

STANDARDS IN SPORT: AMERICAN FOOTBALL



In this new series of features for 2012, the standards that apply to the clothing, footwear and equipment used by competitors in particular sports is examined, including recent changes in those standards and the debate surrounding them. The first article looks at American football.

In where it hurts

You don't need much to play American football! Take a person and apply protective padding to the shoulders, elbows, thighs, hips, knees and, depending on the position the player will fill, possibly the ribs and the back too. These will typically be made from foam rubber on the next-to-skin side and protective vinyl when required on the outside. Brands such as Schutt, Douglas, Rawlings, Riddell and TMS are top suppliers of these pieces of equipment. TMS hand-makes products such as its rib protection units in the US (Jacksonville, Florida, in this case), making them expensive pieces of kit.

Gum-shields are another necessity, to protect the teeth, and butterfly restrictors can help

prevent neck strain. Gloves help protect the hands, but are also used to stop the ball from slipping from a player's grasp. Footwear is cleated like the boots soccer players wear, but with higher, extra protection around the ankle. And then there is the helmet. With American football helmets, protection scarcely seems a strong enough term. The National Operating Committee on Standards in Athletic Equipment (NOCSAE) has put together a form of words that must appear on a clearly legible label on every helmet sold. You cannot access the Schutt corporate website without ticking a box to acknowledge that you have read this warning statement (see panel on page 38).

Emphasis on safety has increased because the number of concussions that young players are

New research into concussion has prompted a re-think on standards for helmets in American football.

Walter G Arce / Shutterstock.com

suffering while playing this sport has become a concern for parents, and school authorities and coaches at every level of the game. A news report on CNN in October 2011 said millions of sports-related concussions are occurring every year and that, in the US, these would probably result in 300,000 instances (in 2011) of an athlete losing consciousness. When we think about a player suffering concussion, most of us picture one big hit or one bad fall, but recent research has also honed in on the cumulative effect that a series of smaller hits (a much more common occurrence) can have. It has also become clear that the type of hits a running-back may not be the same as those a quarter-back suffers, while those affecting a lineman may be different again. This research is ongoing.

Political sphere

Politicians have become involved. Senator Tom Udall has held discussions on this issue with former players in the NFL, the top professional level of the game. Nick Lowery, all-time record points scorer for the Kansas City Chiefs (1,466), told the senator that players during his NFL career, which spanned the years 1978-1996, put much more importance on toughness and showing opponents they could handle the hits than on safety. Senator Udall's state, New Mexico, is one of several that now have a law about this. Coaches must receive specific training in concussion and brain injuries and players suffering a concussion face at least a week without playing and can only resume playing when a doctor clears them to do so.

And, acknowledging that there is much more to safety than coaches and doctors can control, the senator is working to win approval for new legislation, the Children's Sports Athletic Equipment Safety Act, to come into force across the US. If the act becomes law, there will be much stricter steps to make sure new and reconditioned football helmets for high school and younger players meet safety standards "that specifically address concussion risk and the needs of young athletes". There will also be severe financial penalties for any company making "false injury-prevention claims" for its equipment.

It's not as if sports equipment brands and their suppliers have not been working hard to improve things. Rogers Corporation is the cushioning technology partner of Rawlings, supplying its Poron XRD Extreme Impact Protection product to football equipment including the NRG Quantum helmet. Rawlings, which has been involved in the sport since leather helmets were an innovation, says: "Football is at a crossroads. It's a high-impact sport requiring advanced technology and testing of its equipment." It uses testing equipment called the Linear Impactor, to simulate two

athletes colliding at more than 20 kilometres an hour and has developed the NRG Quantum as a result. It uses the Poron XRD in what it calls its Active Impact Absorption (AIA) system, claiming that "communication channels" inside the lightweight foam dissipate the impact of any blow to the head. Rogers Corporation's own claim is that Poron XRD Extreme Impact Protection absorbs more than 90% of the energy of a hit. It uses a straightforward test to illustrate the point. Two steel balls drop through tubes from the same height. One drops onto Poron foam and stops dead. The other falls onto regular foam and bounces several times.

