Restraining children with disabilities or medical conditions safely

Susan Teerds, Tory Cameron

Kidsafe Queensland Incorporated

Abstract

In 2009, 288,300 children (7%) of those aged 0-14 years, were estimated to have a physical disability. Children with such conditions often cannot support their torso or head in an upright seated posture. They often have diverse conditions including seizures and intellectual disability.

The Australian Standard (AS/NZS 4370:2013) Restraint of Children with Disabilities, or Medical Conditions in Motor Vehicles recommends that these children be restrained in (AS/NZS 1754:2013) compliant car restraints. Even modified compliant car restraints should be considered before special purpose seats from overseas which are quite expensive and not compliant. Coupled with the recent release of Type G child restraints, and restraints with supportive side-impact protection that meet AS/NZS 1754:2013, Kidsafe Queensland has been extremely successful in seating increasing numbers of children with disabilities in Australian Standard child car restraints with minimal modifications.

Lessons learnt in Queensland provide a platform for strengthening the safe restraint of these children in motor vehicles in car restraints that meet one of the highest standards in the World. They also improve awareness and understanding of the ability to seat children with disabilities into compliant child car restraints.

We are collaborating with manufacturers on the development of car restraints that meet the requirements of children with disabilities and Australian Standards. We are also collaborating with occupational therapists, physiotherapists and other key stakeholders on the safest method of transporting children with medical conditions and their special needs.

Introduction

Children with disabilities can present many challenges in daily life and to seat them safely in motor vehicles has been a focus for Kidsafe Queensland. The release of the Australian Standard (AS/NZS 4370:2013) increased the impetus to restrain these children in compliant restraints and it supported the work that Kidsafe Queensland had been undertaking.

In Australia it is illegal to use child restraints which do not comply with the AS/NZS:1754 child restraint systems for use in motor vehicles. However, child restraints meeting this Standard are often not suitable for children with a disability or medical conditions and many special purpose child restraints are imported from overseas.

A study published in the Medical Journal of Australia (MJA) (Reene, Zuryinski, Elliot & Bilston, 2007) showed that:

- In Australia in 2005, 72 child passengers under the age of 16 were killed in motor vehicle accidents, accounting for about two-thirds of all road user deaths in this age group.
- About a thousand Australian children are seriously injured in motor vehicle accidents each year, despite 92% using seatbelts and child restraints.
- Car accidents are the most common cause of injury and deaths for Australian children aged 1-14 years and account for about 40% of all injury-related deaths.
- Premature graduation of children to adult seatbelts, misuse of seatbelts and use lap-only belts increase the risk of injury or death.
- Australian parents believe child restraint installation is easy, however research indicates that more than 20% of restraints are fitted incorrectly (e.g. top tether not connected, seatbelt incorrectly threaded or not buckled, anchorage point used incorrectly). About two-thirds of parents consider using licensed restraint-fitting stations.

Premature graduation of children to adult seatbelts is something commonly seen in the disability area. Parents are unaware that there are options for their children to stay within a 6-point harness for longer. When the incorrect restraint is used, whether because their age or physical needs, the increase in injury or death is much more significant, which is why Kidsafe Queensland is dedicated to providing the resources and education to help parents, occupational therapists and disability workers aware of other options for restraints in motor vehicles.

After investigation of many of the special purpose seats, Kidsafe Queensland staff were not happy with the weight, lack of tethers, adult seatbelt path and installation of many of these restraints.

The recent introduction of Type G seats particularly, has allowed Kidsafe staff to supply seats to Queensland families where there is a need for extra upper torso support and lateral supports. Previously it was common practice for families to import special-purpose seats at an incredibly expensive cost to themselves and/or the Queensland Government. The cost of imported speciality seats range from approximately $3000 to $15000. At one time they were the only option available even though not designed for Australian vehicles, roads and not legal under the Australian Standard. A complaint Type G seat allows a child to be restrained in a 6-point harness from approximately 6 months to 8 years or older. There are currently 5 Type G seats on the market, with more to be released. Prices vary between $250 and $480, making them more affordable for families. It also frees up any funding the families are entitled to for other vital needs. Not only does it help families financially, the seats are easily accessible which allows a variety of different seats to be tried for each individual case. All kids are different and disabilities are different, and having a myriad of seats to choose from allows for an optimal fit for each child's special needs and also an optimal fit for the particular vehicle transporting each child. A seat may also need to be transferred between cars and special buses.

Along with Type G seats, the 2103 AS/NZS:1754 Standard also allowed manufactures to produce seats that can rear face for longer. The recently-released Type A4 restraint allows a child to rear face for between two and three years. In terms of disabilities, children who can't support their own weight when sitting can often more easily be restrained rear-facing. It is safer for them to travel rear facing when their muscles cannot support the weight of their torso and head. Larger rear-facing seats have padded inserts that offer the body good, solid

support which is often required. For the younger children and babies, Kidsafe Queensland is commonly using the Meridian SICT, which can rear face to approximately 2-3 years. It offers a great recline both rear facing and forward facing and has very supportive padding. It will also last approximately 4-6 years making it a great option financially. Having more options at a lower cost makes our work easier, lessens the stress on the families and also lessens the financial stress on the Government - which is often providing the funding for restraints for children with a disability or medical condition.

