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Head injuries linked to brain diseases

Some sports elevate risk of Alzheimer’s, U.S. scientists warn

BY ANDRÉ PICARD
PUBLIC HEALTH REPORTER

Boxers, soccer players and hockey players may be at higher risk of developing Alzheimer’s disease and other forms of dementia because of the repeated blows to the head they suffer, U.S. scientists are warning.

Researchers at the University of Pennsylvania conducted their research on mice. One group of rodents was repeatedly bashed on the head; a second group suffered one blow to the head; and the third group was not injured.

The mice are bred specifically to develop Alzheimer-like disease. But those in the group that suffered repeated head trauma developed symptoms far more quickly than the others.

"This is the first experimental evidence linking head injuries to Alzheimer’s disease by showing how repetitive concussions can speed up the progress of the disease," said Kunihiro Uryu of the university’s Center for Neurodegenerative Disease Research.

The mice were sedated and subjected to blows that were slightly harder than a slap to the head. Dr. Uryu said that, in a person, this would be equivalent to a punch to the head, heading a soccer ball, or hitting a helmeted head against board or another helmet, as occurs frequently in hockey and football.

Writing in the *Journal of Neuroscience*, the researchers said they were trying to test the validity of studies that reported, retrospectively, that people who suffered head trauma were more likely to suffer from Alzheimer’s and other forms of dementia.

There is anecdotal evidence that athletes who suffer repeated blows to the head are at greater risk. The boxing legend Muhammad Ali, who suffers from Parkinson’s disease, is a case in point. Just last week, the former world boxing champion Carl (Hobo) Olson died of Alzheimer’s disease at the relatively young age of 73. And, last year, former European boxing champion Tiberio Mitri died when he was struck by train; he suffered from both Alzheimer’s and Parkinson’s, an unusual combination.

A Norwegian study showed that soccer players were twice as likely to suffer from dementia as members of the general population. Sports like hockey and football have been studied less systematically.

In the new study, researchers used mice bred to carry the human CDNR gene, which controls production of amyloid beta protein. They develop gooey plaque in their brains that is similar to that found in people with Alzheimer’s.

Scientists know that this buildup of plaque slowly kills off brain cells, robbing sufferers of their memories and ability to function, but they do not know why the buildup begins.

The Pennsylvania researchers killed some mice two days after they suffered concussions, and others after 16 weeks, and measured the amyloid deposits.

"At each point we saw a dramatic increase of indicators for Alzheimer’s disease in the mice that received repeated head traumas," Dr. Uryu said.

An estimated 364,000 Canadians suffer from Alzheimer’s disease and related dementias, a number that is expected to more than double by 2031.

According to the Alzheimer Society, an estimated 83,200 new cases of dementia were diagnosed in 2001.

Age is an important factor: One in 13 people over 65 suffer from Alzheimer, as do one in four people over 85.

The disease costs the economy about $5.5-billion annually.

While no treatment can stop the progress of the disease, several help with some symptoms.

It is unclear what causes Alzheimer’s disease, although it is likely a combination of genetic predisposition and environmental factors.

The article EM0204 reprinted above is used in Chapter 10 of the STAT 231 Course Materials.