

WHAT EFFECT DOES PROTECTIVE HEADGEAR HAVE ON REDUCING THE IMPACT TO THE BRAIN IN SOCCER AND ALL OTHER SPORTS?

Protective soccer headgear / headbands do make a difference!

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We are routinely assured that peer reviewed articles are “evidence-based.” Science itself guides our footsteps, our opinions, and many decisions. But what does this mean? For many years the scientists and lay public have been encouraged to equate academic research with accuracy and reliability.

A scientific finding “cannot be regarded as an empirical fact” until it has been “independently verified” by third-party researchers who have followed the same steps and achieved similar results. Findings that have not yet been reproduced in this manner are, in scientific terms, merely tentative. In many cases, after influencing decision makers in charge of the safety and welfare of our children involved in contact and collision sports, the findings and conclusions in a peer reviewed study would be considered “junk science” with respect to what scientists and forensic engineers know from the real world and their own extensive experience.

But this sort of due diligence almost never happens. What would seem to be a logical first step in establishing evidence-based policy is routinely skipped over. No systematic reproduction of research takes place before its conclusions begin shaping policies and beliefs by coaches and their players.

In the past and up to the present time, we in the scientific and engineering fields have found many “peer reviewed” articles and chapters in textbooks inaccurate and in many cases incorrect and/or flawed even when the article was supposed to be reviewed by peers.

With reference to the peer reviewers, it is important to note that the referees or peer reviewers all work for free. They lack the time and resources to perform anything more than the metaphorical sniff test. Nothing like the required audit occurs.

No one examines the raw data for accuracy, variables not incorporated in the study that were never incorporated, and in the case of the article being published, the DNA, number of actual reported and non-reported brain injuries of the number of teenagers playing soccer, how the pre-existing condition of the brain was prior to the study and what tests were performed to determine the status of the brain. The latter has been time consuming and expensive.

The undersigned has been a reviewer for a number of scientific journals in the past. Whenever I stated that the article. I reviewed was not at a level to be published with back-up data and reasoning, the article was published in most instances because other reviewers did not come to the same conclusion. I never was informed by the publisher why the articles were still published even though they were flawed, inaccurate, or not unique and other technical people already published similar articles. Many times, reviewers have little or no background concerning the article they are reviewing.

Flawed science and flawed forensic engineering have placed innocent people in prison. For example, a revelation in the understanding of fire has exposed many of the scientific certainties of the era as guesswork in disguise. Flashover, for example, can obscure a fire's origin and make an accident look like arson, and its absence has allowed the prosecution to argue with powerful certainty that the fire was deliberately set. Research since then has led to more accurate ways of looking for evidence of flashover and a greater understanding of its misleading effects, and even prosecution fire experts acknowledge now that it did occur in the Parks' case, a mother who spent 30 years in prison for bad forensic science. It is better known as "*junk science*".

Additional junk science that sent many innocent people to prison involved bite-mark comparisons, ballistic comparisons, fingerprint matching, blood-spatter analysis, arson investigation and other common forensic techniques have been tainted by systematic error, cognitive bias (sometimes called "tunnel vision") and little or no research or data to support it, or experience in the real world.

It should be noted that there are no manufacturers of any type of protective headgear in the world that are capable of eliminating sub-concussions or full concussions. Furthermore, there is no other protective equipment used in any sport that can eliminate injuries even if they are rare. For example:

- 1. The MMA fighters wear protective gloves but there are times their fists are fractured.**
- 2. Boxers wear protective gloves but there are times their fists and fingers are fractured.**
- 3. Boxers and sparring partners wear protective headgear for their heads and sides of their faces when practicing or participating in the amateur AAU tournaments, but still receive concussions during workouts.**
- 4. MMA and boxers wear no protective headgear in professional competition where the objective is to knock out your opponent. They all have some level of brain injuries and continue to fight knocking each other's brains and exacerbating pre-existing injuries.**
- 5. Football players wear helmets and receive concussions.**
- 6. Ice hockey players wear protective helmets but also receive concussions.**
- 7. Field hockey players wear protective helmets and also receive concussions.**
- 8. Jockeys wear protective helmets and receive concussions when they fall off a horse.**
- 9. Cyclists wear protective helmets but still receive concussions.**
- 10. Rugby players wear protective helmets but still receive concussions.**
- 11. Soccer players wear protective headgear but still receive concussions.**
- 12. Skiers wear head protection but still receive concussions.**
- 13. Curlers who do not wear headgear receive concussions and those that wear protective headbands have not received concussions.**
- 14. Figure skaters who have fallen and do not wear protective headgear have received concussions. Those that have worn protective headbands have not.**
- 15. The elderly who are prone to falling are receiving concussions in nursing homes. Those who are wearing protective headbands have not.**

