZS 1754 will be discussed.

The knowledge of the OTs in relation to child restraint options for children with additional needs and access to AS/NZS 4370:1996 will also be discussed. The average wait time for a child to access an appropriate restraint is one to three months.

Conclusions:

Given the relationship between sub-optimal restraint usage and injury outcome, it is imperative that restraints for children with additional needs are compatible with motor vehicles in Australia and meet the intent/or requirements of AS/NZS 1754.

Prescribers need to be able to access up-to-date information about suitable child restraint options for children with additional needs.

Keywords additional needs, car restraint, child restraint, disability, motor vehicles

Body of paper

Introduction

Children with a disability, due to a medical condition or behavioural problem, often require special consideration when being transported in motor vehicles.

Motor vehicle crashes remain one of the leading causes of death among infants and children in Australia (Australian Bureau of Statistics, 2010), and serious injury has been associated with the use of sub-optimal restraint options; that is, when the child uses a restraint type that is not the most size-appropriate or when the restraint is not being used as it was designed to be used.

VicRoads, on behalf of Department of Human Services, commissioned research to review the child restraint systems for children with a disability that are supplied in Victoria. The review applied desktop review criteria to assess each child restraint's compatibility for use in motor vehicles in Australia: and whether each child restraint is likely to meet the intent of the *Australian/New Zealand Standard 1754: Child restraint systems for use in motor vehicles* (AS/NZS 1754).

In addition, the Murdoch Children's Research Institute (MCRI) undertook a research project aiming to understand the knowledge of and challenges faced by paediatric occupational therapists when making recommendations regarding the restraint of children with additional needs in motor vehicles in Victoria. This project was funded by the Australian Association of Occupational Therapists Victoria.

This paper reports on the findings of both research projects.

Background

In Victoria, the Road Safety Road Rules 2009 (Road Rules 2009) exempt people with medical conditions or physical disability from wearing a seatbelt. This exemption includes a child restraint and booster seat.

For the purposes of the Road Rules 2009, the Victorian Government Gazette Notice, 9 November 2009, defines an:

- approved child restraint
- approved booster seat
- approved child safety harness

These definitions only include child restraint systems that comply with AS/NZS 1754. However, there are child restraint systems which do not comply with this standard but are used by children with a disability.

In Victoria, children with a disability are usually assessed for their travel needs by an allied health care professional such as an occupational therapist or a physiotherapist (referred to as prescribers').

The prescriber recommends the most suitable child restraint for the child in accordance with the voluntary *Australian/New Zealand Standard 4370: Restraint of children with disabilities in motor vehicles* (AS/NZS 4370:1996).

Children with a physical disability

In Australia in 2009, 144,100 children aged 0-14 years were estimated to have a physical or diverse disability[1].

[1] The Australian Institute of Health and Welfare (AIHW) Survey report 2009

Physical conditions and disorders range from head and trunk control problems (e.g. cerebral palsy, muscular dystrophy), to connective tissue disorders (e.g. spina bifida, osteogenesis imperfecta) and to spinal deformities (e.g. kyphoscoliosis).

Children with these or similar physical conditions often are not able to support their own torso or head in a standard upright seating posture. They may also exhibit abnormal movements or unwanted reflexes which affect their ability to sit and travel in safety and comfort.

Additionally, children with a physical disability often encounter growth, postural and physical development issues which can lead to problems fitting a child into a restraint safely.

These children often require extra support and larger child restraints than those restraints certified to AS/NZS 1754.

Children with a medical condition

Children with burns, orthopaedic conditions, congenital dysplasia of the hip or congenital respiratory diseases, often require short and long term child restraint system options which provide flexibility for:

- seating posture, for example the recline of the restraint may need to be greater than that provided by an AS/NZS 1754 child restraint system
- the size of the child restraint and length of the child restraint harness straps, for example to cater for a child's leg position if they are wearing a plaster cast.

Children with behavioural problems

Over half a million Australians have intellectual disability and a majority (61 per cent) have a severe or profound limitation in core activities required for daily living. People with intellectual disability are a major group of users of disability support services in Australia.

In Australia in 2003, 166,700 children aged 0-14 years were estimated to have an intellectual or learning disability[2].

On average, there is one child with an autism spectrum disorder for every 160 children aged between six and 12 years. This represents 10,625 children in Australia[3].

Children with an intellectual disability, autism and behavioural difficulties often need special considerations for safe travel in a motor vehicle. These behavioural problems can create a dangerous situation for the child and other vehicle occupants if they can release themselves from the restraint.