Kidsafe Queensland has had a 100% success rate in the past six months to June 2015 in seating children with disabilities in Australian Standard compliant child car restraints. Of 23 clients, 19 seats required some modification. This success is somewhat attributed to the questionnaire developed by Kidsafe Queensland and the enthusiasm from the specialised medical practitioners by providing vital information to allow us to assess each child's individual need. The team at Rehabilitation Engineering at Lady Cilento Children's Hospital and other orthopaedic departments throughout Queensland hospitals are embracing the use of compliant seats and work closely with us to provide input and modifications where required.

To date 11 training seminars have been delivered with various organisations and hospital Occupational Therapists and Physiotherapists on the use of compliant seats. Seminars have also been delivered to the Cerebral Palsy League workers, Department of Child Safety Officers and Disability Services workers.

Case Studies

Child A. Condition - Down Syndrome with sternal sutures following open heart surgery; scoliosis with thoracic spine concave to the left centred at T6.

Child A was very difficult to transport in the car due to behavioural issues which included getting out of his child restraint and trying to climb into the front seats whilst parents were driving. Child A used to scream, bite and hit when the harness was being done up. His parents and OT worked out that the chest area was still very tender and was causing this behaviour. Child A also needed some extra lateral support to help with the curve of his spine.

After trialling Child A in three seats over half-hour time periods, The Maxi Guard SICT with modifications was the most successful.

Modifications included the design and build of a chest plate to cover the area which caused him to be distressed. Prototype 1 was made it out of neoprene with a white foam backing but after fitting this was found to be bulky and, with the Queensland humidity, it was not viable. Trial 2 used a heavy wetsuit material with a small pocket along the sternum for extra support and connected it onto the crotch area so it was secure and firm.

A high-density foam wedge was added to the left hand side of the seat to get child A seated more frontal than curved.

A Houdini Stop strap was added to discourage Child A removing his arms from the harness.

It has been four months since completion of the modifications and supply of the seat and the parents are extremely happy with the outcome. Child A is now staying in his restraint and is happy to get in his restraint, making travelling in the car pleasant for all.

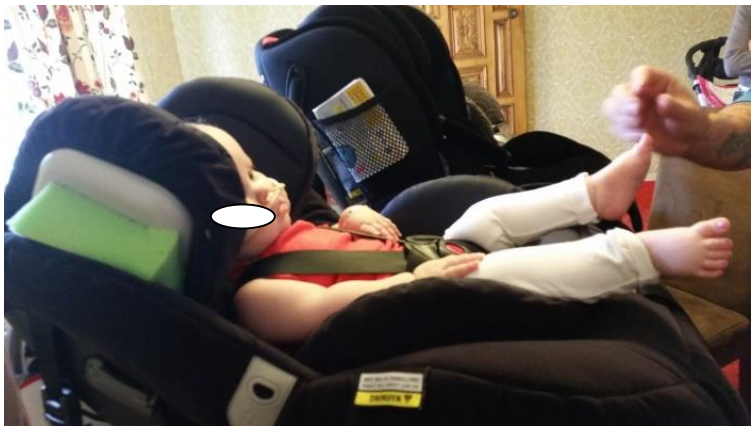
Child B. Condition: Very low tone; nil head control; not always alert; frequent seizure activity (up to 40 per day); requires oxygen through NP; NGT feeds; and under palliative care.

Child A, due to such frequent seizures, and not having a restraint that supported her enough whilst travelling, was only transport via ambulance to and from hospital appointments.

After trialling Child B in three seats over one-hour time slots to monitor how she functioned in the child restraints while seizing, Kidsafe Queensland staff we able to work out areas within the restraint where extra padding was required. The Meridian SICT with modifications was the most successful solution.

Modifications included using high density foam wedges in places where Child B needed extra support. We also added a high-density foam wedge in the head area to compress the head support to open the area for support to the head whilst seizures occurred while allowing enough room for sufficient airflow. Child B was in full recline in rear-facing mode.

It has been two months since completion of the modifications and supply of the restraint and the parents are extremely happy with the outcome as Child B is travelling comfortably rearward facing to and from hospital.



Child C. Condition: Cerebral palsy.