16. **Autistic children not wearing protective headgear are receiving concussions. Those who wear protective headbands have not.**
17. **Young children wearing protective helmets for medical reasons can now wear protective headbands.**
18. **Many dwarfs learning to walk as infants wear protective headbands to eliminate injuries to their brain.**
19. **Many Veterans in hospitals with injuries to their brains are wearing protective headgear to minimize or eliminate exacerbation of their pre-existing condition.**
20. **Cheerleaders who do not wear protective headgear are receiving concussions. The cheerleaders who wear protective headbands have not reported any to date.**
21. **A coach of a women's college varsity soccer team reported that his team had no down time for head injuries in the history of the team when they wore protective headbands.**
22. **Challenged young children and teenagers wear protective headband when they engage in sports.**

The question to be answered is: Why is it important for all soccer players of all ages to wear a protective headband or protective headgear when they participate in a competitive contact sport?

The published reports regarding this issue state that wearing protective headgear in soccer will not make a difference. There are scientific publications on both sides- one saying they are not needed and others stating they can be beneficial. There are peer reviewed articles by medical doctors who also have experience coaching soccer teams such as Scott Delaney. His extensive testing proved that headgear protection for soccer is beneficial. Dr Timothy McGuine has minimal actual experience, if any, with soccer.

Concussions make up a significant percentage of injuries in soccer players in high school. The players are getting stronger and faster. *The only protection is for their shins, not their head or brains.* Dr. William Feldner, a former sports medicine specialist and past president of the Academy of Sports Medicine stated that for any sport involving the exposure of the brain, not offering any protection, is absolutely dangerous.

The published data by McGuine was flawed in several other ways. He claims his research is novel. The data collection is also novel for concussion studies. There was not one actual base line medical analysis of any participant. It was left up to the players to fill out forms. McGuine relied on high school students to report about themselves. If any one of them started out with a sub-concussive brain injury the student would not be able to report that fact because sub-concussive brain injuries are asymptomatic and cumulative.

Since the brain chemistry of sub-concussive brain injuries are prevalent in many contact sports, there is a much higher percentage of sub-concussive brain injuries than full concussions. It can be actually considered an epidemic in many sports, including soccer. The brain chemistry in sub-concussive brain injuries simulates that of a full concussion. A few sub-concussive brain injuries can easily wind up as a full concussion if the player receives an impact to the body or head that is much lower in force than a full concussive impact. That important fact was never discussed or even considered by McGuine.

Furthermore, the premise and objectives of McGuine's paper is flawed. He wanted to determine if soccer protective headgear would reduce the impact of a blow sufficiently to reduce the likelihood of a full concussion. That premise is utter nonsense!

First of all, there is NO helmet in any contact or collision sport that can reduce concussive impacts to a player's brain in any sport to eliminate a concussion. That fact has been proven thousands of times in the impact testing of all helmets. Therefore, McGuine did not prove anything in his research. In spite of that fact, it was peer reviewed by who? It was published as factual and approved by the National High School Federation Association which frightened many schools and leagues from protecting young children, teenagers and adults from significantly reducing the impact force to their brains.

There is not one manufacturer of any protective helmet, headgear or headband that makes a claim that their protective headgear eliminates concussions for anyone. Furthermore, each individual has a different DNA, mass and neck and back muscles that come into play when they receive an impact to their brain.

