Reducing the G-force and Traumatic Brain Injuries on Soccer Players through the Use of Headgear

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Roughly 3.8 million concussions occur annually because of sports in the United States. There are lawsuits in professional football and hockey leagues for concussions that propose to award over $1 billion to injured athletes. Soccer has the third highest rate of traumatic brain injuries (TBIs) of any sport, but research is in its infancy and headgear is currently not required. Experts agree that preventative measures need to be explored. While soccer headgears exist, none have been proven to prevent TBI's. This project tested whether one of the most commonly used soccer headgear vs. other cushioning materials would reduce the g's on impact to the head and thus reduce TBI's. A soccer ball was fastened to a pendulum and released, hitting a dummy's head equipped with the aforementioned materials. Three accelerometers were placed throughout the head to measure impact g's. The results were measured in g-force which is a unit of force equal to the force exerted by gravity. The experiment showed that the dummy with no headgear did the worst, resulting in an average g-force of 17.72. In addition, the combination of the rubbery polymer with the headgear proved to best reduce g-force, being 16.11 for g-force. Overall, there was no conclusive deviation from the absorbent materials and the headgear by themselves, but when the headgear and the rubbery polymer combined, nearly a 10% lower g-force reading was taken. In conclusion, the mix of the two materials could possibly be more beneficial in reducing TBI's in soccer.

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