An Analysis of Football's Spearing Rules

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The cervical spine injury resulting in paralysis is one of the most devastating injuries in all of sports. It has a tremendous impact on the athlete and his family through astronomical medical costs, dramatic lifestyle changes, and a lifetime of dependency on others. Because the paralysis is permanent and rehabilitation limited, prevention of the cervical spine injury is the only acceptable management plan.

Torg et al (5-11) have identified the mechanism of cervical spine injury (fracture, dislocation, subluxation) and subsequent spinal cord damage in football as axial loading. Axial loading occurs when an athlete flexes his neck to 30 degrees and makes contact with the top or crown of his helmet. This position eliminates the cervical spine's normal force handling abilities and transfers the impact directly to the cervical vertebrae.

Through the study of game films of actual injuries Torg found spearing to be the cause of these axial loading injuries. Spearing is defined as a player lowering his head and making contact using the top or crown portion of his helmet. In this situation upon impact, the athlete's head stops while his body continues to move forward crushing the cervical spine between the two. This will only occur if the athletes neck position transfers the impact directly to the cervical vertebrae with enough force to cause the vertebrae to fail. It is important to note none of Torg's analysis has hyperflexion or hyperextension been a cause of a catastrophic neck injury resulting in paralysis. Spearing has been the only identified cause.

Based on this information in 1976 college and high school football made spearing a rule infraction resulting in a 15 yard penalty or ejection. College football chose to exclude initiating contact with the face mask from their spearing rule. However, on the high school level initiating contact with any part of the helmet (including the face mask) is illegal (8). The 1976 rule change has caused a dramatic reduction in the number of quadriplegic injuries occurring each year. In high school football it has gone from a high of 25 cases of paralysis in 1976 to a low of four in 1984, which represents an 82% decrease (7). Since 1981 the number of occurrences has remained constant between four and nine per year.

The number of cervical spine fractures/ dislocations without quadriplegia occurring each year are equally important because spinal cord injury is secondary to cervical vertebra damage. Each incident of fracture/ dislocation has the potential for quadriplegia. The rule change has also reduced this number since 1976, although not as successfully as quadriplegia. It has reduced Fracture/ dislocations from a high of 86 in 1976 to a low of 22 in 1987, which represents a 70% reduction (7).

The data Torg has collected indicates the spearing rule has been very successful. The data does not indicate why the spearing rule has been effective. The most logical explanation is the spearing rule decreased the number of fracture/ dislocations by reducing the incidence of spearing. A decrease in the incidence of the injury mechanism would explain the decrease in cervical fracture/ dislocations that have occurred each year.

Following this premise, the reduction in cervical spine injuries could be accomplished in two ways. Officials enforcing the spearing rule during football games and coaches teaching and practicing correct contact techniques with players. The effectiveness of the spearing rule would therefore depend heavily on officials and coaches.

EFFECTIVENESS OF THE RULE

Has the spearing rule been as effective as possible? Although the level of injury reduction is impressive, I believe the answer is no. In reality officials have not enforced the spearing rules. In a study I did of a New Jersey football team's 1989 season officials called no spearing penalties (1). During this season via game films I observed 239 incidents of spearing. I believe this is the norm for enforcement of the spearing rule rather than the exception.

The spearing rule is the single most important rule in football in terms of consequences (paralysis) and yet is probably the least enforced. One explanation may be officials do not understand the importance of the rule and spearing's relationship to catastrophic spine injuries.

Another explanation is the spearing rule is the only rule in football that penalizes a player for his own protection. The vast majority of football infractions protect one player from the actions of another (clipping, face mask, etc.). Football adopted the spearing rule to deter and protect the player who spears. Its primary function is not to protect the player getting speared. It is the only penalty in football that protects a player from himself.

I believe officials have focused on protecting the player who receives a spear, which is a misinterpretation of...
the rule. The spear that is a late hit or the spear of a player who is already down represents this situation. In my experience officials have not enforced the rule during the tackling process when most cervical spine injuries have occurred. Officials have not used their flag as a deterrent to head first contact techniques.

What has caused the reduction in cervical spine injuries? I believe it has been the efforts of coaching staffs and athletic trainers to educate and teach athletes (1,3,4,10). Educating them that spearing is a mechanism of paralysis. Teaching them proper contact techniques.

It is safe to state these efforts have stopped most athletes from purposefully making contact with the top of their helmets. I believe this removal of intent has been the major factor in the success of the spearing rule. This is not to imply spearing has been removed from the game.

FURTHER REDUCING THE RISK

Can the risk of catastrophic spine injuries be reduced further? Is it possible to lower the 30% of fracture/dislocations and 20% of quadriplegias that have remained each year? Or are these injury levels part of the inherent risk of a collision sport. I believe several things can be done that will further reduce the risk of catastrophic neck injuries.

Spearing has an inherent risk of quadriplegia (12). Since tacklers have accounted for the majority of catastrophic neck injuries (5,6,10) they have been the focus of preventive techniques (1). This has allowed the techniques of other positional players to go unnoticed. I found ball carriers speared on one of every five plays or 20% of the plays per game (1). For such a dangerous technique this is a surprisingly high number. Being tackled was also the activity associated with seven cases of quadriplegia between 1977 and 1987 (4).

The point is each time any athlete spears he increases the risk of quadriplegia (1). If the above spearing rate is representative of other high schools then there is a significant amount of spearing that can be eliminated. These numbers indicate football needs to recognize all types of spearing (ball carriers, blockers, and tacklers).

Initiating contact with the shoulder while keeping the neck in extension is the safest contact position (1,2). By observing game films I found tacklers and ball carriers often were in the correct position but dropped their heads just before contact. This may demonstrate not purposeful but unintentional spearing by ball carriers and tacklers. I believe this shows a need for more practice time to perfect proper technique during the crucial instant of contact. Each player has to overcome the instinct of protecting his eyes and face by lowering his head at contact.

Coaches should spend added time on correct contact technique. They should follow a regimented schedule that spreads sessions over the entire season (1). The progression should be from slow walk through skills to full-speed contact. The coaches should focus each drill or session solely on keeping the head up and initiating contact with the shoulder. The technique has to be drilled in game like situations. They also should include types of collisions Torg (7) identified with quadriplegia. Two athletes colliding while moving in opposite directions and athletes meeting at an oblique angle. Coaches and athletic trainers should design drills for ball carriers, blockers, and tacklers.

Officials also can aid in lowering the incidence of spearing. They can begin by enforcing the spearing rule during games. They also should acknowledge spearing during the tackling process when it most often occurs. The flag should be thrown on the player who spears to protect the player who spears. These players should include ball carriers, blockers, and tacklers. Cervical spine fractures/dislocations do not discriminate by position.

Officials enforcing the spearing rule will deter players from spearing and serve as an incentive for coaches to spend more time preventing it. A 15 yard penalty is a real, immediate result of a spear that a coach can see.

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It becomes more than .56 quadriplegias per 100,000 athletes. It now affects the outcome of each and every game.

To further reduce the risk of catastrophic spine injuries officials must enforce the spearing rule on a level with the clip, face mask, or hold. Coaches must spend adequate time drilling correct contact technique in game like situations throughout the season. Officials, coaches and athletic trainers must realize spearing is potentially dangerous to ball carriers, blockers, and tacklers. When these things are accomplished the spearing rule will take a huge step toward maximum effectiveness.

REFERENCES


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