



# AOTA Evidence Briefs

## Brain Injury

*\*A product of the American Occupational Therapy Association's Evidence-Based Literature Review Project*

### BI #9

## **Helmets are effective in preventing ahead injuries in bicycle riders**

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Thompson, R. S., Rivara, F. P., & Thompson, D. C. (1989). A case-control study of the effectiveness of bicycle safety helmets. *New England Journal of Medicine*, 320, 1361–1367.

### **Level: IIA2a**

Nonrandomized controlled trial, 2 groups, 20 or more participants per condition, moderate internal validity, high external validity

### **Why research this topic?**

Bicycling is a popular sport but has its hazards; among them, head injury. “One third of all victims of bicycling accidents treated in emergency rooms have head injuries, as do two thirds of all patients with bicycling injuries admitted to the hospital.” Helmets have been promoted as a way to reduce head injuries. But when this study was conducted, no research had generated compelling evidence of helmets’ effectiveness.

### **What did the researchers do?**

The researchers, variously affiliated with the Group Health Cooperative of Puget Sound (Seattle, Washington) and the University of Washington (Seattle), evaluated the effectiveness of helmets. They compared outcomes of the case group with outcomes of two control groups. The case group consisted of 235 people (171 men and 64 women, 60.9% of whom were under 14 years of age) with head injuries received while bicycling who sought care at the emergency room of one of five hospitals in the Seattle area between December 1, 1986, and November 30, 1987. One of the control groups, “emergency room controls,” consisted of 433 people (304 men and 129 women, 46.7% of whom were under 14 years of age) who received emergency care at one of the five hospitals during the same period for bicycling injuries not involving the head. The other group, “population-based controls,” was made up of 558 members (437 men and 121 women, 85.7% of whom were under 14 years of age) of Group Health Cooperative of Puget Sound (a large health maintenance organization) who had had bicycling accidents during the previous year.

The researchers sent questionnaires to the members of all three groups. The questionnaires inquired about household income, educational level, cycling experience, the circumstances of the accident, and ownership and use of helmets. The researchers obtained data on injuries from the medical records of the case group and the emergency room control group and from the participants themselves of the population-based control group.

The outcome area of interest was *helmet use in relation to severity of injury* (as measured by the Abbreviated Injury Scale).

### **What did the researchers find?**

In the case group, 7.2% of participants were wearing helmets when they had their accidents, compared with 23.8% of the emergency room controls and 23.3% of the population-based controls. Riders wearing helmets reduced their risk of head injury by 85% and their risk of brain injury by 88%.

## What do the findings mean?

- For *therapists and other providers* who use bicycle riding as mobility training, the findings support implementing prevention programs using appropriate helmets. Helmets are particularly important for children, who are at high risk of injury and who, in this study, showed a low rate of helmet use during bicycle riding.
- The findings support promoting of helmet laws to reduce the number and severity of head injuries related to bicycling accidents. Such laws would be similar to those covering seatbelts and motorcycle helmets.

## What are the study's limitations?

The researchers' method of selecting study participants was not systematic; the members of each group were matched according to a variety of factors. This flaw in the study's design lowers confidence that the results of the study can be attributed to the intervention.

The study provides useful information, and the findings are generalizable to the population of persons who ride bicycles.

■ Terminology used in this document is based on two systems of classification current at the time the evidence-based literature reviews were completed: *Uniform Terminology for Occupational Therapy Practice—Third Edition* (AOTA, 1994) and *International Classification of Functioning, Disability and Health (ICIDH-2)* (World Health Organization [WHO], 1999). More recently, the *Uniform Terminology* document was replaced by *Occupational Therapy Practice Framework: Domain and Process* (AOTA, 2002), and modifications to *ICIDH-2* were finalized in the *International Classification of Functioning, Disability and Health* (WHO, 2001).

This work is based on the evidence-based literature review completed by Beatriz C. Abreu, PhD, OTR, FAOTA, and colleagues.

For more information about the Evidence-Based Literature Review Project, contact the Practice Department at the American Occupational Therapy Association, 301-652-6611, x 2040.



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