



Keep Their Heads in the Game

Manage Concussion Assessments like a Pro with the SCAT3

WHITEPAPER





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Introduction

According to the Centers for Disease Control and Prevention (CDC), the number of trips to emergency rooms related to concussions in children and adolescents has increased by 60 percent in the last decade alone. The high-profile “master complaint” lawsuit against the National Football League (NFL) and over 4,500 former players claimed that NFL was aware of the long-term effects of head trauma and the link between concussions and brain disease, yet chose not to disclose this information to players. Riddell, the manufacturing company of the official NFL helmet, is also under fire for allegedly defective helmets, not built to provide maximum protection against traumatic brain injuries (TBI) and also for a lack of disclosure in terms of risk. Whether the rise in these numbers reflects an increase in the physicality of sports or a heightened awareness of the impact and danger of concussions, it is clear that the risk of concussions affects athletes in all sports at all levels.

A TBI is typically caused by a blow or jolt to the head that causes the brain to move violently. TBIs, specifically recurrent ones, can cause brain swelling, brain damage, long-term disabilities and in extreme cases, death. The most common form of a TBI is a concussion, accounting for approximately 75 percent of TBI cases and is a contributing factor in a third of all injury-related deaths in the U.S. each year. In an effort to reduce the incidence of concussions, medical experts, law-makers, coaches, league commissioners, parents and sports safety equipment manufacturers have all taken proactive steps. Part of this effort involves educating young athletes on the importance of recognizing symptoms and reporting them to medical staff. Perhaps the most important advancement has been the creation of a standardized assessment tool, the Sport Concussion Assessment Tool (SCAT) now in its 3rd edition, the SCAT3. The SCAT3 was designed to be used on athletes 13 years old and up while previous versions were designed to evaluate athletes 10 and up. As such, the first SCAT intended specifically for young children was published in conjunction with the SCAT3, the Child SCAT3. Especially when integrated with an Athlete

What Is a Concussion?

It is a traumatic brain injury (TBI) that is caused by a direct or indirect force, blow or jolt to the head, causing the brain to move violently. Depending on the severity, concussions can cause a dazed feeling or periods of unconsciousness. Most effects are temporary and can be mild enough that people don't even realize they are concussed.

Symptoms include:

- Headache or nausea
- Unsteadiness
- Confusion or short-term memory loss
- Abnormal behavior
- Blurred vision or fatigue

What to Watch For

Symptoms can have a delayed onset, so it is important to monitor anyone with a suspected concussion for the first 48 hours and to take them out of play immediately.

Seek medical attention if any symptoms worsen or if any of the following occurs:

- Unconsciousness extends for more than two minutes
- Repeated vomiting
- Slurred speech
- Athlete is drowsy, can't be woken up or can't walk
- Confusion, irritability
- Seizures
- Weak or numb arms or legs
- Vision or eye disturbances occur, for example dilated or different sized pupils





Electronic Health Record (EHR), the SCAT3 is an important tool that can help sporting teams and organizations at all levels keep their athletes safer and healthier. Having access to centralized health data for all athletes in one secure space facilitates the most effective prevention, planning and management.

What is the SCAT3?

At the 2012 Concussion in Sport Group (CISG) Consensus Meeting in Zurich, Switzerland, leading concussion researchers and clinicians presented facts and statistics regarding the use and outcomes of the SCAT2. The SCAT2 was published in 2009 as an updated form of the original SCAT published in 2005. After reviewing the data, the group of experts revised the concussion evaluation tool and published the SCAT3 in 2013.

The SCAT3 is an evaluation tool that takes 15-20 minutes to complete and provides a quantified concussion assessment. It is even more effective when a baseline assessment of the athlete has been done in advance, so that the assessing medical professional can compare the post-injury assessment to the athlete's baseline scores. The Orthopedic Clinic Association and A.T. Still University found in their research that there is variance in the baseline scores of different athletes and between different genders and ages, meaning that a healthy score for one athlete may be slightly different than another athlete's healthy score. This reinforces the need for baseline testing to ensure that the best possible return-to-play decisions can be made after an injury.