The so-called extensive research performed by McGuine was flawed from the beginning. His results could have been predicted. However, from a real-world analysis of over one million soccer players throughout the world in schools and leagues that have worn the soccer headgear available over the years, the reports from coaches, and endorsements by medical specialists, experts, parents and players speak volumes.

There is another major problem throughout the United States. Coaches and parents are in denial that their players will receive any type of brain injury. I can attest to that fact in my experience in presenting talks to coaches and parents at conventions. There were a few instances that parents and coaches have stated at the end of my talks that their children are at home for the rest of their lives with permanent brain damage from participating in varsity soccer. They have no memory, cannot communicate, can't go back to school, have problems sleeping and continue to experience migraines.

A coach explained that his daughter was cleared by a psychologist who gave her the ImPact Test for clearance to start playing again. Fifteen minutes into the game his daughter received another concussion and was out of competition and school for the rest of her life. She was not wearing any protection.

Why do I strongly disagree with that result and the consequences that affect all of the manufacturers of protective headgear in the United states?

As the leading provider of protective headbands for soccer and 19 other applications and sold world-wide I would be accused of having a hidden agenda. On the contrary, I have over 50 patents and have been very fortunate in commercializing a number of them including over 5 patents for the ForceField Protective Headbands. We have and still donate a large number of our product line to the challenged children, teams that can't afford to protect their players as well as schools that are in areas that have budget problems. I never advertise any of the schools or people for any monetary gain. ForceField is the only manufacturer of protective headbands/headgear that is not required to answer to investors.

In contrast to my competitors who also have good products, they all have backers to answer to and a large overhead. We also had different objectives in designing our products. Their products are designed strictly for soccer, including a clothing line. The ForceField Protective Headbands are used for over 20 different applications. We have no one to answer to because only my funds were used to start ForceField and pay for all of the patents awarded by the US Patent Office. Our patents are now good for the next 23 years.

The headband/headgear manufacturers are trying to have many young children and teenagers participating in wearing head and brain protection. This task is difficult because many academic professors with limited real-life experience of what success the manufacturers have had over the years, are relying on limited field testing and using statistical analysis to come to conclusions that it does not matter whether the soccer players wear protection or not.

In contrast to what the manufacturers have found in over a million players using their headgear worldwide, the National Federation of State High School Associations state the following:

“There is currently limited medical evidence to support the use of soft headgear products to reduce the risk of concussions. Their design and recommended uses do not fully address the suspected mechanisms of concussive injury such as acceleration, deceleration, and rotational forces acting upon the brain. The permissive use of soft headgear in some non-helmeted sports is allowed, but the primary intent of the usage should not be concussion prevention.”

They refer to a recent limited study by Timothy McGuine, PhD that did not include a base line that incorporated past sub-concussive brain injuries that were not known or recorded, all of the prior brain injuries of all of the participants that went unrecorded and relied completely on the replies on a questionnaire filled out by the participating players. The reported data and opinions are flawed. McGuine also stated that the approach used for data collecting and reporting was novel which can be interpreted as McGuine is the only person to use that type of input into the study leaving a question as to the accuracy of the results.

There is not one reported incident in the study where a player received a sub-concussive brain injury. That is the epidemic where the injury is asymptomatic and cumulative and not noticed by the player, coach or athletic trainer. There is no data in the report whether the player received a sub-concussive brain injury or the headgear prevented it? A full concussion and its effect on the player are noticeable by both the player and the coach.

What is also left out of the study is the fact that if we take two large well developed men, the same size and weight and place them side by side and hit them both in their unprotected head with a soccer ball with enough force to cause a concussion, one of them can wind up with a concussion and the other will walk away without any evidence of any level of a brain injury. People’s DNA makeup also makes a significant difference. This more than documents that there are so many variables that are involved with testing players that it is difficult to cover all of the important ones. That is what happened in the

referenced paper by the NFHSA's decision. McGuine never mentioned any of the other variables that could not be evaluated as part of the study and list the ones that were impossible for the author to incorporate.

A rush to judgment is not good science especially when a million or more have benefitted by wearing all of the headbands and headgear used in the author's study. Very few people become critical of a professor. We all live in the real world where we can all make a mistake. The problem is that many organizations are swayed easily which results in the detriment to others who have proven the referenced author incorrect.

