Helmet Safety Innovation

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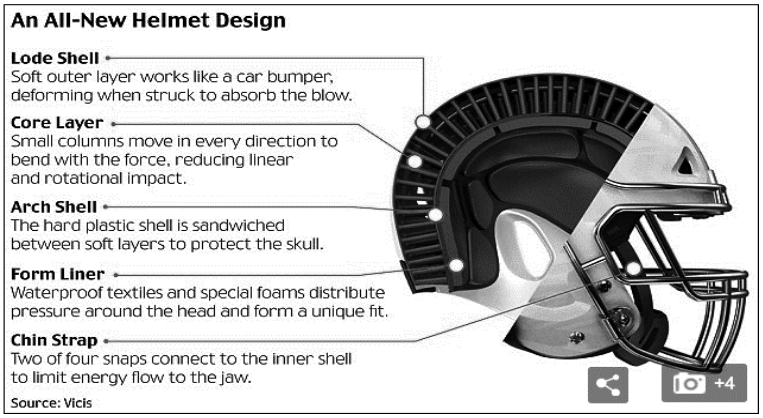
The technology I decided to research is the new helmet innovation being used by many football organizations across the United States, including the NFL. The new helmet innovation is built by data that has been studied on and off the field to determine the impact of hits and what positions are more susceptible to those hits. Injuries are a very serious concern in the sports world, and some of the most serious injuries in the sports world are concussions. This is because of the long-term effects we have seen develop as a result of concussions. With the rapid increase in technology, many companies are searching for a way to help athletes continue to play the games they love while also lowering their risk of a serious long-term injury. A company called VICIS is working to develop a helmet that can help soften the blow an athlete might receive. They have developed an outer shell that is meant to absorb some of the impact. This outer shell has proven to reduce the number of concussions a player might sustain. However, there are still other issues VICIS must solve in order to prevent concussions together.

VICIS has partnered with the National Football League and the National Football League Players Association to develop better helmets that will help prevent concussions. VICIS is trying to eliminate the quick jerking motion of one's head during impact. Whether that be from side to side or from a player's head slamming on the ground. This is the hardest concussion to prevent because the amount of padding or cushion needed to stop this from happening would prohibit the athletes from playing to the best of their ability. The design and functionality of these helmets are game-changing. "The rigid structure acts as a penetration resistance and initial shock absorber. The second part is attached inside the helmet's shell–the energy-absorbing material, usually polyurethane foam" (Dymek et al., 2021).

A team at the University of California is attempting to solve the issue by developing helmets that have about an inch of give in them to prevent the athlete's head from twisting or coming to an abrupt stop. These helmets would have an inner and outer shell that moves to allow the head a small amount of movement. These helmets would also not add any extra weight to the already prescribed helmet and could be interchangeable for various contact sports. Tim Feaster, an equipment manager at the University of California tried on a helmet and stated, "I have never seen anything like it: an outer shell that moves over the inner shell was intriguing to me. It was so inventive, it made sense the way it moved. I thought they might actually have something here." (Sanders, 2020). This technology is helping to improve player safety in contact sports.



Here is a link to a video on the helmet design:
https://www.youtube.com/watch?v=axQRM3bQOuU&t=99s

There are several positives that come from trying to reduce the amount of head trauma that football players receive. For example, it allows athletes to play the game of football a lot longer with less fear of developing major head trauma. Concussions have been a part of sports since the beginning. Only recently, though, has there been a massive increase in researching concussions and their long-term effects. Companies are constantly using data to help monitor concussions and find ways by which they can prevent them. VICIS is using RFID tags. These tags are placed in various areas on players to track how their bodies react to different hits and falls. RFID tags placed on shoulder pads, chinstraps, and mouthguards can help determine how fast and in what direction the head moves in the helmet after a hit. "Using this device, the present study sought to identify factors [e.g., player position, helmet model, the direction of head acceleration, *etc*.] that are associated with head impact kinematics and brain strain in high school American football athletes" (Cecchi et al., 2021). The mouthguard sensors play a big role in the new helmet technology, as they are able to detect the amount of force from the impact. These tags are all vital to ensure that they can develop technology that can reduce the severity of the impact these athletes receive. "Zebra's RFID tags are attached to players' shoulder pads and in footballs to transmit real-time location data to gather metrics such as player speed, distance traveled, orientation and acceleration" (NFL, 2021). Helmet technology is advancing in a positive way. This new technology is allowing athletes to play the game they love and live longer, healthier lives. However, the challenge with this technology is still allowing athletes to perform at very high levels. These athletes must be able to move, jump, sprint, catch, throw, and all sorts of other motions. These motions cannot be limited by the gear they wear. Another drawback is that they haven't developed position-specific helmets just yet. However, that is the goal with their emerging technology.

How might this technology impact the future of sports? It is clear these advancements would positively impact the world of contact sports. The technology of helmet innovation that VICIS provides is a flexible outer shell. These helmets are very

similar to new cars, due to the flexibility on the outside which allows it them to absorb the impact of a hit. The impact these helmets can absorb are used to protect the player's head--for football as well as every other contact sport. This technology could be used by a variety of different players. For instance, baseball, softball, soccer, hockey, and rugby. These helmets will improve the safety of the game and allow players to remain playing the game they love. "Linemen experience more than twice as many impacts as other players, with the largest percentage of hits to the front of the helmet" (VICIS, n.d.). The design of the helmet will continue to change and develop in the future. The softshell of the helmet acts like a car bumper, absorbing the impact of a hit before the forces can reach the head. As this technology grows more, innovations will be made to lower the risk of concussions in contact sports. Lowering the risk of concussions and head trauma in contact sports is the ultimate goal in the future of sports and helmet technology, and innovation can make that happen. "If there's one thing more important to protect than the ball, it's what's underneath that helmet" (NFL, 2021).

VICIS (2021)

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