The SCAT3 consists of a series of questions and tests, each of which is scored. It includes the Glasgow Coma Scale (GCS) response test, the Maddocks sideline questions, a "how do you feel" questionnaire, balance and coordination tests, as well as the Standardized Assessment of Concussion (SAC) which gauges orientation, memory and concentration and a neck examination. The individual values are then combined to

The Glasgow Coma Scale (GCS): Designed to test the level of consciousness after a concussion by testing eye opening, verbal response and motor response.

Maddocks: This sideline assessment asks the athlete basic game-day questions such as, "What venue are we at today?" The Maddocks score is used for post-injury testing, but not for baseline assessments.

Standardized Assessment of Concussion (SAC): Assesses an athlete's cognitive functioning through orientation, memory and concentration questions.





obtain a set of overall scores indicating the number and severity of symptoms. When the assessment is done on paper, the examiner must manually calculate the individual and overall scores.

Since its publication, the SCAT has become the most widely used tool for concussion assessments, endorsed by organizations worldwide. While it is designed to be used by qualified medical professionals, it also offers valuable information to the athletes themselves, to their parents, coaches and others with a vested interest in monitoring the athlete's health. In the days or weeks following a serious concussion, repeated SCAT3 assessments may be conducted to measure the athlete's progress of recovery. However, the diagnosis of a concussion or determining an athlete's recovery time should always be performed by a trained medical professional with sports concussion experience.

Integrating the SCAT3 with an Athlete EHR

The SCAT3 is an excellent tool for several reasons. It is quantitative, standardized, portable and easy to administer. However, the SCAT3 is best used as a complement to other tools and information, as SCAT3 scores by themselves are not sufficient to diagnose concussions, evaluate recovery or decide an athlete's return to competition date. When SCAT3 assessments are digitally integrated within an Athlete EHR, athletic trainers, coaches and other members of the medical team can revolutionize the way they manage concussions.

Collaboration

While an Athlete EHR ensures the privacy of SCAT3 results, it also offers the option to share this information with other medical professionals who are involved in the athlete's health management. If an athlete gets a concussion while away at a game, for example, by recording the SCAT3 responses directly into an Athlete EHR system, other users who have access to the athlete's medical profile can be instantly notified so that they may adjust any current treatment or training plans. After an athlete suffers a concussion, it is important that they not take certain medications, such as paracetamol, codeine, aspirin or anti-inflammatory medications. If the athlete has an existing condition, these types of medications could already be a



Prevention is key, especially when dealing with repeat concussions which can cause brain swelling, brain damage, long-term disabilities and in extreme cases, death.





part of their ongoing treatment, so the entire medical team needs to be alerted. A well-designed Athlete EHR system will let you plan and communicate such restrictions, which may also include a prescribed period of restraint from exertion or rough contact.

Automatic Calculations

There are eight sections in the SCAT3 that use a scoring system to evaluate the athlete. The section scores are then combined to determine an overall score. When conducted manually, math errors may distort the final scores and such errors may go unnoticed. By recording the responses directly within an Athlete EHR system, the calculations are done automatically, ensuring precision. Furthermore, the system can display comparisons to previous assessments and baselines for a broader view of the severity of the athlete's current condition and progress of recovery.

Females are more susceptible to concussions than males.

Portability and Accessibility

Web-based Athlete EHR systems allow users to log in to the system anytime and from almost any location, enabling users to easily and instantly retrieve the actual test itself and all of their athletes' scores. Athlete EHR systems that also provide mobile access via smartphones and tablets are even better, allowing the information to be recorded and viewed while on the road, on the field or at a game. When the SCAT3 is used in its paper form, coaches and athletic trainers must remember to carry one with them at all times. Otherwise, they must return to wherever the papers are stored before assessing an athlete on the sidelines. Once the paper version is completed, the assessment will ultimately end up in a filing cabinet and may never be accessed again, even if the athlete incurs another concussion. There is also a risk of loss for any paper-based assessments and notes.

Those between the age groups of 0-4, 15-19 and 65 and older are the most likely to suffer a concussion.

More Information Leads to Better Decisions

An Athlete EHR provides a complete view of an athlete's medical history and activities of care, including recent medical imaging, illnesses, injuries, surgeries, medications, treatment plans and notes recorded by other practitioners. This information should be consulted and considered to make well-informed decisions as to whether it is safe to allow an athlete to return to competition or back to practice. Basing such decisions only on SCAT3 results is comparable to a driver changing lanes without checking his mirrors.

