CURRENT TOPIC

Cycle helmets

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The late Dr William Spooner of Oxford is said to have remarked that 'there is nothing quite so exhilarating as a ride on a well boiled icicle'.¹ Most schoolchildren own a bicycle² and have experienced this exhilaration for themselves. Far too many have also experienced, sometimes at the cost of their lives or serious injury, how dangerous cycling can be. In Great Britain in 1990, 49 children under 15 were killed, 1246 seriously injured, and 6122 slightly injured in cycling accidents.³ These figures, and provisional totals for 1991 of 47, 1150, and 5940 respectively,⁴ suggest improvement since 1989 (71, 1546, and 7758), which is welcome after a decade of little change.⁵ Interpretation has to take account of a marked decline in the use of cycles by children for journeys to and from school and leisure activities,² reflecting the growing threat to children's safety and freedom of movement posed by increasingly heavy and fast moving traffic on United Kingdom roads.

Cycling is so much a part of daily life that it requires a considerable effort to view it objectively as the potentially unstable and hazardous activity that it undoubtedly is. Cyclists run a high risk of falling or being knocked off, usually onto a hard surface and often in a situation involving traffic. Not surprisingly, head injuries are characteristic of serious cycling accidents, and have been identified as the major cause of death to pedal cyclists, especially children.⁶ In one study 86% of child cyclists killed or seriously injured were boys; 90% of cycle accidents occurred in daylight; and over half of the children under 12 years old involved in cycle accidents were playing, performing tricks, riding too fast, or simply losing control and falling off,⁷ providing indirect evidence of the relatively high risk to children of not riding a cycle with 'reasonable care', and of the importance of cycle training.

The case for protective cycle helmet use is entirely reasonable,⁸⁻⁹ but to date it has had to be based almost entirely on the types of data quoted above, together with laboratory and other experimental work simulating the protective effect of helmets using dummies. A study in the USA of 235 head injured cyclists concluded that 'helmets could reduce the risk of head injury by 85% and of brain injury by 88%'; 24% of control groups were helmet wearers, and only 4% of 99 patients with 'serious brain injury' had worn helmets.¹⁰ In the United Kingdom, an annual saving of £80 million in hospital costs alone following universal (all ages) cycle helmet use has been estimated,⁷ and the overall saving in financial and human terms would of course be much greater than this.

In 1990 the Department of Transport in the United Kingdom started a vigorous education and publicity campaign to promote the use of cycle helmets for all age groups. There have been similar campaigns of much longer standing in other countries, particularly Australia, Scandinavia, and parts of the USA. Legislation has now been introduced in Victoria¹¹ and New South Wales in Australia, and it is likely that conclusive evidence about the protective effect of cycle helmets will soon start to become available from there.

Helmet design and safety standards

As well as providing protection, a cycle helmet must be as light and as comfortable as possible. It consists essentially of a layer of expanded polystyrene or polypropylene fitting snugly over the cranium and designed to absorb impact energy and thereby to protect the head from injury. A 'softshell' helmet has a Lycra cover over the polystyrene to provide some scuff and abrasion protection. A 'hardshell' helmet encloses the polystyrene in a shell of harder plastic, which provides some protection from sharp, penetrating objects and increases the overall durability of the helmet, but usually with the penalty of increased weight and cost. Improvements in helmet design have reduced these differences, and more recent 'microshell' helmets for children have a hard outer shell with very little extra weight or cost.

Most available helmets conform to one or more nationally approved standards, which provide a specification for manufacture and also varying degrees of quality control. The most widely used standards to date are two from the USA, the ANSI Z 90.4 and Snell B 90, and the Australian standard AS 2063.86. Helmets to some or all of these standards have been imported in large numbers to this country, because the British standard BS 6869:1989 was not available at the time when helmet sales started to soar following the publicity campaigns. Apart from the stringent quality controls associated with kite marking, the British standard involves a 'kerb anvil' test, simulating the helmeted head striking an angular object such as a kerbstone. This test is not included in the other standards, and a controversial *Which?* report¹² showed that several helmets conforming to US and Australian standards failed this particular test. The late arrival of the British standard was not well received by the United Kingdom cycle trade, which tends to regard British helmets as being less well designed, less stylish, and heavier than imported rivals

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(S Rogers, personal communication). British helmets are undoubtedly closing the gap, and the newest designs for children in particular cannot be faulted on these grounds. The standards issue will be taken further when a new European standard is introduced in 1993: this will include the kerb anvil test, and European Community regulations will make it illegal to sell cycle helmets which do not conform.

Ownership and use

Children must be encouraged to own and use a cycle helmet, and obviously regular use does not follow automatically from ownership.

Helmets are now widely available through normal retail outlets and also through low cost schemes usually (but not invariably) organised by local authority road safety departments, linked with cycle training programmes.¹³ The cost of a helmet has decreased markedly compared with three years ago: typical prices are £13.50 through a low cost scheme, and £20–30 from cycle shops.

