



Alcohol: obscuring the outcomes of helmet research?

An unforeseen influence

When Crocker, Zad, Milling and Lawson, 2010 commenced their research, they expected to show a link between the non-use of cycling helmets and a heightened risk of head injury. An early press release (Seaton, 2008) (removed by the authors, after the commentary on their paper was submitted for peer-review) claimed: "preliminary results of a year-long study that indicates cyclists are nearly twice as likely to suffer a brain injury if they are not wearing a bicycle helmet".

However, as the research progressed, it became clear that the strongest link with head injury was not helmets but alcohol use by cyclists. Of 40 alcohol-affected cyclists, 57.5% had head injuries, compared to 29.5% of cyclists who had not used alcohol, a highly significant difference. In fact, the research found no significant relationship between helmet use and head injury for sober cyclists. It just so happened that all the intoxicated cyclists except one did not wear a helmet.

Drunk cyclists rarely wear helmets

Kim, Kim, Ulfarsson and Porrello, 2007 also discovered a correlation between alcohol and helmet use. In their study, only 1 of 174 intoxicated bicyclists wore a helmet. Li and Baker, 1994, too, noted that intoxicated bicyclists may be less likely to wear helmets. Li, Baker, Smialek and Soderstrom, 2001 found that sober cyclists are 7 times more likely to wear a helmet than drunk cyclists.

A greater risk of injury

Kim, Kim, Ulfarsson and Porrello, 2007 found that intoxication greatly increased the probability of a bicyclist suffering a fatal injury in a collision with a motor vehicle (by 174%). A Canadian coroner's review has shown that of 129 cyclists' deaths, toxicology tests were performed on 90 and of these one-third (30) showed evidence of the cyclists being under the influence of alcohol or drugs (Ontario, 2012). Olkkonen and Honkanen, 1990 found that an inebriated cyclist had 10 times the risk of injury than a sober cyclist.

Frank, Frankel, Mullins and Taylor, 1995, a study in Portland, Oregon, found that alcohol-intoxicated riders are considerably more likely than sober cyclists to be severely injured or killed. While only 15% of killed and hospitalized adult cyclists had elevated blood alcohol levels, half of the adult cyclists whose injuries were fatal had been intoxicated.

More specifically, Olkkonen and Honkanen, 1990 and Andersson and Bunketorp, 2002 found that intoxicated cyclists have a greater risk of head injury. According to Kraus, Fife and Conroy, 1987, over half the brain-injured bicyclists aged 15 and older who were blood alcohol tested were legally intoxicated.

Spaite et al, 1995 found that the prior consumption of alcohol by cyclists is highly associated with greater injury severity, longer hospitalization, and higher health care costs. In particular, intoxicated cyclists are much more likely to suffer major head injuries. It also happened that drunk cyclists were less likely to wear helmets. Spaite had previously shown that the collision circumstances for helmeted and unhelmeted cyclists are often different (Spaite et al, 1991).

Li, Baker, Smialek and Soderstrom, 2001 concluded that alcohol use while bicycle riding is associated with a substantially increased risk of fatal or serious injury.

Other studies reporting a greatly increased risk for intoxicated cyclists include Kwigizile, Sando and Chimba, 2012.

Alcohol, a common influence in head injury

Research going back many years has shown that alcohol consumption is associated with most causes of head



injury.

Galbraith, Murray, Patel and Knill-Jones, 1976 and Haddon, Valien, McCarroll and Umberger, 1961 found a strong correlation between alcohol and head injuries among pedestrians. According to the UK National Health Service, alcohol may be a factor in about 65% of adult head injuries (NHS, 2012).

A confounder with potentially significant consequences

No helmet research has considered alcohol use by cyclists as a possible confounder and no correction has therefore been made for it. Given the strong association between alcohol, crashes and head injury and the fact that intoxicated cyclists rarely wear helmets, the confounding effect of alcohol could render many of the predicted benefits of helmet use unreliable for cyclists who have not been drinking.

References

Andersson and Bunketorp, 2002

Andersson AL, Bunketorp O, 2002. [Cycling and alcohol](#). Injury 2002;33(6):467-471. **External Link**
<http://www.injuryjournal.com/article/S0020-1383%2802%2900028-1/abstract>

Crocker, Zad, Milling and Lawson, 2010

Crocker P, Zad O, Milling T, Lawson KA, 2010. [Alcohol, bicycling and head and brain injury: a study of impaired cyclists' riding patterns](#). American Journal of Emergency Medicine 2010;28(1):68-72. **Link includes commentary**
<http://www.cyclehelmets.org/1216.html>

Frank, Frankel, Mullins and Taylor, 1995

Frank E, Frankel P, Mullins RJ, Taylor N, 1995. [Injuries resulting from bicycle collisions](#). Academic Emergency Medicine 1995;2(3):200-203. **External Link**
<http://onlinelibrary.wiley.com/doi/10.1111/j.1553-2712.1995.tb03198.x/abstract>