Statistical Analysis

Athlete EHR systems typically come equipped with reporting tools which can be used to analyze athlete health data. By centralizing all athletes' data, reports can be run to identify trends and expose risks. When the SCAT3 results are incorporated into an Athlete EHR, the SCAT3 data, in conjunction with other data from athletes' profiles and medical history, can be analyzed and mined.





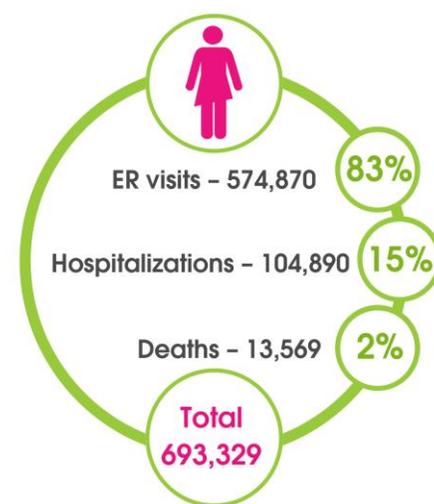
Security and Privacy

It's essential to handle athlete health information in a secure manner to safeguard the privacy of sensitive data and to comply with regulations such as the Health Information Portability and Accountability Act (HIPAA). Athlete EHR systems can protect all data by implementing effective security models to ensure that only authorized users have access to athletes' information. Ideally, an Athlete EHR system should utilize both role-based and group-based security mechanisms. A user's role determines what types of records they are permitted to see and their group determines which athletes' data they are permitted to access. Access to SCAT3 results can therefore be limited to specific system users and only if they have been authenticated and authorized. Paper-based SCAT3 assessments, by contrast, can be accessed by anyone who has access to the filing cabinet.

Conclusion

In the past, when an athlete sustained a concussion, they were often told to "walk it off" or "get back in the game." Negligence lawsuits, especially those filed by student athletes, were extremely hard for plaintiffs to win. However, times have changed and over the last several years much more attention has been paid to concussions and levels of awareness and understanding have risen significantly. This awareness and attention has not only manifested itself in the media and in medical journals; many states in the U.S. have recently implemented concussion-related legislation - see the attached list in the appendix below. The high profile media coverage of the NFL lawsuit has led to predictions that concussion based lawsuits will be the next big litigation trend in the U.S.

The SCAT3 is a simple and effective way to ensure that concussions are assessed consistently and promptly following an incident. Baseline assessments are recommended for all athletes as they provide a good opportunity to educate the athletes about the precautions that they must take if they experience concussion-like symptoms after a head injury. The SCAT3 provides the most value when integrated within an Athlete EHR. This ensures that the concussion assessment is easily and securely accessible by the medical team who need to be informed in order to make optimal treatment and training decisions.



Concussion statistics by gender ¹



¹ Faul M, Xu L, Wald MM, Coronado VG. Traumatic Brain Injury in the United States: Emergency Department Visits, Hospitalizations and Deaths 2002 – 2006. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2010.





The ability to access SCAT3s and Athlete EHRs via smartphones and tablets is also important, as this leads to more timely assessments and notifications, and the ability to make better-informed return to play decisions from the sidelines. By integrating the SCAT3 within an Athlete EHR, athletes that are fit to play can get back in the game while those that aren't are given the time needed to fully recover, lowering the risk of repeat concussions and strengthening the team as a whole.

About Presagia

Presagia provides secure web-based and mobile-accessible health management software solutions used by athletics organizations worldwide. Our multi-sport Athlete EHR and injury management system with a mobile SCAT3 centralizes information needed by athletic trainers, physicians, coaches and physiotherapists while streamlining data entry to speed up the capture of treatment records. It also includes real-time reporting and collaboration tools. Our customers include the World Anti-Doping Agency, the U.S. Ski and Snowboard Association, Stanford University, University of Alabama, the English Institute of Sport and the Irish Sports Council. For more information, visit www.presagiasports.com.