Academic studies

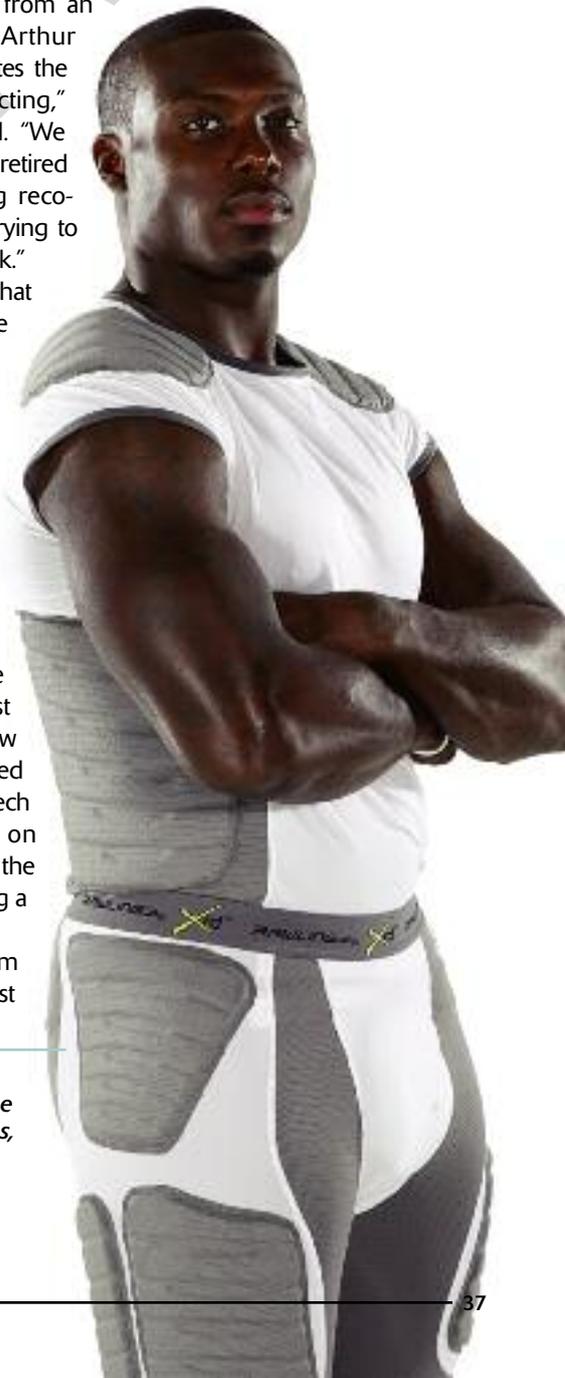
At the University of North Carolina, Professor Kevin Guskiewicz has been developing tests of his own, using the insight he has received from sitting on the specialist committee on head, neck and spine safety that the game's professional body in the US, the NFL, runs and a \$500,000 endowment he won in 2011 from an organisation called the MacArthur Foundation. "The award validates the work that we've been conducting," Professor Guskiewicz has said. "We study youth athletes as well as retired NFL football players, studying recovery curves from concussion, trying to remove some of the guess-work."

Advances in the technology that many players get to use have not been clear to everyone examining this issue. Researchers at the academic medical centre, the Cleveland Clinic, have carried out analyses on the protective helmets athletes use these days to play American Football and concluded that the traditional leather helmets players wore almost a century ago offered just as much protection. In a new study the Cleveland Clinic carried out impact tests on the high-tech helmets in use today and on leather headgear, reproducing the effects a player can suffer during a game.

Lead researcher, Adam Bartsch, said later that for most

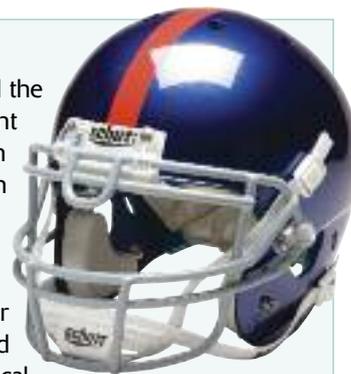
Depending on the position an athlete plays, protection may be necessary for the shoulders, ribs, hips, ankles, knees and back.

 Rawlings/Rogers Corporation.



Warning

The start page on the Schutt Sports website obliges users to acknowledge that they have read the following text from the National Operating Committee on Standards in Athletic Equipment (NOCSAE) before allowing them to enter. The same text must appear on all helmets. It says (with emphasis left intact): "WARNING. Keep your head up. Do not butt, ram, spear or strike an opponent with any part of the helmet or faceguard. This is a violation of football rules and may cause you to suffer severe brain or neck injury, including paralysis or death and possible injury to your opponent. Contact in football may result in Concussion/Brain Injury which no helmet can prevent. Symptoms include loss of consciousness or memory, dizziness, headache, nausea or confusion. If you have symptoms, immediately stop and report them to your coach, trainer and parents. Do not return to a game or contact until all symptoms are gone and you receive medical clearance. Ignoring this warning may lead to another and more serious or fatal brain injury. NO HELMET SYSTEM CAN PROTECT YOU FROM SERIOUS BRAIN AND/OR NECK INJURIES INCLUDING PARALYSIS OR DEATH. TO AVOID THESE RISKS, DO NOT ENGAGE IN THE SPORT OF FOOTBALL."



impacts and angles new-style helmets are no better at reducing injury and, in some cases, the old leather helmets offered slightly better protection. He said the study called into question the effectiveness of a helmet with a hard outer shell and stiff interior padding in protecting players from the "everyday" hits that, over time, can lead to head, neck and brain injuries. The results of the study have been published in the Journal of Neurosurgery.

