Here's a novel idea, given that American parents send almost 4 million of their children out to play tackle football every year, despite mounting concerns about youth concussions: Maybe the helmets their kids wear should be tested and ranked on how well they prevent concussion.

A study to be presented at a meeting of the American Academy of Neurology attempts to do exactly that, comparing 10 of the most widely used football helmets in drop tests designed to measure the kinds of forces that are most likely to result in concussion.

The latest research finds that football helmets, which have been designed largely to prevent skull fractures and brain contusions, aren't all that effective against concussion, which happens when the brain bounces and twists around inside the skull.

"All of them were terrible," said Dr. Francis X. Conidi, who is to present the new research before the American Academy of Neurology's annual meeting April 26-May 3. Conidi, a Florida
neurologist who is vice chair of the American Academy of Neurology's sports neurology section, says the helmets' poor showing underscores the importance of emphasizing safety in football culture: Coaches should be teaching football players tackling techniques that limit concussion risk; they should encourage younger football players to follow the example of older ones and strengthen their neck and shoulder muscles; and officials at all levels of play should be enforcing rules against head-first contact, Conidi said.

While the differences among the popular football helmets were not great, Conidi and his research collaborator -- John Lloyd of the research and development company Brains Inc. in San Antonio, Fla. -- found that the Adams A2000 helmet provided the best protection against concussion. And the Schutt Air Advantage fared most poorly in protecting against concussion.

If you are a parent of one of those 4 million football-playing children, you are probably now saying, "Aha! here's some science news I can finally act upon!"

Well, not so fast.

This is not the first time that commercially available football helmets have been tested for how well they protect against "rotational acceleration" forces -- the twisting, torquing, sheering forces that result when the brain is knocked side-to-side as well as front-to-back inside the skull. A project at the Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences has also sought to gauge the effectiveness of football helmets in blunting the forces that cause concussion.

In ratings released early this year, the Virginia Tech-Wake Forest researchers rated the Adams A2000 ProElite "not recommended," giving the helmet the lowest score of 18 helmets it tested for protection against a combination of "linear acceleration," the straight front-to-back forces that can cause bruises and bleeding in the brain; and "rotational acceleration," the twisting of the brain within the skull that causes concussions.

For the record, the Virginia Tech-Wake Forest team awarded the Schutt Air Advantage two stars in protecting against brain injury, labeling the helmet "adequate" but well below the five stars it awarded to the Riddell Revolution Speed, the post-2013 Xenith X2, the Rawlings Quantum Plus and the Riddell 360.

All these helmets have passed muster with the National Operating Committee on Standards for Athletic Equipment, the nonprofit organization that sets standards for headgear.

In an interview, Stefan M. Duma, who heads the Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences, cautioned that the research being presented at the American Academy of Neurology's meeting must be considered preliminary until it's been peer-reviewed and published. But he also took exception to the suggestion that there is little difference among football helmets when it comes to concussion prevention.
"Some helmets are much better than others," said Duma, whose team has compared helmets' performance not only in acceleration laboratories but on football fields, by analyzing college teams' helmet-brand use and their concussion rates.

If there is one point on which all these researchers agree, it is that better and more realistic testing of helmets will improve helmet design and reduce concussions, just as the plethora of car-crash safety ratings has pushed automobile manufacturers to design and build more safety features into their products.

Concussion researchers are getting steadily better at detecting what combination of forces causes lasting disturbances and injury in the brain, they said.

"We can and should make better helmets," said John Lloyd, the biomedical engineer who coauthored the research Dr. Conidi will present. "The first step toward doing that is improving the standard testing methods."

"In the meantime," he said, "parents and players and coaches should realize that players are not invincible on the field."

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