Appendix - Concussion Legislation

Many countries have implemented specific laws to address concussions, largely designed to prevent occurrences and reoccurrences. In the United States alone, all but one of the states have passed concussion legislation, many of which are relatively recent, on how to deal with young athletes suffering from concussions. Below is a table of the individual acts or bills and when they were signed.

- **Alabama** – HB 308, May 10, 2012
- **Alaska** – HB 15: An Act relating to prevention and evaluation of and liability for concussions in student athletes, May 27 2011
- **Arizona** – SB 1521, April 18, 2011
- **Arkansas** – SB 1158 (Act 1435), April 22, 2013
- **California** – AB 25, October 4, 2011
- **Colorado** – SB 40: the Jake Snakenberg Youth Concussion Act, March 29, 2011
- **Connecticut** – SB 456: An Act Concerning Student Athletes And Concussions, May 18, 2010
- **Delaware** – SB 111, August 30, 2011
- **District of Columbia** – B19-0007: Athletic Concussion Protection Act, July 27, 2011
- **Florida** – HB 291, April 29, 2012
- **Georgia** – HB 284, April 23, 2013
- **Hawaii** – HB 2273, July 3, 2012
- **Idaho** – HB 632: An Act Relating to Youth Athletes and Concussion, April 3, 2012
- **Illinois** – HB 200, July 28, 2011
- **Indiana** – SB 93, May 10, 2011
- **Iowa** – SF 367: An Act concerning the protection of students from concussions and other brain injuries, April 7, 2011
- **Kansas** – HB 2182. May 25, 2011
- **Kentucky** – HB 281, April 11, 2012
- **Louisiana** – SB 189: Louisiana Youth Concussion Act, June 28, 2011
- **Maine** – SP 654: An Act To Direct the Commissioner of Education To Adopt a Model Policy Regarding Management of Head Injuries in School Activities and Athletics, May 21, 2012
- **Maryland** – HB 858, May 19, 2011
- **Massachusetts** – SB 2469: An Act relating to safety regulations for school athletic programs, July 19, 2010
- **Michigan** – SB 1122, November 8, 2012
- **Minnesota** – SF 612, May 27, 2011
- **Missouri** – HB 300: Interscholastic Youth Sports Brain Injury Prevention Act, July 13, 2011
- **Montana** – SB 112, April 22, 2013
- **Nebraska** – LB 260: Concussion Awareness Act, April 14, 2011





- **Nevada** – AB 455, May 31, 2011
- **New Hampshire** – SB 402, June 18, 2012
- **New Jersey** – AB 2743, December 7, 2010
- **New Mexico** – SB1: An Act Relating to School Athletics Safety; Establishing Safety Protocols and Education Regarding Concussion and Other Head Injuries Resulting From Athletic Activities, March 9, 2010
- **New York** – SB 3953-A, March 10, 2011
- **North Carolina** – HB 792: Gfeller-Waller Concussion Awareness Act, June 16, 2011
- **North Dakota** – SB 2281, April 22, 2011
- **Ohio** – HB 143, December 20, 2012
- **Oklahoma** – SB 1700, May 13, 2010
- **Oregon** – SB 348, “Max’s Law,” June 18, 2009
- **Pennsylvania** – SB 200, November 10, 2011
- **Rhode Island** – H 7036 Substitute A, June 9, 2010; H 5440 Substitute A: School and Youth Programs Concussion Act, July 9, 2011
- **South Carolina** – H 3061, June 7, 2013
- **South Dakota** – SB 149: An Act to establish policies for youth athletes with concussions resulting from participation in youth athletic activities, March 28, 2011
- **Tennessee** – SB 882, April 12, 2013
- **Texas** – HB 2038, June 17, 2011
- **Utah** – HB 204: Protection of Athletes with Head Injuries March 21, 2011; HB 269, March 28, 2013
- **Vermont** – SB 100, May 31, 2011; SB 4 (Act 68): An Act Relating to Health and Schools, May 14, 2013
- **Virginia** – SB 652, April 11, 2010
- **Washington** – HB 1824: The Lystedt Law, May 14, 2009
- **West Virginia** – SB 336, May 1, 2013
- **Wisconsin** – AB 259, April 2, 2012
- **Wyoming** – SF 38, March 10, 2010

