

Bicycle Helmets



- Bicycles are owned by 1 in 10 people and are involved in more accidents per kilometer than any other vehicle excluding motorcycles. In a study by Begg et al., 57 of 848 cyclists reported 62 (6.7%) accidents with 40 (4.7%) injuries. In an earlier paper by Kilburz et al., accidents, defined in a broader sense, were reported by 46% of 492 cyclists with 9% requiring hospitalization and 23% having lost days from work. In total, the bicycle injury rate is 163 per population of 100,000. Forty-two of these are head injuries, the most serious bicycle related injury.
- Head injuries in children are most frequently caused by bicycles and, according to various authors, result in 70 to 90% of bicycle related deaths and 50% of significant injuries. Only 20% of bicycle injuries involve the head, but these account for 70% of bicycle related hospitalizations. The frequency of bicycle accidents is greatest in the 13 to 16 year old age group and 40% of bicycle deaths occur between the ages of 3 and 14. Ninety percent of the fatalities involve a motor vehicle; 50% take place at an intersection.
- Helmet use plays a significant role in reducing the severity of trauma to the head, particularly when those approved by SNELL (Snell Memorial Foundation), CSA (Canadian Standards Association), or ASI (American National Standards Institute) are worn. A study by Benz et al. showed that in a 1.5 meter fall, forces acting on the head were reduced fivefold from 547-1078 g to 122209 g with the use of a helmet. Another report states that, at 15 kilometers per hour, the energy absorbed by the head is lessened by 90% if a helmet is worn. Helmet use has been shown to reduce the Injury Severity Score (ISS) from 18 to 3.8; serious head injury from 47 to 5.2%; mortality from 60 to 0.9%; the occurrence of head injury by 85 to 95%; brain injury by 88%; skull fractures from 11 to 1%; soft tissue facial injuries from 18 to 5%.
- While literature is inconsistent, reports by various authorities clearly reflect the positive impact of helmet use on prevention. These describe decreases in injury rates ranging from 39 to 90%. As well, reductions of 86% in loss of consciousness, 40% in fatalities, 20% in total injuries, and a protection factor of 3.25 (11% versus 4% head injuries) are reported.
- These estimates support observations that a bicycle helmet was not worn by any child who sustained a head injury or died as a result of a head injury. Cooke et al. report that, in Western Australia, helmets reduced deaths by eight-fold. It appears that a cyclist traveling on a hard surface at 25 kilometers per hour will be protected from head injury by a standard helmet. The overall effect of bicycle helmets has been compared to that of a car seat belt. Consequently, various authorities recommend regular use of helmets by cyclists of all ages.
- Compliance with bicycle helmet use can be improved through education and legislation. Increases ranging from 8 to 13% and 5 to 62% have been attributed to campaigns in education and the media. Education has been most successful in elementary schools, resulting in a 70% compliance rate. Other factors affecting helmet use include subsidization of helmet costs and cultural influences. The history of previous injury did not affect compliance. Several references in recent literature describing the various aspects of public campaigns and education report that 20 to 73% of the populations studied eventually used helmets. Two such campaigns resulted in limited, 8 to 43%, or no effect on compliance. Legislation has been the strongest influence, credited with increases ranging from 47% to 90%.

Summary and conclusions

- Bicycle helmets reduce the incidence of head, face, and brain injuries. Both educational campaigns and legislation have improved child, adolescent, and adult compliance, but legislation is more effective. It is important that bicycle helmet education and legislation be promoted by all healthcare providers.