

Springs engineer's helmet could lessen concussions

INNOVATION

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Imagine a football helmet lined with tiny sensors that measure the impact of a hit and then deploy dime-sized airbags to protect the head.

Colorado Springs engineer Troy Fodemski imagined it, and then he designed such a "smart helmet." Like automobile airbags, the helmet airbags would cushion the head during impact.

Fodemski believes the athletic helmet has to change, becoming more modern and responsive to reduce the 300,000 reported sports-related head injuries each year making news headlines across the country. Sports-related head injuries are responsible for athletes' deaths, long-term brain damage and now more than 2,400 professional football players suing the NFL for concussion-related injuries.

"But our appetite for sports will never end," Fodemski said.

The idea for a high-tech helmet came to him while he was watching his beloved Chicago Bears. The quarterback got hit in the head, went down and was taken off the field on a stretcher.

"The announcer said the quarterback coming in would communicate with the coach through his helmet headset," Fodemski said. "I thought, 'If they can put electronics in the helmet to talk, why not put electronics in the helmet to better protect the head?'"

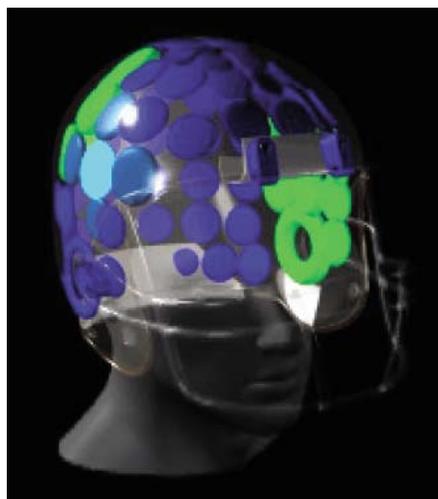
He grabbed a notebook he kept on the table titled "inventions" and wrote out what would become the blueprint to a smart helmet, for which he now has a U.S. patent. Fodemski, an engineer who specializes in microprocessors and minicomputers, drew out a helmet system that uses sensors to measure a hit, compare it to a set of criteria, and deploy up to 75 airbags inside the helmet that would precisely cushion the area of impact, thereby stopping the brain from forward movement.

His smart helmet design has been looked at by doctors at Colorado Springs Neurological Associates, who said the system has great potential.

Fodemski, who works in the aerospace industry, launched the startup company Concussion Mitigation Technology in May 2010 and received a patent for his smart helmet system in December 2011. His smart helmet would also store data of the impact, which could be analyzed post-injury.

In the early 1900s, football helmets were made of soft leather. By the 1950s, football helmets were made of plastic with no padding, which was added in the 1970s. Overall, the football helmet is not that evolved, Fodemski said.

But with all the news about concussions, and research that shows repeat concussions can cause chronic traumatic encephalopathy — degenerative brain disease — Fodemski isn't the only inventor thinking about noggins. Other helmet designs



What is a concussion?

A concussion is a type of traumatic brain injury caused by a bump, blow or jolt to the head that can change the way the brain normally works. Concussions can occur in any sport or recreation activity.

5 to 10 percent of athletes will experience a concussion in any given sport season.

Football is the most common sport with concussion risk for males, who have a **75 percent** chance for concussion.

Soccer is the most common sport with concussion risk for females, who have a **50 percent** chance for concussion.

78 percent of concussions occur during games, as opposed to practices.

A professional football player will receive an estimated **900 to 1,500** blows to the head during a season.

Source: Center for Disease Control

in development include one that uses a special gel inside the foam liner to help with impact. Another smart helmet also uses technology to measure the impact to the head.

But Fodemski's helmet design is the first to try the airbags, said Wemimo Agbesola, a mechanical engineer at Concussion Mitigation Technology.

"It knows what to do to reduce the impact," he said. "We are trying to reduce the number of times the brain moves in the skull on impact."

Like many startups, the biggest hurdle in the making of the smart helmet is funding. This month, Concussion Mitigation Technologies is reviewing proposals from several manufacturing companies that could build a prototype. The company also is looking into military and National Institutes of Health development grants or private funding, Agbesola said.

A high-tech smart helmet would cost about \$1,000 per helmet, compared to about \$300 for a typical NFL helmet. The company estimates a budget of \$1.5 million to build a prototype and continue development for the next year.

"There is nothing out there that can compete with what we have," Agbesola said. "I feel confident that we can get some grant funding." • *CSBJ*

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