The Fairmount Soccer Association has an abiding interest in the health and safety of our players. In the soccer community there is always concern about the potential for head injuries caused in any way, including heading the ball. Below, you will find two interesting articles about heading the ball and its safety. Please read the articles and pass along any comments you have in the form following the articles.

Heading the Ball: Is it Safe?

UCLA Study Confirms Safety

In a study from UCLA to be published in the *American Journal of Sports Medicine*, five prominent physicians (Jordan, Green, Galanty, Mandelbaum and Jabour) confirmed the results of Swedish researchers Eriksson and Haglund, who found minimal radiographic or neuropsychiatric abnormalities in soccer players when compared to amateur boxers or track athletes.

The study found no evidence of a "dose response" to heading. In the soccer player group, head injury symptoms or MRI findings did not correlate with age, years of play, exposure index to headers, or number of headers per practice or game.

The U.S. doctors studied 20 active U.S. National Team soccer players. These players were playing for an average of 17 years were compared to 20 elite track athletes. Both groups completed a head injury symptom questionnaire and underwent magnetic resonance imagining of the brain (MRI). In addition, the soccer players were segregated by position teams, numbers of headers, and years of soccer experience. Both groups were also questioned regarding alcohol intake and incidence of acute head trauma.

This study also tested the hypothesis that the amount of brain damage is directly
proportional to the absolute number of headers. The study created an "exposure index" to assess if more heading created more objective damage. If heading a soccer ball truly causes brain injury, then those players with the greatest number of headers in their careers would be at greatest risk. There was no evidence of any such injury being caused.

The UCLA physicians did find head injury symptoms in both soccer players and track athletes. These symptoms did correlate with previous acute head trauma from collisions with other athletes, objects such as goal posts, and with the ground.

The UCLA physicians concluded that repetitive heading does not cause chronic brain damage. If brain injury occurs, it is more likely related to acute injury from contact, and from heading.

There has been considerable public interest regarding the effects of heading a soccer ball on the brain. Some studies have attempted to demonstrate that chronic brain injury can result from repetitive heading performed by soccer players in practices and games. Most recently, it has been suggested that the cumulative effects of heading could lower the IQ of a soccer player.

These studies attempting to demonstrate negative effects of heading have been limited and flawed in their methodology. The studies fail to control for other confounding variables which include the size of the population studied, the lack of accurate accounting of cumulative exposures to heading, an inadequate control group, failure in control for acute head trauma, not controlling for alcohol use, and a failure to appropriately blind the investigators. These basic scientific factors seriously limit the validity of the negative studies.

The Sports Medicine Committee of US Soccer also studied this subject, and presented results at the "Sports Medicine of Soccer" symposium in conjunction with World Cup '94. These findings confirm and support the research and findings of the UCLA physicians.

Some authors have proposed that soccer players wear helmets to lessen the damage from repetitive heading. The experience with football has shown that the incidence of significant brain damage and other injuries increases with helmets. It is more prudent to decrease the small number of acute head injuries in soccer by stringent enforcement of the rules of the game, coaching proper technique, and making sure goal posts are safe.

Soccer remains one of the safest sports for children, with one of the lowest rates of injury between the ages of 5 to 14. It is highly unlikely that chronic brain damage and intellectual impairment occurs from heading a soccer ball. Youth soccer remains the sport of choice for children to maintain general fitness and good health, and to have fun.

*Reprinted with permission from US Youth Soccer, Fall, 1995*
No, this is not an article about heading, but about a much bigger issue. Heading does cause significant impact to the head and whether it causes a decrease in mental capacities needs further study. While studies to date, have focused on neurological damage suffered from heading, they have overlooked two very significant issues: what about head injury from other types of impact, and what about damage other than neurological damage?

Let's focus on injuries referred to as Athlete's Jaw Disorder (those that affect the Temporomandibular Joint (TMJ) and surrounding delicate structures of the head). This is probably the most misunderstood and unreported injury in soccer, occurring with an alarming frequency. Most players are suffering many of the symptoms listed in the table below. These are symptoms of Athlete's Jaw Disorder.

### EYES
- Sensitivity to light
- Pulsating pain behind eyes
- Bloodshot eyes

### MOUTH
- Discomfort when chewing
- Discomfort when at rest
- Pain when opening mouth
- Clicking or popping when opening mouth
- Limited opening of mouth
- Jaw jumps or deviates to one side when opened
- Jaw locks in open position when eating, yelling or yawning
- Teeth do not seem to fit together properly; can't locate "bite"
- Tender, sore or loose teeth

### HEAD
- Radiating headache pain from forehead to eyebrow
- Pain and pressure similar to sinus problems
- Ache in temple area
- Hair or scalp painful to touch
- Radiating pain in back of head

### EARS
- Decrease in hearing capacity
- Earache but no infection
- Constantly clogged or itching ear with no infection or foreign body present
- Dizziness; vertigo; ringing, hissing or buzzing in ears

### THROAT & NECK
- Sore throat but no infection
- Sore, tired or stiff neck muscles
- Frequent shoulder and neck pain
• Pain or numbness in arms and fingers

**MOTOR FUNCTIONS**

• Impaired speech
• Nausea
• Impaired sense of balance

It should be made clear that head injury is of utmost importance in soccer as it should be in all sports and in all our every day activities. In fact, many individuals can suffer what is known as TMJ syndrome as a result of many causes, including any type of impact, grind of teeth, and stress among others.

Much has been done in the medical field regarding the treatment of TMD, unfortunately the majority of what has been done is to remedy the problem with surgical procedures, a situation that has been reinforced by the health insurance companies. It is also clear that even the experts don't agree on who's an expert. With all this said, TMD or TMJ syndrome is a very confusing medical problem that causes considerable pain and suffering for many people, especially athletes. It is important to address the problem as it relates to sports, specifically soccer.