Placing sensors from a company called Simbex inside 60 helmets per season since 2005, the University of North Carolina has been able to

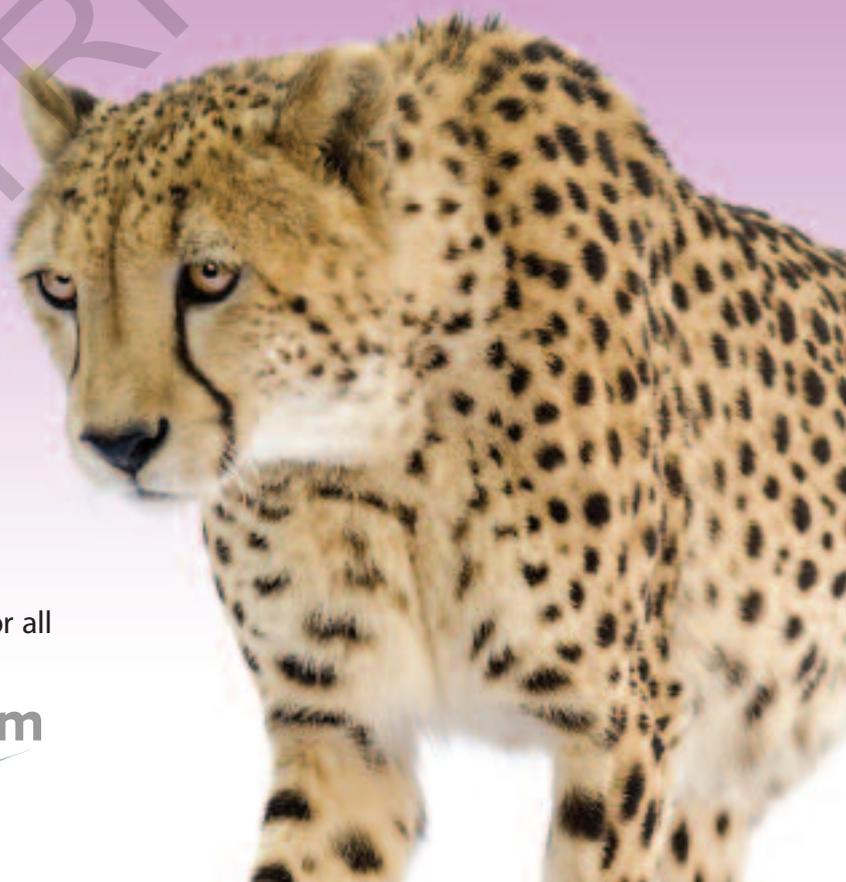
develop a system it calls Head Impact Telemetry to track every impact to each of the helmets. "I'm as big a sports fan as you'll find," the professor says, "and I want to be sure we're all doing our part to try to preserve sport and keep athletes of all ages out on the field in a safe way."

 Schutt Sports

Revolutionary changes

For Angela Walters, a consumer product specialist at Rogers Corporation, padding must continue to play an important part in protecting players of American football. "Just in the past three years we've seen revolutionary changes in

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helmet design and materials that are tested to greatly improve the safety, fit and comfort of helmets," she says. This prompts her to question the number of reconditioned helmets in use at many levels of the game. It's common practice in many leagues, she explains, because the cost of reconditioning an old helmet—shells are buffed, sanded and repainted, while interior parts that fail to pass inspection are replaced—is about one-third of the cost of a new helmet. In the face of all the questions raised over protection in 2011, the National Athletic Reconditioners Association announced it would no longer certify any helmet that had been in use for ten years or more.

Ms Walters thinks that, bearing in mind the extra emphasis on safety and the recent improvements her company and other have been able to make, a ten-year window for helmets is still much too wide. She has been critical of star players for a sometimes cool response to new helmets, saying their old ones have served them well for years and they prefer to stick with what they know. Helmets that senior players have worn for a long time may easily contain 20-year-old technology, she argues, adding that protective padding and the design and material composition of the shell all have to complement one another because if the look isn't right, athletes with big advertising contracts and concerns about how the

on-screen headshot will look will not take a new helmet onto the field of play.

New rules

"Forcing players to wear a particular type of equipment isn't the answer," she says. "Neither is continuing to develop technologies that no one wants to wear. To save cost, many brands will often try to keep the same shell design but stuff different types of foams and impact absorption materials inside the shell. We do not think this offers the best solution. It certainly gets complicated when you try to design a piece of equipment needed to absorb a full spectrum of impact levels, but we're working on finding a solution."

Football authorities need to look at changes to the rules, she continues. This has helped in high school ice-hockey in Canada, for example, in which any player who makes contact with an opponent's head or neck now incurs an immediate penalty. She calls this "changing the play of the game to lessen the 'concussion creating' moments", with the added bonus is that these ideas can improve the flow of the play too. Whether acceptable rule-changes, plus advances in protective equipment, can ever eliminate concussion entirely from a sport like American football remains in doubt. 



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