Australian/New Zealand Standard AS/NZS 1754

Clause 3.12 of AS/NZS 1754:2010 states: "…where child restraints are designed for children with disabilities requiring special needs, the child restraint shall comply with the **intent** of this Standard…"

Intent is not clearly defined in AS/NZS 1754, however there are a number of clauses included in AS/NZS 1754 which assist in defining the intent of AS/NZS 1754. For example, clause 3.1 relates to 'the extent of protection of the child provided by child restraint systems':

Extent of protection:

(a) The child restraint shall be capable of protecting the wearer under the dynamic conditions specified in AS/NZS 3629.1 *Methods of testing child restraints*

(b) The child restraint shall minimise the possibility of hazardous impact with the interior of the vehicle.

2 http://www.aihw.gov.au/publications/index.cfm/title/10582 accessed December 2010

3 http://autismaus.com.au/uploads/pdfs/PrevalenceReport.pdf accessed December 2010

In addition, three further clauses relate to child restraints for children with a disability:

"where child restraints are designed for children with disabilities requiring special needs, the child restraint shall comply with the intent of this Standard, see Clause 5.2.2(b) and Clause 6.3(h)." Clause 3.12

"where a child restraint is specified as suitable for children with a specific disability, e.g. hip spica condition, testing shall be performed with the test dummy simulating the form of disability nominated on the child restraint." Clause 5.2.2(b)

Information to be supplied on the child restraint packaging: "if the child restraint is designed for a child with a disability, the occupant's disability and any limitations on the use of the child restraint". Clause 6.3(h)

The Australian Competition and Consumer Commission (ACCC) Consumer Protection Notice No. 21 of 2011 *Child restraint systems for use in motor vehicles* makes it illegal to sell or hire any child restraint that does not comply with the AS/NZS 1754: 2000, 2004, 2010. However, since October 2008 manufacturers of child restraints for children with a disability have been able to comply voluntarily with the AS/NZS 1754 clauses relating to child restraints for children with a disability (clauses 3.12, 5.2.2(b) and 6.3(h)). As compliance with these clauses is voluntary, there is no evidence that Australian or overseas manufacturers supplying child restraints for children with a disability are following this practice.

It is possible therefore that some child restraints for children with a disability available for hire or purchase in Victoria, do not meet the requirements of AS/NZS 1754, especially in relation to intent.

Methods

VicRoads undertook a desktop review and applied criteria, based on AS/NZS 1754 requirements, to each special purpose child restraint identified as available for hire or purchase in Victoria:

- technical data availability, such as testing performance results
- compliance with one or more of the overseas standards for child restraints
- top tether anchorage system or an engineer approved alternative system
- access to the child restraint manual, including guidelines for installation
- access to a local distributor
- child restraint has features to minimise the occupant's motion in the restraint, such as:
  - five or six point harness (as in AS/NZS 1754 Type A, B and D child restraints)
  - side wings or walls to prevent lateral motion of the occupant in a side impact crash
  - sash seatbelt guides – to orient the sash seatbelt over the occupant's chest in a booster seat
  - lap seatbelt guides – to orient the lap seatbelt over the pelvis area of the occupant and to prevent submarining
- child restraint design avoids loading of the occupant's genital area
- child restraint buckle cannot be released by the occupant.

The MCRI study used a cross sectional survey design to explore current practice in relation to the prescription of child restraints for children with additional needs in Victoria. An electronic survey was sent to occupational therapists currently working in Victoria with children aged birth to 18 years in early intervention services, hospitals, schools, community services, or private practice. The survey was comprised of 25 closed response and one open response question, and took approximately 15-20 minutes to complete. Closed response questions were primarily used to reduce the time it took to complete the survey and to reduce

the chance of incomplete responses. The survey was divided into four sub-sections:

Demographic and employment information; Clinical issues: decision making; Clinical issues: service delivery; and Additional information.

Results

The VicRoads review found that in Victoria nine child restraints for children with a disability are available for hire or purchase. Not one of the nine child restraints is certified to AS/NZS 1754, or at least tested to the requirements of clause 5.2.2(b). The restraints are all supplied from overseas, comply with at least one overseas standards, and can all be classified as special purpose child restraints.