Attitudes have also changed. Publicity campaigns have certainly encouraged parents to buy helmets for their children. The 'nerd factor' (peer derision) is a less potent inhibitor than it used to be. Helmets are being marketed as essential fashion accessories for the young cyclist. Most children these days want a mountain bike, and mountain bikers as a group are good helmet wearers, so that a cycle helmet is becoming part of the image.

Helmets must be stylish and attractive. They must fit properly; growth in children is accommodated by sizing pads or adjustable webbing systems within the helmet. Helmets must be worn correctly, and rakish perching on the back of the head has to be actively discouraged. A helmet must be comfortable, which means as light and as well ventilated as possible. It must be sufficiently durable, though in childhood growth will probably dictate the need for a new helmet before polystyrene fatigue. It must not impair vision or hearing: two children's helmets tested by *Which?*¹² were criticised for potentially restricting hearing.

Over one million cycle helmets were sold to children in the United Kingdom in 1991, half of these through low cost schemes (T Smith, personal communication). By now it is likely that about 15% of school age cyclists in this country own a helmet, so there is a long way to go. There are no available figures on regular use: it is estimated that 16% of schoolchildren in Sheffield owned a helmet by the end of 1991, and 6% were using them regularly (T Smith, personal communication). It is tantalising to speculate, in the absence of evaluation data, whether helmet use has begun to contribute to the recent decline in child cycle accident mortality and morbidity noted earlier^{3 4}: the timing is certainly right.

Further progress

The traditional approach to road accident prevention through engineering, education, and

enforcement is also appropriate to further progress with cycle helmets.

ENGINEERING

The design and manufacture of safe, user friendly helmets for children has made great strides in the past few years; further progress can be expected, and it seems likely that the new European standard will represent best practice.

EDUCATION

Education and publicity campaigns clearly continue to make an impact. Attempts to change people's behaviour in ways which are health promoting have a poor collective track record, however,¹⁴ and there are no particular reasons to expect exhortation on its own to result in sufficiently high levels of cycle helmet use on a regular basis. The likelihood of helmets remaining indoors when children go cycling may be a disincentive to parents to add the cost of a helmet to that of a bicycle.

ENFORCEMENT

Experience with seat belts in cars and with helmets for motorcyclists suggests that further prolonged education campaigns will need to be backed up at some point by legislation making the use of cycle helmets compulsory. Many will regard this approach as impossible to enforce, but similar fears were expressed in anticipation of seat belt and motorcycle helmet legislation. Once again Australia may be pointing the way. Education campaigns alone in Victoria have produced regular helmet use rates of 77% in primary schoolchildren, 18% in secondary schoolchildren, and 46% in adults. Much higher rates even than these impressive levels were reported within five months of legislation being introduced in August 1990,¹⁵ and we should be keenly interested in their effects on rates of head injury.

Limitations

It is important to be clear and make clear what cycle helmets will and will not do. They could reduce considerably the number of head injuries resulting from cycle accidents. They will not directly reduce the number of accidents, and roads will not be made any safer for children on cycles. Helmets will not make children better cyclists unless the links between helmet use, cycle training, and unsupervised cycling are made extremely close. Cycling injuries other than those to the head will not be prevented or reduced; 40% of children killed in cycle accidents have other serious injuries.⁷

Helmet manufacturers are now producing helmets for children from the age of 5 years upwards. It is an excellent idea to associate helmets with learning to ride, but it is important that small children do not assume that some sort of magic protection results from wearing a helmet. Children under the age of about 9 years do not have the necessary cycling skills,

coordination, ability to judge distance and speed, and other perceptual abilities to enable them to cope with riding a cycle in traffic. For older children, the traditional passive approach to personal safety must be replaced by cycle training which encourages the acquisition of cycling skills, combines these with risk management, and emphasises that cycling should *always* involve wearing a helmet.

The doctor's role

All doctors in contact with children can contribute to promoting the use of cycle helmets. They could start by setting an example themselves, if they cycle, and ensuring that family members use helmets and have a positive attitude to wearing them.

Opportunistic promotion in general practitioner's surgeries and hospital departments can be backed up by use of posters and leaflets available through local road safety departments and national organisations.

Community paediatricians should offer explicit and practical support of low cost helmet schemes, and local campaigns can be organised through accident prevention groups.¹⁶ Help with evaluation and audit would probably be a particularly valuable contribution. The brave new school health service should also support cycle safety programmes, including helmet schemes.

General practitioners and paediatricians should expect to be consulted by parents about helmets: they should be sufficiently informed themselves about the basics of helmet design and standards, and also know where to refer

parents and children for further advice: road safety officers, trading standards departments, and responsible retail outlets can help.

Paediatricians should be authoritative about the feasibility of preventing head injuries caused by cycle accidents, and alert to emerging research data which reinforce the case for cycle helmets. Public attitudes and possible future legislation should be shaped by a strong preventive voice representing the collective opinion of paediatricians in the United Kingdom.

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