



No evidence that helmet add-ons reduce concussion risk

by **Kevin D. Walter, M.D., FAAP**

The desire to protect young football players from concussion has prompted some coaches and leagues to recommend after-market helmet attachments, such as bumpers, pads and sensors. Despite marketing claims that these covers and strips reduce the risk of concussion, no prospective, well-controlled studies show that helmets or third-party attachments prevent or reduce the severity of concussions.

The National Operating Committee for Standards in Athletic Equipment (NOCSAE), an independent body that creates performance standards for protective equipment, recently issued a statement on third-party helmet add-on products. According to the statement, no additional lining or padding inside the helmet was included in testing required for all helmets that are certified to NOCSAE standards. Also not included in testing was any bumper, pad, sensor or covering that attaches outside the helmet. Therefore, the certification is voided if an after-market item is added to a helmet (<http://nocsa.org/wp-content/uploads/2013/07/Third-party-add-on-statement-with-letterhead.pdf>). Many helmet manufacturers also state that attaching third-party products will void their warranty.

At this time, no protective equipment can prevent concussion. Although helmets reduce craniofacial injuries, skull fractures and intracranial hemorrhage, they were not designed to prevent concussions. Preliminary data presented at the 2013 American Orthopaedic Society for Sports Medicine annual meeting showed no difference in concussion rates between newer and older helmets, and no difference in concussion rate or severity based on helmet type (www.nlm.nih.gov/medlineplus/news/fullstory_138698.html).

Researchers at Virginia Tech created an evaluation system called STAR (summation of tests for analysis of risks), which rates different football helmet models on how well they appear to reduce linear forces in a lab setting (Rowson S, Duma SM. *Ann Biomed Eng.* 2011;39:2130-2140).

RESOURCE

AAP clinical report *Sports-related Concussion in Children*, <http://pediatrics.aapublications.org/content/126/3/597.full>.

This theoretical calculation of injury risk is based on a series of laboratory drop tests using an adult anthropomorphic head form. Since these data are based on college athletes, the STAR rating system cannot be extrapolated to youth football helmets. In addition, it has not been proven that wearing higher-rated helmets decreases concussion risk.

Researchers also are using helmet sensors (telemetry) that measure impacts and acceleration to attempt to identify a biomechanical threshold for concussion (Guskiewicz KM, Mihalik JP. *Exerc Sport Sci Rev.* 2011;39:4-11). Equipment manufacturers have developed sensors that light up or signal when a helmet impact reaches a certain threshold. However, these sensors may produce false positives or miss concussions since the low force threshold for concussion is unknown. At this time, helmet telemetry is best used in the research setting only, not as a clinical tool to assist with concussion diagnosis.

Pediatricians are encouraged to counsel schools and private club sports that recommend young athletes wear third-party helmet devices on the lack of scientific evidence, the nullification of NOCSAE certification and the potential loss of helmet warranty. In addition, they should find out if their state's interscholastic athletic association has rules or recommendations against the use of third-party add-ons and helmet adornments.

Pediatricians should advise all players to wear helmets that fit properly and encourage athletes to report concussions and seek out appropriate medical care.

Physicians also can work with football teams on a concussion action plan that provides a framework for how young athletes can return to play and the classroom after an injury.



Dr. Walter is a member of the AAP Council on Sports Medicine and Fitness.