The nine child restraints met the desktop review criteria (refer to appendix 1 and 2), providing a limited assessment. Further research, including performance testing of each restraint, is required to make a comprehensive comparison with the requirements of AS/NZS 1754. For example, AS/NZS 1754 is the only standard in the world requiring side impact testing of child restraints, therefore it is likely a comparison may highlight concerns relating to side impact protection of some restraints supplied from overseas.

Table 1: Overseas special purpose child restraints for children with a disability available in Victoria

Child restraint	Complies with FMVSS 213	Complies with CMVSS 213	Complies with ECE Regulation 44
Columbia orthopaedic	Yes	Yes	Yes
Hippo spica cast	Yes	No	No
Lars	No	No	Yes
Carrot	No	No	Yes
Timy	No	No	Yes
R82 Panda Evo	No	No	Yes
Recaro monza reha	No	No	Yes
Sonja	No	No	Yes
Snug Seat Traveller plus	Yes	No	No

The MCRI survey was completed by 107 paediatric occupational therapists. The research identified that 61% of prescribers who responded to the online survey did not have access to a copy of AS/NZS 4370:1996. In addition 30.5% of participants were unaware that AS/NZS 4370:1996 existed, and 22.0% of participants indicated that they did not make child restraint

recommendations often enough to warrant purchase of the document. A further 12.2% of participants indicated that cost prevented them from accessing the document.

Participants in this research project indicated that in a quarter of cases families do not purchase the child restraints recommended by the therapists, and continue to transport their child in a way that is considered to be unsafe. This may primarily be due to the high cost of equipment and restraints, with families being the primary source of funding for special purpose child restraints. For those families who do purchase the equipment and restraints recommended by therapists, on average it takes between 1-3 months for families to be able to self-fund the purchase.

Conclusion

The VicRoads desktop review of child restraints for children with a disability represents a limited assessment and should be viewed as an interim guide pending further research. The child restraints from overseas need a comparative assessment against AS/NZS 1754 and the overseas standard to which they have been approved to determine their compatibility with the performance requirements of AS/NZS 1754 and for use in motor vehicles in Australia.

Further work is required to develop appropriate resources which support occupational therapists to make car seating recommendations for children with additional needs and which comply with Australian legal requirements and standards.

Ongoing research is also required to look at the high cost of equipment and restraints which are all imported from overseas, and the impact that this is having on families of children with additional needs.

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VicRoads, June 2011, *Child restraints for children with a disability*

Appendices

	Columbia	Hippo Spica Cast	Timy	Snug Seat Traveller Plus	Carrot	Lars	R82 Panda Evo	Sonja	Recaro Monza Reha
Technical data availability	✔	✔	✔	✔	✔	✔	✔	✔	✔
Compliance with one or more of the overseas standards for child restraints	✔	✔	✔	✔	✔	✔	✔	✔	✔
Top tether anchorage system or an engineer approved alternative system	✔	✔	●	✔	✔*	✔	✔	●	+
Access to the child restraint manual, including guidelines for installation	✔	✔	✔	✔	✔	✔	✔	✔	✔
Access to a local distributor	✔	✔	✔	✔	✔	✔	✔	✔	✔
Child restraint has features to minimise the occupant's motion in the restraint, such as:									
Five or six point harness (as in AS/NZS 1754 Type A, B and D child restraints)	✔	✔	✘**	✔	✔**	✔**	✔**	✔**	✔**
Side wings or walls to prevent lateral motion of the occupant in a side impact crash	✔	✔	✔	✔	✔	✔	✔	✔	✔
Sash seatbelt guides – to orient the sash seatbelt over the occupant's chest in a booster seat	N/A	N/A	✔	N/A	✔	✔	✔	✔	✔
Lap seatbelt guides – to orient the lap seatbelt over the pelvis area of the occupant and to prevent submarining	N/A	N/A	✔	N/A	✔	✔	✔	✔	✔
Child restraint design avoids loading of the occupant's genital area	✔	✔	✔	✔	✔	✔	✔	✔	✔
Child restraint buckle cannot be released by the occupant	✔	✔	✔	✔	✔	✔	✔	✔	✔

● The Timy and Sonja restraints both meet overseas standards. However at this stage it is unclear how well the lower attachment system would perform under the tests in AS/NZS 1754 or other impact conditions. Further work will be undertaken to assess this issue.

* The tether strap system may provide only limited restraint of the seat in a crash.

** The 4 or 5 point harness functions to position the child in the restraint and may not provide protection in a crash. The restraint of the child is achieved through the use of a three-point seatbelt

+ ISOfix variant would be suitable if compatible with vehicle, but not tether strap.

