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Concussions: What do you do Afterwards?

A concussion, or violent collision between the brain and skull, is one of the most common injuries sustained during physical activity. Estimates indicate that annually, about 170,000 children under the age of twenty seek emergency treatment for a concussion (1). Treatment is not where uncertainty ends; in fact, it is where it often begins. For young athletes, there is no single protocol to follow to follow after a player sustains a concussion. That is, no universal timetable for return exists, and often no special protective measures must be taken following a head injury. In general, players are not continually monitored following a significant head injury. As a result, those suffering from a concussion face a similar risk of sustaining another, more serious concussion. Because of this risk, a number of athletic governing bodies in the United States have implemented policies which call for a gradual, structured return to sports following a serious head injury.

Baseball is one sport in particular in which a player is at risk of concussions. The combination of high-velocity pitching, aluminum bats, coupled with inexperienced players at lower levels, makes for a high propensity of head injuries. Accordingly, the Little League organization proclaims an active stance in the prevention of such violent head injuries. Per the official Little League website:

> *Many states have enacted laws designed to prevent concussions and protect the health and safety of young athletes. LLB has compiled a summary of all currently existing and proposed state laws regarding concussions in youth athletes. . . Not every state has*

adopted concussion laws, and not every state's concussion law is applicable to a LLB program. (2)

The laws of most states require an injured player to receive clearance from a physician before he or she may play again. Neither the Little League organization nor any state laws strictly indicate that anything else must be done afterwards. Players are not required to wear special protective headgear, have their playing time or ability to practice limited, or follow up with coaching personnel after an injury to the head. This is undoubtedly a risky policy, due to the elevated vulnerability a player's brain would be at after a concussion. According to the American Association of Neurological Surgeons, a player who has sustained even a mild concussion and not fully healed from it risks developing a condition known as second-impact syndrome, in which a supplementary impact to a still-recovering head can cause fatal swelling of the brain (3). Second-impact syndrome can also be attributed to the majority of the concussion-related deaths in the United States; a single concussion is rarely a fatal injury (3). Despite the extreme risk a player would be at following a concussion, regulations do not always necessitate a strategically-delayed return accordingly.

Football is another sport in which concussions are fairly common. The propensity for brain injury stems from the physical, often aggressive nature of the game. As a running back collides with a linebacker, a safety tackles a tight end, or two linemen block each other, there is a high incidence of helmet to helmet contact. The National Football League has banned such contact in many situations, such as helmet-to-helmet contact with a receiver who deemed "defenseless", or when a runner is met by a defensive player and uses the crown of his helmet to avoid a tackle (4). These rule changes have come shortly after the NFL was named a defendant

in a class-action lawsuit by former players, who claim that the league knew of the dangers of concussions and other traumatic brain injuries (5). Riddell, the NFL's primary helmet manufacturer, was also named a defendant in the case, and it is alleged that the company knew that their helmets did not adequately prevent concussive head injuries (5). Though each team employs numerous medical professionals whom specialize in a broad variety of medical concerns, the NFL rulebook lacks any requirement of special treatment following a concussion. Other than receiving requisite medical clearance, no NFL player will face any delay from the league or their teams during their return to gameplay. This is so even despite the extreme liability and financial responsibilities which NFL franchises assume when a player is tendered a contract. As previously discussed, a player still recovering from a concussion would face a potentially fatal situation if he were to sustain an additional concussion shortly after their first.

Some athletes who have sustained a concussion or other serious head injury have taken additional precautions following their injury on their own accord, likely in an effort to avoid the potentially life-threatening second-impact syndrome. New York Mets third baseman David Wright exhibited a very notable instance of taking optional extra precautions. In August of 2009, Wright was struck in the head by a pitch by San Francisco Giants pitcher Matt Cain, giving Wright a serious concussion. Upon his return from the disabled list in September, Wright sported a much bulkier batting helmet, the Rawlings S100 model (6). This new helmet is quite a bit larger than the original model worn by most major league players. Though the helmet offers a great deal of extra protection to any player wearing it, Wright struggled with two varieties of the S100 model, eventually opting to use a stronger helmet for two games before reverting to his

original model (6). Wright cited the extra bulk as uncomfortable and stated that it created a balance issue when donned (6). Ultimately, the distraction when Wright was batting proved too significant to offset risk of injury. David Wright is not the only notable professional sports player to take extra precautions after a concussion. After sustaining concussions in consecutive games during the 2012 NFL season, Pittsburgh Steelers free safety Ryan Clark chose to wear a helmet padded with an extra layer of KEVLAR material as to negate the risk of his self-declared aggressive style of play (7). The KEVLAR, which necessitated that Clark wear a much larger helmet during the game against division-rival Baltimore, greatly reduced his chances of sustaining a third concussion in a short time span. This was a very key precaution taken by Clark, who had already had a chance of suffering second-impact syndrome by playing shortly after a concussion. Clark cited the game, a pivotal, Sunday Night Football division matchup against the eventual Super Bowl champion Baltimore Ravens, as the primary factor motivating him to seek KEVLAR helmet inserts; he stated that "[he's] going to sell out every time until I'm not playing," and play despite risking a third concussion in as many games.

Unfortunately, not all players take extra precautions following a concussion or severe head injury. All too often, players ignore the risks and play shortly after such an injury. In a notable example, Atlanta Falcons tight end Tony Gonzalez remarked he feared a knee injury moreso than one to his head (8). This revelation came about shortly after Miami Dolphins tight end Dustin Keller tore his ACL, a season-ending injury, when tackled in a legal manner at the knees (8).Though players must usually receive medical clearance prior to returning, a physician's clearance cannot accurately gauge the chances that a second injury would be life-threatening. Rather, it can only indicate that concussion-related symptoms have subsided to an acceptable

level. To truly and significantly reduce the likelihood of second-impact syndrome, a player must be eased back into play. Such a protocol is required by the Utah High School Activities Association, the organization which oversees scholastic athletics in the state of Utah. The association requires players to adhere to a strict "Graduated Return to Play Protocol," a strategic list of activities which slowly increase physical activity as to ease the injured player back into action (9). By requiring a slow return to play, the protocol effectively reduces the risk of another head injury to young athletes. This protocol is not the only such that exists in the United States. The Florida High School Athletic Association maintains an incredibly similar policy requiring progressive rehabilitation (10). Both organizations have a very similar approach, to bring players back to their respective sports in a controlled manner. This undoubtedly reduces the risk of sustaining another concussion shortly after the first one, and thus directly reduces the likelihood of a fatality on youth athletic fields across the United States.

After detailed examination, it is evident that athletes are often inadequately supported following a concussion. All too often, players may be allowed to resume game activities too soon after an injury, risking a fatal case of second-impact syndrome in the process. However, this is not always the case. A number of professional athletes have taken precautionary actions on their own, such as the donning of more substantial protective headgear. As not all athletes would willingly take such preventative measures, especially with scholastic players, a number of youth athletic organizations have implemented strict policies which require players to return gradually from serious head injuries. Such policies bring players back into game action in a

strategic manner, as to avoid second-impact syndrome and other subsequent injuries. These post-concussion protocols have had the direct effect of reducing fatalities in youth sports.

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