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Purdue BME Faculty Lead Impactful Research Project

In a first-of-its-kind study, Purdue BME researchers are teaming up with local high school football players to better understand how large impacts to the head can result in concussions.



The team of researchers, including Eric Nauman, Tom Talavage and Charles Bouman, kicked off the study by collecting baseline MRIs and cognitive data on participating members of the Jefferson High School football team. Twenty-five players' helmets were then fitted with sensors that record the intensity and direction of impact. By examining this data in conjunction with monitoring video of the games, the researchers hope to better understand how specific hits happen, and why certain players are affected differently by similar hits. The participating coaches will be able to utilize this information to better instruct the players, thus improving the overall safety for all team members.

Although earlier studies measured impacts and their effects on players, no one has ever collected MRI or cognitive data on players *prior* to documenting their concussions; thus the baseline data was simply not available for comparison. The availability of a 3-Tesla MRI machine for research has made a significant difference in the project. If a player is diagnosed on the sidelines with a concussion, he will undergo subsequent computer cognitive testing and MRIs that can be compared to the preseason data. Clinical methods of diagnosing concussions - confusion, drowsiness - tend to fade with time. The current follow-up tests will provide better metrics on how long a player is affected by the concussion. According to Professor Talavage, "What's exciting to us it to be doing this at the high school level, where you are still dealing with individuals whose brains are developing, whose bodies are maturing still. Anything we can do at this stage to prevent these types of injuries, especially long term consequences, is a big plus."

The research team is hoping to expand its study to include other area schools, and even other sports. Non-sport applications could include soldiers who are suffering from blast trauma or improved automobile design.

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