Short reports

Use of restraint systems by preschool children in cars

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SUMMARY Many deaths and injuries would be prevented if children in cars were adequately restrained. Cars were stopped at random and the use of child car seats by 853 children aged between 6 months and 4 years was ascertained. One hundred and thirty-three (65%) of the children aged between 6 and 11 months were travelling in seat restraints. Thirty-five (30%) of the children aged between 3 and 4 years were similarly restrained. Thus there was a significant decline in the use of child car seats within the age range for which they are suitable. There are several possible explanations for this finding and it is suggested that not only should efforts be made to encourage parents to provide car restraints for their infants but that attention should be focused on the reasons for this decline in the use of seat restraints.

In New Zealand, accidents are the leading cause of death of children aged between 1 and 14 years and those involving a motor vehicle form the largest single group. If child passengers were adequately restrained while travelling in cars, many casualties would be prevented. At present only a few children are safely restrained.¹

The most appropriate method of safely restraining a child varies with age. Between ages 6 months and 4 years child car seats are recommended. The use of restraints by such children is reported.

A child car seat is a specially designed safety device for the protection of infants and young children travelling as passengers in motor vehicles.

Each car seat has its own 'seat belt'—straps which slip over the child's shoulders, around his waist, and between his legs. The straps clip into a buckle thereby restraining the child securely within the seat. The device is held in place on the normal car seat by means of an adult seat belt or tether straps bolted to the car chassis.

Methods

The observations were made on various occasions

between November 1980 and July 1981 in several New Zealand cities.

Cars containing small children were stopped at random on suburban roads by traffic officers of the Ministry of Transport or by volunteers in shopping centre car parks. The age of the child was obtained from the driver. The manner in which the child was travelling was noted. Each observer had received detailed briefings on the range and correct use of child car seats available in New Zealand.

The observations were recorded primarily to provide baseline data before the introduction of a pilot child car seat rental scheme. All parents in a designated geographical area will be offered the opportunity to rent a child car seat when their infant reaches 6 months of age. In the first year of the scheme's operation, the impact will be on children under 2 years. Accordingly, particular attention was paid to obtaining data on such children.

Results

Eight hundred and fifty-three children between ages 6 months and 4 years were observed. A similar pattern of results was obtained from each city and from each of the two types of location; therefore the results have been combined (Table).

Even though the use of a child car seat is recommended for children aged between 6 months and

Table How children ($n = 853$) aged 6 months to 4 years travel in cars

Age (months)	Number restrained		Number not restrained	P	
	No	(%)			
6-11	133	(65)	73	NS* <0.05† <0.01‡	} P<0.001§
12-23	243	(61)	157		
24-35	66	(51)	64		
36-47	35	(30)	82		

* $\chi^2 = 0.84$ 1 df, † $\chi^2 = 4.02$ 1 df, ‡ $\chi^2 = 11.08$ 1 df, § $\chi^2 = 35.89$ 1 df.

4 years, only half as many such children were restrained compared with those between 6 months and 1 year of age.

Discussion

The use of child car seats by preschool children is related to the age of the child. Many parents protect their infants but later abandon the use of restraints before the children outgrow them.

This inverse relationship between the age of the child and the use of restraints has been noted to continue throughout childhood.²

In the course of the growth and development of a child several different devices are required to ensure adequate restraint. This may have deterred parents from taking action to protect their children, because of the cumulative cost of several devices, the difficulties experienced in fitting some of them into vehicles, and the lack of availability of devices for certain age groups.³

Associations have been noted between such factors as the use of child restraints and the wearing of a seat belt by an adult,⁴ the attitude of the parents towards how they view their ability to control events in their lives,² and the level of education of the mother.⁵

All these may well be important, but other factors may contribute to the decline in use over the approved age range of a child car seat, and we offer the following hypotheses.

Parents may use child car seats as positioning devices rather than as safety devices. With increasing age, children are more able to maintain their balance in cars and so have less need for the support offered by child car seats.

Parents may purchase a car seat for their first child. They may regard a very young infant as more vulnerable than an older toddler and so the latter may be removed from the seat to make way for a younger sibling.

The normal development of a child may play an important role. When a child enters his phase of negativism, this general attitude may be reflected in his behaviour when attempts are made to place him in a child car seat. There are times when a parent, wishing to avoid potential conflict, leaves the child unrestrained.