Appendix 2: Description of child restraints for children with a disability

The table below provides information on key design features, the recommended size and weight ranges, and where to purchase or hire the restraints from. All of the child restraints presented in the table meet the definition of special purpose child restraint in accordance with AS/NZS 4370:1996.

AS/NZS 1754 certified child restraints may be suitable for use by children with a disability. As per AS/NZS 4370:1996, the first consideration for the prescriber is to recommend an AS/NZS 1754 certified child restraint for a child with a disability (refer to appendix one). These products have been tested to the performance requirements of AS/NZS 1754. However, in some instances the prescriber may recommend a modified child restraint or use modification in accordance with AS/NZS 4370:1996.

For example, children with hip spica are often prescribed use modification with the use of an extended crotch strap with a compatible AS/NZS 1754 certified child restraint (e.g. Safe-n-sound safeguard, guardian or maxi-rider).

One feature of some of the child restraints is a swivel base. The Timy and Sonja restraints both have this feature, for example, which may help in assisting a child in and out of the restraint. However, the swivel base prevents the use of a top tether strap. In both the Timy and Sonja the restraint is anchored by a bar that fits between the seat base and the back.

Note: Some of the child restraints presented in this table have optional extras. The use of those optional extras may in some circumstances interfere with the safety performance of the child restraint. The prescriber should consider if the optional extra changes the anchorage system or the harness system of the child restraint.

Special purpose child restraints

Product and Standard	Design features	Recommended Size Range	Available from:
Columbia orthopaedic car seat 	• Forward facing (fixed) • Height adjustable • Padded head supports • Seat depth extender • Four lateral positioning foam pads	Model 2000 Body weight: 9.1 to 46.3 kg Height: less than 152.4 cm Model 2500 Body weight: 18.1 to 59.0 kg Height: 137.2 to 167.6 cm	FAS Paediatric Mobility
Hippo spica cast car seat 	• Rearward or forward facing • Reclinable • Shorter seat depth	Rearward facing reclined Body weight: 2.3 to 15 kg Forward facing reclined Body weight: 9 to 15 kg	Britax Dejay Rehabilitation Mobility Equipment
Timy 	• Forward facing • Swivel base • Reclinable • Height and angle adjustable footrest • Additional position padding for head and torso • Support tray option	Model standard: Intended for children between 3 and 12 years and Body weight: to 36 kg Model Maxi Body weight: up to 49kg	Medifab

Appendix 1: Comparison of child restraints for children with a disability compatible for use in Australian motor vehicles

Product and Standard	Design features	Recommended Size Range	Available from:
Snug Seat Traveller plus 	• Forward facing • Optional padded abductor • Height adjustable headrest • Reclinable • Support padding • Buckle guard • Optional seat extension	Body Weight: 10 to 47.5 kg Height: up to 142.2 cm	Dejay Medical and Scientific
Carrot car seat 	• Forward facing • Slightly reclinable • Foot rest • Seat extension • Swivel base • Available in three sizes	Designed for children between 3 and 15 years Body Weight: 15 to 36 kg	Medifab
Lars car seat 	• Forward facing • Swivel base • Sliding motion of sub frame • Lateral supports • Adjustable hip supports • Width and depth adjustments • Back height adjustment • The sub frame has a height and angle adjustable footrest • Tilting bracket allowing the seat to be tilted up to 25 degrees. • Hip strap • Foam padded tray • Two seat variants	Body Weight: up to 36 kg.	Liberty rehab
R82 PANDA EVO 	• Forward facing • Swivel base • Range of head supports • Lateral supports • Foot plates • Frame installation required	Body weight 9 to 36 kg	Independent Living Centre NSW GDS Mobility GTK Rehab Mobility Plus
Sonja car seat	• Forward facing • Swivel base	Model SSCS-1: Body weight: up to 30 kg	FAS

Appendix 1: Comparison of child restraints for children with a disability compatible for use in Australian motor vehicles

Product and Standard	Design features	Recommended Size Range	Available from:
	• Three sizes available	Model SSCS-2: Body weight: up to 45 kg Model SSCS-1: Body weight: up to 60 kg	
Recaro Monza Reha car seat 	• Forward facing • Tray option • Depth extension • Wedge support inserts	Body weight: 15 to 50 kg Height: 94 to 150 cm	FAS

Note: This list represents the child restraints for children with a disability identified as for sale or hire in Victoria. There may be other child restraints for children with a disability available which have not been identified in this report.