Abstract Title: Do Football Helmet Add-Ons Reduce Concussion Risk?

Press Release Title: Helmet Add-Ons May Not Lower Concussion Risk in Athletes

Objective: A growing number of helmet add-ons promise protection against the epidemic of concussions on the football field. However, few have undergone even rudimentary biomechanical evaluation. This study compares the effectiveness of four football helmet add-on technologies to determine if there is any scientific evidence to their claims.

Author(s): John Lloyd, Francis Conidi

Background: Football helmets became mandatory in the 1930’s for protection against catastrophic head injury. Over the past eighty years there have been significant modifications in helmet design. Yet despite advances in technology there is still little evidence that helmets offer significant protection against concussion. An industry of helmet add-ons has emerged with the promise of meeting this need.

Design/Methods: A modification to the NOCSAE standard test apparatus has been developed and validated for impact testing of protective headwear to include measurement of both linear and angular kinematics. Using this apparatus, we evaluated four football helmet add-ons: Guardian Cap, UnEqual Technologies’ Concussion Reduction Technology (CRT), Shockstrips and Helmet Glide. A Riddell Revolution Speed and Xenith X1 football helmet were outfitted with each of these add-ons and impacted 5 times from drop heights of 1.0, 1.5 and 2.0 meters.

Results: Peak measures of linear acceleration, angular velocity and angular acceleration were calculated and averaged across the five impacts at each drop height. Results were then expressed relative to the values for the unmodified Riddell and Xenith helmets. Findings show that the Guardian Cap, Concussion Reduction Technology and Shockstrips reduce linear accelerations by about 11% compared to a standard helmet. However, their effectiveness in reducing angular accelerations is limited to only 2%.

Conclusions: Helmet add-ons have gained popularity in football, with the promise of injury prevention. Our research shows that these technologies have limited effectiveness in reducing the angular forces associated with concussion risk. At this time no magic concussion prevention solution exists.

Study Supported by: BRAINS, Inc. and Seeing Stars Foundation