Some children are physically able to release themselves from the device at an early age, thus rendering the restraint useless. Car seats meet the requirements of the New Zealand standard. This specifies that the force necessary to release the buckle on the harness should be not less than 35 N. Since this level is sufficiently high to prevent nearly all preschool children from securing their release by direct

pressure with their fingers, some children must have discovered ways of applying the necessary force to the buckle by some other means.

Child car seats are recommended for children up to 18 kg body weight. The manufacturer's guidelines indicate that such seats are suitable for children up to age 4 years. New Zealand growth standards for children demonstrate that one child in four will attain a body weight of 18 kg by age 3½ years.⁶

The only other direct observational study that we could find, in which the results were broken into comparable age groups, showed a much lower level of restraint.⁴ Sixty-one per cent of 1-year-old children in New Zealand were restrained compared with 12% in the USA. For 2-year-old children the comparable figures were 51 compared with 7%, and for 3-year olds, 30 compared with 6%. The reason for these pronounced differences is unknown but it is possible that they reflect the laws and attitudes relating to seat belt use by motor vehicle occupants in the two countries.

In New Zealand all car drivers are required by law to wear a seat belt. In addition all passengers over age 8 years in the front seat must wear a seat belt and if a seat belt is available to a passenger sitting in the rear seat, it must also be worn.

Other observational studies have reported that there is a low overall use of restraints by children in cars and this has led to health education campaigns designed to encourage parents to obtain restraints for their children.³ One study even distributed free seats to determine if this would increase their rate of use.⁷ Some places have legislation which requires children to travel in restraints. The variable results obtained from these different approaches have been reviewed.⁸

The results of this study suggest that not only should efforts be made to encourage parents to provide car restraints for their infants but that attention should be focused on the reasons for a decline in the use of a restraint system within the age range for which it is suitable. A variety of approaches would be necessary to counter the hypotheses put forward in this paper. They range from the development of programmes designed to correct mistaken parental attitudes to suggestions for the redesign of aspects of child car seats. Further information is needed to ensure that efforts are concentrated on the most effective solutions.

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Prolonged foreign body impaction in the oesophagus

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SUMMARY The severe consequences of prolonged impaction in the oesophagus of a fairly radiolucent foreign object (aluminium can top) in 2 children are reported. The value of endoscopy in cases of unexplained dysphagia, even in the presence of normal radiographic examination, is stressed.

Ingestion of foreign bodies by infants and small children is common. In many cases, the foreign object passes uneventfully through the gastrointestinal tract.^{1,2} Impaction occurs most often in the upper third of the oesophagus. Generally, the history, clinical symptoms, and plain x-ray investigation establish the correct diagnosis. Occasionally, as a result of mild initial symptoms or the ingestion of a radiolucent object, the diagnosis of an oesophageal foreign body is delayed for several months or even years with severe consequences or even mortality.

The aluminium ring can top is a classical example of a fairly radiolucent foreign body which may easily be overlooked on a plain radiograph. Delay in the extraction of an impacted can top in the oesophagus may result in transmural ulceration into the mediastinum with consequent abscess formation,³ haemorrhage from one of the great blood vessels,⁴ or stricture formation.

Patients

Case 1. This 8-year-old girl had been investigated at age 2 years because of a 6-month history of

recurrent upper respiratory tract infections and for feeding problems since birth. Plain x-ray film of the chest showed a slight widening of the superior mediastinum. A contrast swallow showed a small hiatus hernia with minimal gastro-oesophageal reflux. The child was reviewed at regular intervals for the next 6 months, and as her weight remained on the 50th centile for her age, she was eventually referred back to the family practitioner for further management.

She continued to experience difficulty with swallowing and failed to thrive. At age 8, she was admitted to her local hospital with a further respiratory tract infection. Her weight had fallen to below the 3rd centile for her age. A barium swallow (Fig. 1, left) showed a large multilobular diverticulum at the level of the thoracic inlet with a long distal oesophageal stricture extending to the level of the 3rd vertebra. Tomography of the superior mediastinum clearly demonstrated the presence of a pull-ring situated at the thoracic inlet (Fig. 1, right). Oesophagoscopy confirmed the presence of the pull-ring within the upper oesophagus and the distally strictured lumen. The ring was firmly embedded in the oesophagus and in view of the possible adherence to adjacent blood vessels no attempt was made to extract it. A feeding gastrostomy was fashioned as the child was unable to swallow even thin liquid food at this stage. Three weeks after admission the affected oesophagus was explored via a combined cervical and mediastinal approach through an upper median sternotomy incision. The upper third of the oesophagus was found to have been virtually