TMD is one of the health hazards uniquely associated with contact sports such as hockey, football and boxing, the most frequent cause being a blow to the head, chin or jaw. What about soccer? Yes, soccer players get hit in the head, chin or jaw frequently. If you think about what happens on the field, it is common for players to get hit in the head, every time they head the ball, and when they get hit by a kicked ball. Ever see a player get stunned from getting hit in the face by the ball? What really happens?

We must understand the mechanics of the jaw joint in this circumstance. In its normal position the ball of the joint (condyle) sits in the socket (glenoid fossa), separated only by a disc of cartilage. In other words the condyle is very close to the socket and on impact, is driven back into these bones, causing damage at an alarming rate. In fact noted Philadelphia specialist in sports dentistry and Athlete's Jaw Disorder Dr. Edward Williams experience to date has shown every one of the over 40 soccer players x-rayed has a broken ear (temporal tympanic) bone. So why isn't this problem diagnosed more often? Well for one thing, the only way to tell if the bone is broken is to get an x-ray. This is not usually done just for some discomfort or ringing of the ears. But why haven't doctors made a bigger issue of this occurrence? Well, the ability to get a good x-ray of this joint area, requires a special technique that is not widely available.

Now we can see that there is plenty of opportunity for the jaw joint to suffer damage from any impact to the head, even from heading. When a player heads the ball there is a force of 208 joules at the moment of impact. This is greater than the force from any other ball except a golf ball. This can cause the lower jaw, which is not rigidly attached to the skull, to snap back into the jaw joint as a recoil reaction from the heading action. These bones are delicate and this action can cause significant damage. But a broken bone is not the only damage that can affect the player. There are several other important things to note about the anatomy in the area of the head.

Behind the ear canal in the skull are the semicircular canals which control balance and equilibrium. Injury to this delicate area explains why an impaired sense of balance is a symptom.

There are two more parts of the anatomy that are important in understanding the damage
a player can suffer. The area under and adjacent to the jaw joint contains two holes in the skull called foramens that allow nerves and blood vessels to enter and exit the brain. The proximity of these holes is important in that number one, the carotid artery, which is the main blood supply from the heart to the brain passes here, and second, there are four nerve groups that exit the base of the brain through this area. These nerves can and do become impaired from damaging forces to the jaw joint. For example, many people recognize that some boxers will speak with a tongue-tied pattern. This is not a result of getting their tongue beat up, but of getting the nerve that controls the tongue damaged from repeated impacts to the jaw joint!

Is there significant risk of head injury from playing soccer? The studies and experiences to date would seem to indicate yes there is. But, soccer is not alone in this regard, as other contact and aggressive sports are as prone to head injury from internal jaw joint damage not more so. How can we protect the players? Should we outlaw heading? This would of course change the game dramatically if not destroy it. Besides, soccer is still a contact sport and players would still have contact with other players and the ball. What about helmets least for younger players? This may even worsen the situation. In helmeted sports such as football and hockey, while head, mouth, and dental injuries dropped dramatically in the 1970’s when mouthguards and face shields were mandated, there remains a more significant problem. A helmet may do a good job of protecting the head but what about the jaw joint? After all the helmet is held in place by a chin cup with 2 or 4 point straps. Therefore every blow or impact to the helmet results in the vector forces of the blow getting transmitted to where? That’s right, the jaw joint! Helmets may provide great protection from damage from external forces, but create an even worse situation by increasing the pressure on the jaw and therefore increasing the internal force to the jaw joint.

What about mouthguards? Many like to attribute the reduction in dental and head injuries to mouthguards. But an additional problem has been introduced by the use of mouthguards. Mouthguards can contribute even more to the damage inflicted on the jaw joint by providing a smooth surface for the lower teeth to slide more freely on and allow the jaw to slam back into the TMJ with even greater force!

Okay, so what can be done? Is there is a solution? Yes, there is. It is called a WIPES jaw joint protector. In his studies and work with athletes of all ages, both sexes, and in man sports, Dr. Williams has developed a new form of safety equipment that prevents the type of damaging incidents that are described above. The WIPES locks the jaw in a down and forward position, thereby removing the condyle from harm’s way. This patented appliance was developed after years of research and treatment of hundreds of athletes, many of whom are soccer players. Should jaw joint protectors be mandated for sports, specifically soccer? Up until recently the answer was no, due to the fact that jaw-joint protectors were not readily available except through a lengthy custom fabrication process for each individual. They are now available through your dentist and soon to be available over-the-counter at your sporting goods store. WIPES jaw-joint protectors can be custom fit in seconds by a boil and bite technique that can be performed at home. Dentists can provide more individual fit for those who have specific dental problems, including orthodontic braces.

Are the facts in support of a jaw joint protector mandate overwhelmingly supported by studies? Yes, as a matter of experience and opinion of many qualified medical, dental, and sports medicine personnel. But how much more will it take to convince those that are not in support yet? This is a good question, but one that can be individually resolved for each player by their parent or guardian. As a coach, I have mandated the use of jaw joint protectors for my teams. Jaw joint protectors give my team a competitive advantage in strength and performance, and a level of protection that exceeds anything else available anywhere today. As a parent, I am convinced that this is the right thing to do. A jaw joint protector is not a mouthguard but an engineered safety device that protects more than 1
mouth, teeth and jaw. It protects important parts of the head. It is as easy to wear as shin guards and allows freedom to speak and breathe.

Dr. Williams is planning a long term study of jaw joint protection. This study should confirm what he has identified and help to gain further support from the governing bodies in sports medicine.

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