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ABSTRACT

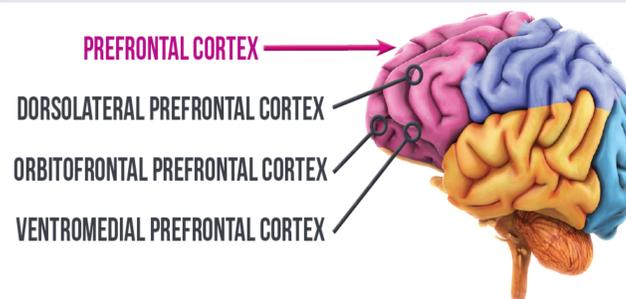
Athletes who play contact sports are highly likely to sustain repetitive brain injuries throughout the course of their careers. With repetitive brain injuries leads to elevated risks of neurodegenerative diseases such as CTE, Alzheimer's, and other forms of dementia. The area often affected in the brain is the prefrontal cortex which controls executive functioning (i.e. impulse control, emotion regulation, planning behaviors). While the media has spotlighted athletes in several domestic violence and homicide cases, researchers have found a link between increased violence and neurodegenerative diseases among athletes.

INTRODUCTION

- ❖ Chronic traumatic encephalopathy (CTE) is a neurodegenerative disease caused by episodes of or repetitive blunt-force trauma to the head (Omalu et al., 2011).
- ❖ Contact sport athletes such as wrestlers, football players, MMA fighters, baseball players, and soccer players are some of the most common contact sport athletes.
- ❖ Approximately 1.6 to 3.8 million concussions occur per year as a result of sports-related injuries (McKee et al., 2009).
- ❖ Repetitive brain injuries result in prolonged damage to the brain, especially the region known for impulse control, the prefrontal cortex.
- ❖ The prefrontal cortex is at the front of the brain which in contact sports is heavily impacted.
- ❖ Repetitive brain injuries can result in many neurodegenerative disorders including Alzheimer's and other dementias and CTE.
- ❖ CTE can only be diagnosed with an autopsy.
- ❖ Other neurodegenerative disorders may be diagnosed after neuropsychological testing and brain scans.

AREAS OF BRAIN DAMAGE

- ❖ The prefrontal cortex is in charge of executive functions such as impulse control, aggression management, emotion regulation, self regulation, planning, and reasoning.
- ❖ In contact sports such as football and soccer, athletes often use their heads (Stanford Children's Health, n.d.), resulting in injuries to the prefrontal cortex.
- ❖ This area is also affected in Alzheimer's and other dementia patients.
- ❖ In addition, changes in the Papez Circuit in the hippocampus are thought to be behind violent, aggressive, impulsive, and disinhibition type behaviors (Antonius et al., 2014).



VIOLENCE AND HOMICIDE RISKS

- ❖ Impairments in executive functioning result in lapses of judgement, planning ahead, and thinking about consequences of actions.
- ❖ Domestic violence has been seen in many cases among athletes. Media has recently spotlighted several incidents.
- ❖ Sexual assault and assault against women is common among male athletes (Crosset, Ptacek, McDonald, & Benedict, 1996).
- ❖ Kidnapping, homicide, and robbery are other crimes that have been committed by athletes who have experienced repetitive brain trauma.

CASE STUDIES

- Chris Benoit was a professional wrestler who was known to use his head to take out his opponents. For more than two decades he used metal chairs and bashed his head against them.
- His behavior started to alarm many of his colleagues and over a 3-day period in 2007, he murdered his wife, Nancy, and strangled his 7-year-old son before hanging himself.
- During his autopsy, his brain showed the beginning stages of dementia and had neurofibrillary tangles in the neocortex, ganglia, and brainstem nuclei which was consistent with CTE. Autopsy found clusters of the Tau protein which impairs cognitive functioning and affects areas known for impulse control (Galgano, Cantu, & Chin, 2016).

- Warmachine was a professional MMA fighter with repetitive head injuries who was sentenced to life in prison for the kidnapping, sexual assault, and attempted murder of his former girlfriend. Defense argued using psychological testing that he had the beginning states of CTE.

- Aaron Hernandez was an American football star who committed a gang style murder and then took his own life years later. During autopsy, it was found that Hernandez had the worst case of CTE that researchers had seen, stage 3 (McKee, n.d.).

- Football player Ray Rice was found to have punched and knocked out his girlfriend in an elevator. It was suspected he had sustained multiple blows to his head during his career.

FORENSIC IMPLICATIONS

- ❖ Domestic violence, homicide, sexual assault, and kidnapping are violent crimes that can result in serious criminal charges.
- ❖ Forensic psychologists and attorneys should be aware of the connection between such crimes and brain injuries.
- ❖ Forensic psychologists may be asked to testify in cases of violence when the accused is a former athlete who suffered from repetitive brain trauma.
- ❖ Forensic neuropsychologists could provide insight into the type of injury that has occurred, and the region affected as well as the typical functions of that area.

CONCLUSIONS

- ❖ Repetitive brain injuries are common among contact sport athletes.
- ❖ The area of the brain typically impacted is the prefrontal cortex which is in control of executive functioning such as impulse and aggression control.
- ❖ Based on previous research findings, repetitive brain injuries in contact sport athletes increases risk of violence and homicide.
- ❖ There is limited research on the direct correlation of CTE and violence and how it affects athletes so continuing research should focus on the violent behaviors of athletes and possible links to repetitive head trauma.

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