Galbraith, Murray, Patel and Knill-Jones, 1976

Galbraith S, Murray WR, Patel AR, Knill-Jones R, 1976. [The relationship between alcohol and head injury and its effect on the conscious level](#). Br J Surg 1976 Feb;63(2):128-30. **External Link**
<http://www.bjs.co.uk/details/article/927753/The-relationship-between-alcohol-and-head-injury-and-its-effect-on-the-conscious.html>

Haddon, Valien, McCarroll and Umberger, 1961

Haddon W, Valien P, McCarroll JR, Umberger CJ, 1961. [A controlled investigation of the characteristics of adult pedestrians fatally injured by motor vehicles in Manhattan](#). Journal of Chronic Diseases 1961;14(6):655-678. **External Link**
<http://www.sciencedirect.com/science/article/pii/0021968161901229>

Kim, Kim, Ulfarsson and Porrello, 2007

Kim JK, Kim S, Ulfarsson GF, Porrello LA, 2007. [Bicyclist injury severities in bicycle/motor vehicle accidents](#). Accident Analysis & Prevention 2007 Mar;39(2):238-51. **External Link**
<http://dx.doi.org/10.1016/j.aap.2006.07.002>

Kraus, Fife and Conroy, 1987

Kraus JF, Fife D, Conroy C, 1987. [Incidence, severity and outcomes of brain injuries involving bicycles](#). American Journal of Public Health 1987;77:76-78. **External Link**
<http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.77.1.76>



Kwigizile, Sando and Chimba, 2012

Kwigizile V, Sando T, Chimba D, 2012. [Modeling bicyclist injury severity: a focus on the impact of alcohol and drug use](#). Transportation Research Board 12-0057. **External Link**
<http://pubsindex.trb.org/view/1128542>

Li and Baker, 1994

Li G, Baker SP, 1994. Alcohol in fatally injured bicyclists. Accident Analysis & Prevention 1994;26(4):543-548.

Li, Baker, Smialek and Soderstrom, 2001

Li G, Baker SP, Smialek JE, Soderstrom CA, 2001. [Use of alcohol as a risk factor for bicycling injury](#). JAMA 2001;285(7):893-896. **External Link**
<http://jama.ama-assn.org/content/285/7/893.full.pdf+html>

NHS, 2012

[Causes of a minor head injury](#). NHS Choices. **External Link**
<http://www.nhs.uk/Conditions/Head-injury-minor/Pages/Causes.aspx>

Oikkonen and Honkanen, 1990

Oikkonen S, Honkanen R, 1990. [The role of alcohol in non-fatal bicycle injuries](#). Accident Analysis & Prevention 1990;22(1):89-96. **External Link**
[http://dx.doi.org/10.1016/0001-4575\(90\)90010-I](http://dx.doi.org/10.1016/0001-4575(90)90010-I)

Ontario, 2012

[Cycling Death Review 2006 - 2010](#). Office of the Chief Coroner, Ontario, 2012. **External Link**
http://www.mcscs.jus.gov.on.ca/english/DeathInvestigations/office_coroner/PublicationsandReports/CyclingDeathReview/DI_Cycling_Death_Review.html

Seaton, 2008

Seaton Family Hospitals News, Press Release 2008. Previously accessible at:
http://www.seton.net/about_seton/news/2008/05/29/while_umc_brackenridge_research_links_bicycle_helmets_and_injury_alcohol_use_determined_more_dangerous.

Spaite et al, 1991

Spaite DW, Murphy M, Criss EA, Valenzuela TD, Meislin HW, 1991. [A prospective analysis of injury severity among helmeted and non helmeted bicyclists involved in collisions with motor vehicles](#). Journal of Trauma 1991 Nov;31(11):1510-6.. **Link includes commentary**
<http://www.cyclehelmets.org/1164.html>

Spaite et al, 1995

Spaite DW, Weist EA, David MD, Valenzuela TD, Judkins D, Meislin HW, 1995. [A prospective investigation of the impact of alcohol consumption on helmet use, injury severity, medical resource utilization and health care costs in bicycle-related trauma](#). Journal of Trauma 1995;38(2):287-290. **External Link**
http://journals.lww.com/jtrauma/Abstract/1995/02000/A_Pro prospective_Investigation_of_the_Impact_of_28.aspx



The Bicycle Helmet Research Foundation (BHRF), an incorporated body with an international membership, exists to undertake, encourage and spread the scientific study of the use of bicycle helmets. Also to consider the effect of the promotion and use of helmets on the perception of cycling in terms of risk and the achievement of wider public health and societal goals.

BHRF strives to provide a resource of best-available factual information to assist the understanding of a complex subject, and one where some of the reasoning may conflict with received opinion. In particular BHRF seeks to provide access to a wider range of information than is commonly made available by those that take a strong helmet promotion stance. It is hoped that this will assist informed judgements about the pros and cons of cycle helmets.

For more information, please visit www.cyclehelmets.org.

Document downloaded 20 Mar 2018. The copyright in this document is owned by the Bicycle Helmet Research Foundation, but it may be reproduced or distributed freely so long as the content is not modified in any way.