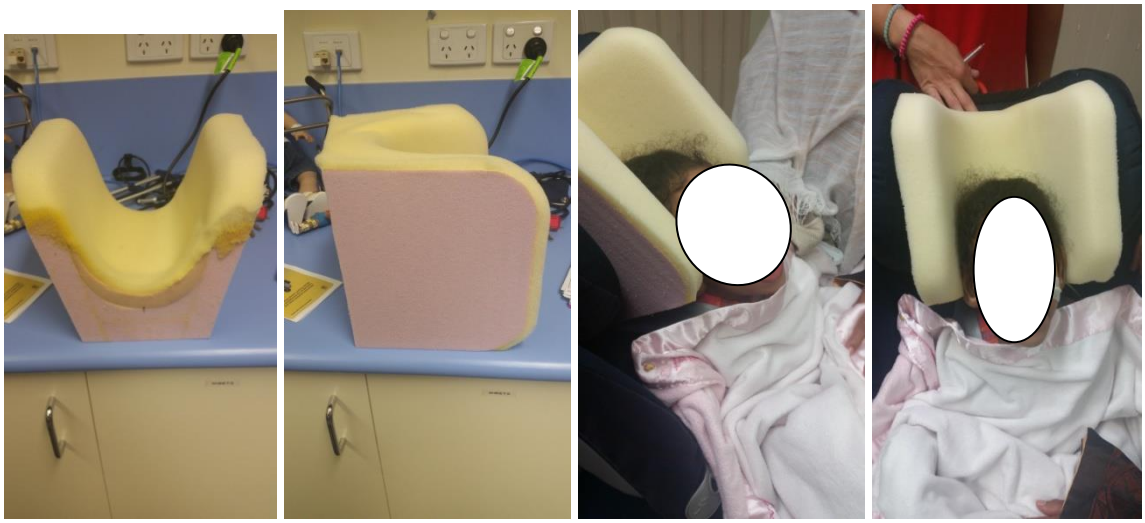
Child C was only being transported via the special school bus but, the bus company then refused to transport Child C due to the seizures and postural position which was causing unsafe driver decisions. This forced the school to review Child C's options for transportation.

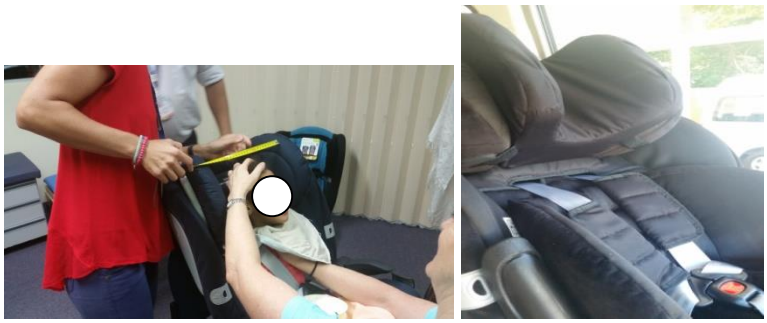
After trialling Child C in four seats over half-hour time slots, the Maxi Guard SICT with modifications was the most successful.

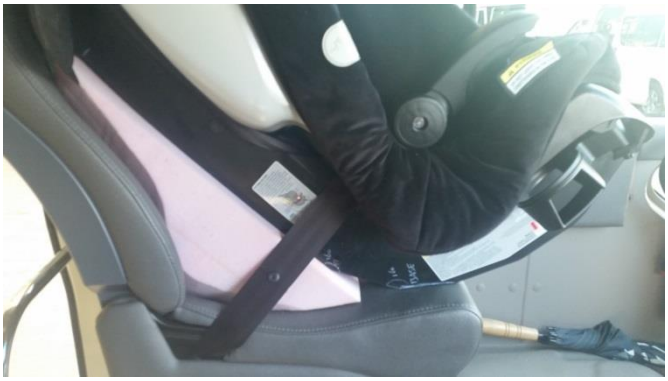
Modifications included removal of the recline foot and the design and build of a new recline shell in high-density foam in three layers. This was built with help from the rehabilitation engineers at Lady Cilento Children's Hospital. This process involved many hours and templates to create the exact recline necessary for the bus seat.

We also added a high-density foam head support that inserted into the head area of the restraint to support the head as Child C would not and could not lean back into the seat due to her condition – therefore we had to bring the seat to her. A child's neck brace also used to support the head further – keeping her chin from resting on her chest – thereby keeping Child C's airway open. A Secure-Ap was added to give even more lateral support in the harness.

It has been four months since modifications were completed and supply of the seat and the school are extremely happy with the outcome as Child C is again being transported to and from school in the bus. The driver is no longer having to pull over repeatedly to prop child C back up in her seat.







Discussions

Kidsafe Queensland is engaging with and consulting key stakeholders including the three child car restraint manufacturers in Australia – Britax, Dorel and Infa-secure. Some manufacturers provide extended crotch buckles and advice on modifications of their child car restraints. We are also in consultation with Kidsafe in Australian Capital Territory and Western Australia. Both of these states also provide solutions for children with disability and/or medical conditions. We also consult with medical practitioners and occupational therapist and various relevant others on the needs for children with a disability or medical condition. Kidsafe Queensland has provided child car restraints for children with hip spica plasters for many years but, with the introduction of the new standard for child car restraints, the high seat sides giving extra side-impact protection, means that these seats are difficult to use with for babies and children with hip spica plasters. Consultation with the manufacturers, and the new compliant seats being brought to market, has resulted in new seating options for these conditions.

References:

Reene, KN, Zuryinski, YA, Elliot, EJ and Bilston, L 'Seatbelts and the law: how well do we protect Australian children?" 186(12) *Medical Journal of Australia* 635, 635-638