It should also be noted that the reported research was flawed by the fact that the undersigned personally informed the investigator that he was ordering the wrong ForceField product for his study. Instead of ordering the ForceField's Universal Protective Headband specifically designed for soccer, he ordered the Ultra which has other applications. As a result, the headgear reported in the research report was an incorrect protective headgear for soccer. As stated previously, the article was peer reviewed. However, if the article is flawed by the data input and relied upon with the incorrect usage of a headgear, the results are questionable and not reliable.

Peer reviewers volunteer their time and are not paid. In many instances they are co-workers, associates and individuals that have little or no knowledge of the issues and subject matter and do not take the time to research the data and referenced novel approach that McGuine undertook in his published paper which had a significant effect on the safety of young soccer players.

Anson Dorrance, who has coached the women's team in North Carolina to 18 national championships, said compulsory use of shin guards had not changed the nature of soccer, as many feared. He predicted that headgear would not either.

"I remember when baseball players didn't wear batting helmets," said Steve Ryan, commissioner of the Major Indoor Soccer League, which approves of headgear. "You see some resistance in soccer, which is natural. But I expect, over time, you will see it broadly accepted."

J. Scott Delaney, MD, at McGill University stated that his studies indicate that headgear does reduce the impact forces. Dr. Delaney does not oppose the use of headgear. He is the team physician for the McGill soccer team and the Montreal Alouettes of the Canadian football League as well as a medical physician at McGill.

Is should be noted that not one manufacturer claims or ever claimed that their headgear eliminated concussions. As I stated many times before, there is not one helmet in any sport or activity that eliminates concussions. All any manufacturer of any helmet can claim is that their head protection significantly reduces the effective impact to a player's head and brain and nothing more.

For anyone to state otherwise, as the referenced author did, he is not aware of the studies of pathologists in Europe and the United States who examined the brains of soccer players

with brain damage. There was recognition of sub-concussive brain injuries as well as evidence of full concussions.

There are many players who object to wearing headgear that looks like some type of helmet. As an inventor with over 50-years of experience in polymers and textiles, my objective was to create a product that looked like an ordinary sweatband and, at the same time, be able to pass the required testing for acceptance in the United States for a number of contact sports and activities such as soccer, basketball, and cheerleading. It turned out that the number of applications the Universal headband is used is for 20. Not one of the other headgears devoted to soccer can be applied to other activities. The Universal ForceField Protective Headband has been widely accepted because it looks and acts just like an ordinary sweatband.

The main difference between the ForceField headband and all of the other headgear being sold is that the Universal ForceField Protective Headband also has all of the properties of a sweatband and is malleable and meets all of the requirements set forth by FIFA.

All of the protective headgear and headbands do serve a purpose in protecting the players' brains and heads in soccer contrary to the author referenced by the National Federation of High School Association. The headgear accomplishes much more than protecting against cuts and bruises to the head and scalp as opined by the NFHSA. That fact was not recognized by the referenced author or the National Federation. It was, in my opinion, blind acceptance without a scientific rationale.

Looking at the positive side of wearing any one of the headgears and protective headbands, they all offer a range of protection with both young and teenage soccer players. Whatever protection that is offered is always better than no protection. Not one of the manufacturers claimed their product eliminates concussions. We are aware of the fact that it is rare that young children playing soccer receive brain injuries. However, isn't it important that young children learn early in life that their brain is the most important organ in their body and that their "body is nothing without a brain"?

The Universal ForceField FF Protective Headgear/Headband/Sweatband (Forcefieldheadbands.com) is the leading provider of protective headgear *for contact, not collision*, sports throughout the United States with over 20 applications. The patented protective headgear/headband, which looks just like an ordinary sweatband, acts like a sweatband, and can absorb and dissipate up to 80% of the effective impact force to a toddler's head and brain and over 50% for teenagers and adults.

Always remember to never underestimate a brain injury and never play with any significant injury to your body. Your brain is the most important organ in your body and "Your Body Is Nothing Without A Brain."

Dr. C. J. Abraham