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[Intervention Review]

Helmets for preventing head and facial injuries in bicyclists

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ABSTRACT

Background

Each year, in the United States, approximately 900 persons die from injuries due to bicycle crashes and over 500,000 persons are treated in emergency departments. Head injury is by far the greatest risk posed to bicyclists, comprising one-third of emergency department visits, two-thirds of hospital admissions, and three-fourths of deaths. Facial injuries to cyclists occur at a rate nearly identical to that of head injuries. Although it makes inherent sense that helmets would be protective against head injury, establishing the real-world effectiveness of helmets is important.

Objectives

To determine whether bicycle helmets reduce head, brain and facial injury for bicyclists of all ages involved in a bicycle crash or fall.

Search methods

We searched CENTRAL, MEDLINE, EMBASE, Sport, ERIC, NTIS, Expanded Academic Index, CINAHL, PsycINFO, Occupational Safety and Health, and Dissertations Abstracts. We checked reference lists of past reviews and review articles, studies from government agencies in the United States, Europe and Australia, and contacted colleagues from the International Society for Child and Adolescent Injury Prevention, World Injury Network, CDC-funded Injury Control and Research Centers, and staff in injury research agencies around the world. The searches were last updated in November 2006.

Selection criteria

Controlled studies that evaluated the effect of helmet use in a population of bicyclists who had experienced a crash. We required studies to have complete outcome ascertainment, accurate exposure measurement, appropriate selection of the comparison group and elimination or control of factors such as selection bias, observation bias and confounding.

Data collection and analysis

Two authors independently extracted data. Odds ratios with 95% confidence intervals were calculated for the protective effect of helmets for head and facial injuries. Study results are presented individually. Head and brain injury results were also summarized using meta-analysis techniques.

Main results

We found no randomized controlled trials, but five well conducted case-control studies met our inclusion criteria. Helmets provide a 63 to 88% reduction in the risk of head, brain and severe brain injury for all ages of bicyclists. Helmets provide equal levels of protection for crashes involving motor vehicles (69%) and crashes from all other causes (68%). Injuries to the upper and mid facial areas are reduced 65%.

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Authors' conclusions

Helmets reduce bicycle-related head and facial injuries for bicyclists of all ages involved in all types of crashes, including those involving motor vehicles. Our response to comments from critics are presented in the Feedback section.

PLAIN LANGUAGE SUMMARY

Wearing a helmet dramatically reduces the risk of head and facial injuries for bicyclists involved in a crash, even if it involves a motor vehicle

Cycling is a healthy and popular activity for people of all ages. Crashes involving bicyclists are, however, common and often involve motor vehicles. Head injuries are responsible for around three-quarters of deaths among bicyclists involved in crashes. Facial injuries are also common. The review found that wearing a helmet reduced the risk of head or brain injury by approximately two-thirds or more, regardless of whether the crash involved a motor vehicle. Injuries to the mid and upper face were also markedly reduced, although helmets did not prevent lower facial injuries.

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