Sports Neuropsychology
Society

Chronic Traumatic Encephalopathy:
A Q and A Fact Sheet

For over 90 years, the medical community has considered the idea that repeated injuries to the brain may cause long-term neurological and psychological impairment or damage. Recently, there has been public debate about the risk of participating in contact sports. This interest has been fueled by reports of high-profile professional athletes who experienced a progressive decline of their physical and thinking abilities, and changes in mood and behavior at earlier ages than normally expected. In some cases, these athletes committed suicide. Examination of their brains after death revealed abnormalities in many, but not all, of the players' brains. These abnormal findings have been called *Chronic Traumatic Encephalopathy* or *CTE*. Some medical researchers (see references) have suggested that the CTE was a result of concussions or repeated hits to their heads during their playing careers. The media attention that followed raised public concern about the risks of developing CTE from playing contact sports. However, many of the media accounts contained inaccurate information, leaving the public misinformed and confused about CTE.

Scientific research is being conducted to understand CTE better and how it may be related to brain trauma. This research is still in the early stages. Many questions remain unanswered. This ***Q & A Fact Sheet*** was created by the ***Sports Neuropsychology Society*** to provide answers, based on currently available scientific data, to some of the frequently asked questions and concerns about CTE. It is written for parents, coaches, athletes, policymakers and other health care stakeholders.

What is CTE?
CTE is a syndrome characterized by abnormal changes in brain cells (abnormal tau proteins), which may be accompanied by changes in thinking, mood, and behavior. The presence of abnormal tau proteins is not unique to CTE since it is also found in the brains of people with other neurological conditions. However, it is thought that the pattern of abnormal tau protein deposits is different in CTE and indicative of a unique condition. The syndrome is also thought to be progressive with worsening symptoms over time, but research on the long-term effects of CTE is in its early stages and is inconclusive at this time.

What are the signs that someone has CTE?
The diagnosis of CTE can only be made by autopsy after death. Identifying the possible signs of CTE in the living person is a challenge for science and medicine. Some signs or symptoms that

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have been associated with CTE include forgetfulness, depression, irritability, and other personality changes. Yet, these same signs and symptoms of cognitive and behavioral changes also occur in other neurologic and psychological conditions, and in individuals whether or not they have a history of concussion or repeated brain trauma.

Because there are many other treatable conditions that have symptoms similar to CTE (but are not CTE), it is important that any current or former athlete with changes in mood, behavior, and thinking seek a comprehensive medical and neuropsychological evaluation. Proper evaluation and diagnosis can lead to identifying medical conditions that are highly treatable, thus improving the athlete's quality of life.

How is CTE diagnosed?
Currently, CTE can only be diagnosed after a person's death by brain autopsy. A neuropathologist conducts special laboratory procedures that detect the presence and distribution of an abnormal tau protein in the brain. Since there is no marker for CTE in a living person at this time and the proposed signs and symptoms of CTE are common in other medical conditions**, it is not appropriate to diagnose CTE in a living person based on behavioral changes alone.**

What causes CTE?
Although neuropathologists have made advances in defining and identifying CTE, researchers do not yet know the exact causes of CTE. Many scientists and international consensus groups have stated that while there may be a relationship between head trauma and CTE, no clear-cut, definitive cause and effect relationship has been established. It appears that multiple biological mechanisms and environmental or lifestyle factors could also produce the brain abnormalities found in CTE. Scientists are currently investigating how a variety of factors and mechanisms may result in CTE.

Are there specific risk factors that may predispose an athlete to CTE?
Multiple genetic, biological, psychological, social, and environmental risk factors for CTE are under investigation but have not been conclusively identified. A history of repeated brain trauma is often found in athletes with CTE, but not all athletes with a repeated brain trauma history develop CTE. Additionally, CTE has been found in non-athletes with no known or diagnosed history of brain injury.

Are children who play contact sports at risk for CTE later in life? Has CTE been found in children and adolescents?
At this time, there is no research that links youth contact sport participation with a risk for CTE. To date, there have been no reports of CTE in young children. Although there have been some reports of abnormal tau protein in the brains of a few deceased adolescents, it has not been established that the abnormal protein was related to the cause of death or the cause of any cognitive or behavioral changes these adolescents may have experienced in life.

Parents and coaches should ensure, however, that safe coaching and playing methods (such as reduced contact exposure, safe methods of contact, proper skill development, enforcement of

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good sportsmanship, properly fitting protective gear) are instituted in all youth sports at all levels of play. *Also of great importance is providing effective training in concussion recognition and management skills to all those individuals involved in youth sports, for all age groups, in both school and non-school leagues.*

Can CTE be prevented and/or treated?

At this stage of science and knowledge, we do not understand all the factors that produce CTE, nor can we determine who will get it. Without such knowledge or a clear understanding of CTE, it is impossible to create a successful CTE prevention or treatment program. Given what we do know, it appears appropriate to take reasonable measures to reduce exposure of the head to traumatic forces, to restrict contact practices, and to teach proper contact techniques. Additionally, proper management of a concussion reduces the risk of prolonged signs/symptoms and the risk for subsequent long-term difficulties.

What should an athlete do if there are changes in thinking, behavior, emotions, or personality?

If an athlete is concerned about such changes, or worried about CTE, seek comprehensive medical, neuropsychological, and psychiatric evaluations that can help identify if there are any treatable problems that are causing the changes. Be sure that the licensed healthcare providers you choose to provide these evaluations are specialists in concussion and head trauma.

To find a neuropsychologist in your geographic area who specializes in sports brain trauma and concussion, go to www.sportsneuropsychologysociety.com.

Source

The above information is based on the current research evidence that was available at the time of the publication of this document (March 28, 2016) and represents the consensus of expert opinion of the Policy and Planning Committee members and Executive Board of the Sports Neuropsychology Society.

Disclaimer

Information presented in this document is not intended as medical consultation, guidance, prescription or advice. The reader should consult a licensed health care provider about any health concerns.

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