

Proposal for an improved helmet design

Introduction

U.S. athletes suffer on average 3.8 million sports-related concussions each year, from the force applied during impact of hits. Professional football players alone, depending on their position, suffer from an average of 1,500 concussions in one season—a total of 15,000 concussions in a ten-year career. This does not take into consideration the concussions those same players may have received during high school, college and pee-wee football. Hits received during football plays not only can cause concussions but permanent brain damage as well. Our nation is experiencing a huge epidemic of traumatic brain injuries.

These brain injuries can result in dementia, depression, or outbursts of anger later on in life. As depicted in the 2015 movie, *Concussion*, former Pittsburgh Steelers center Mike Webster was found dead in his pickup truck in 2002, after years of self-mutilation and homelessness. Webster suffered from years of unexplainable dementia, depression and erratic behavior until Dr. Bennet Omalu did an autopsy on his brain, which reveals extensive brain damage. This sparked an investigation into the brain health of other former NFL stars, who committed suicide following Webster. The subsequent autopsies and examination of their brain tissue revealed severe brain damage resulting from the long-term effects of repeated blows to the head.

Statement of Problem

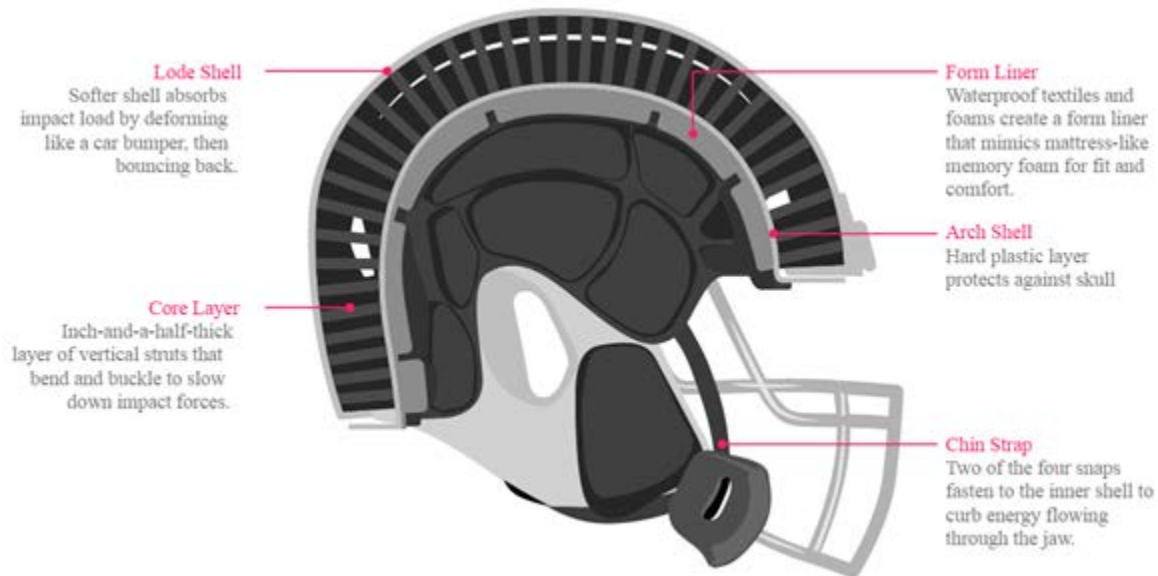
As a result of these findings about NFL brains, equipment manufacturers have been scrambling to design helmets that will offer players more protection against head injuries. There is a strong force applied to athlete's bodies during tackles and the head region is the most vulnerable. Without changing the nature of the game, the challenge is to develop protective gear that reduces the force of impact to the head region during hits. Most recent helmet designs do help protect athletes from skull fractures, but they don't necessarily prevent concussions.

Objective

We propose a helmet design that reduces the impact of hits that cause concussions to football athletes. Although we have already addressed the statistical relevance of this problem, there are two major challenges that we face in designing a prototype helmet. The first challenge is the appearance of the helmet design. It must look like a traditional helmet so that professional football players are willing to wear it. The second challenge is the design effectiveness. Our design must appropriately protect the skull and brain in order to show benefit. Traditional helmets are effective at reducing skull fractures but our design should also reduce brain injury, such as concussions. The following sections of this proposal will address these challenges and share a blueprint model that we have designed, to meet our intended objective.

Prototype Design

This section presents our design blueprint, showing modifications made to our improved helmet. It is important to call out that cost was not a consideration in this design. We are aware that a price range comparable to traditional helmets would be more popular on the open market, but our concern is about athlete safety. Therefore, these helmets are more expensive than traditional helmets, but their ability to reduce the force of impact to the head during tackle collisions outweighs the cost difference. Below is a diagram illustrating our design, with text that explains materials used and why.



Recommendations to NFL

More than 3.8 million sports-related concussions occur to U.S. athletes each year. The amount of force applied to the head region of professional football players is strong enough to result in significant injury, including concussions. This proposal has identified an improved helmet design that would better protect football players from the force of impact during tackles, resulting in fewer concussions to athletes. We believe that the NFL should purchase our helmet design and immediately begin providing them to football athletes.

Citations

Cruley, B. & Robison, P. (2016, January 11). This football helmet crumples—and that's good. *Bloomberg*. Retrieved from <https://www.bloomberg.com/features/2016-vicis-footballhelmet/>