



# NEW CONCUSSION GUIDELINES

## Impact Secondary School Setting

### Implementing Berlin concussion consensus statement recommendations, SCAT5 into clinical practice

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**W**ith the publication of the consensus statement from the fifth International Conference on Concussion in Sport,<sup>1</sup> clinicians have an updated list of recommendations for best practice in evaluating and managing sport-related concussion. Accompanying the consensus statement are a series of 12 systematic reviews, summarizing the best available evidence for the 12 clinical questions discussed in Berlin, as well as the Sport Concussion Assessment Tool, 5th Edition (SCAT5),<sup>2</sup> Child SCAT5<sup>3</sup> and Concussion Recognition Tool. Each of these documents is important in its own right, with SCAT5 and Child SCAT5 being directly applicable to athletic training clinical practice. As with any specific concussion tool use, athletic trainers should discuss the SCAT5, its administration and interpretation with their directing physician and include it in their standing orders or physician direction protocol.

The SCAT5 was developed to improve on the prior versions of SCAT, while keeping those components with good validity and reliability (symptom scale, Standardized Assessment of Concussion (SAC), and Balance Error Scoring System (BESS)). Although this is the fourth iteration of SCAT, the expert panel at the consensus meeting chose to align the instrument name with the fifth international meeting. Unlike SCAT2, which included a total composite score heavily weighted toward symptoms,<sup>4</sup> SCAT5 is similar to SCAT3 in that it includes component scores with no overall total score. The instrument is intended to be administered by health care providers to patients ages 13 or older and includes an on-field (immediate) assessment and a sideline or post-event evaluation.<sup>2</sup>

The immediate or on-field assessment includes an evaluation for red flags, observation of signs, Maddocks' memory questions, Glasgow Coma Scale and cervical spine assessment. This assessment is meant to serve as a go-no-go

process in which the clinician can determine whether a concussion is suspected, at which time the athlete should be removed from play for a further evaluation.

The remainder of SCAT5 (office or off-field assessment) is intended to be administered in a distraction free environment and should take at least 10 minutes to administer properly.<sup>2</sup> It includes a brief medical history, graded symptom scale, cognitive screen (SAC), neurologic screen and modified BESS. SCAT5 also allows the clinician to summarize clinical findings to assist with decision-making and print take-home instructions for patients and parents. Several alterations have been made in SCAT5 from prior versions including the on-field assessment, evaluation of observable signs, alternative and longer word lists for the SAC immediate memory section, alternate sets of numbers for the digits backwards, notation of time when immediate memory and delayed recall is assessed to ensure adequate delay in questioning, a rapid neurological assessment and the option to use the full BESS and not just firm surface.<sup>2</sup>

It is recommended that SCAT5 be administered in a resting state (e.g., resting heart rate), so performing the assessment in a locker room or after the event may provide adequate time

for administration and allow the athlete to complete without the effects of fatigue or exercise to confound results.<sup>5</sup> Clinicians may choose to perform baseline testing using SCAT5; however, it should be noted that SCAT5 is best used in the immediate post-event assessment and may be used through day three to five post-concussion. SCAT5 is not intended to be an assessment that would be used in making return-to-play decisions after five days, as the sensitivity of the instrument decreases.<sup>2</sup>

## IMPLEMENTING AT THE SECONDARY SCHOOL SETTING

With the release of the Berlin Consensus Statement on Concussion in Sport, many athletic trainers are in the process of digesting the new recommendations found in the document, particularly those that might call for a revision of their program's concussion management plan. In other cases, new recommendations in the Berlin consensus statement may affirm existing practices already being implemented by ATs. Such an analysis is provided below by George Wham, EdD, ATC, SCAT, with input from other members of the NATA Secondary School Athletic Trainers' Committee. The reader should understand that the following Berlin recommendations represent the guidelines that stood out to Wham and might be considered by athletic trainers in the secondary school setting for integration into practice. It is recognized that many other recommendations are found in the Berlin statement that might warrant consideration for adjustments in a concussion management plan as well.

**BERLIN RECOMMENDATION: SCAT usefulness significantly decreases after three to five days.**<sup>1,2,4</sup>

### Consideration for Concussion Plan:

**Wham:** In addition to conducting SCAT testing on the day of injury and again at the initial physician exam (48 to 72 hours post injury), our current concussion protocol requires a "clean SCAT" as one of the criteria to move forward for a full contact practice in the graduated return-to-play protocol. Given this new recommendation regarding appropriate SCAT use, our program will need to reconsider the use of SCAT testing after the prescribed time frame. That said,

I would feel uncomfortable returning an athlete to play if I couldn't document that significant improvements have occurred in areas where deficits previously existed.

**Shelly Jones, ATC:** This doesn't change my current practice. While we do use SCAT on the field to aid in a diagnosis, we normally do not use SCAT as a clearance mechanism.

**Dale Grooms, ATC:** This does not change our current practice of care. For us, SCAT is one of the tools we use to aid us in determining if the patient is dealing with a possible concussion. Our protocol requires for a patient to be symptom free before they are able to start a return-to-play program.

**BERLIN RECOMMENDATION: SCAT5 should be conducted in a quiet controlled environment.**<sup>2,6</sup>

### Consideration for Concussion Plan:

**Wham:** Our program adopted this practice sometime back as we decided there were too many distractions on a sideline for a quality exam. At a varsity football game with multiple ATs and doctors present, this practice is easier to implement. One AT escorts the athlete back to the athletic training facility to conduct the exam, while the other AT, team physician and EMS personnel continue to provide services on the playing field.

Obviously, this recommendation presents a challenge in situations where a single AT is providing event coverage. In such situations, our program may conduct the SCAT5 new sideline assessment (titled: Immediate or On-field Assessment), check cranial nerves and get a symptom score to rule out red flags for a medical emergency, then conduct the entire SCAT5 as recommended at the first opportunity after the event or at halftime. Perhaps this limitation might be the impetus for additional AT staffing by the institution.

**Jones:** This recommendation is difficult as I rarely have a quiet controlled environment to test in. We've had a neuropsychologist on our sideline and he marveled at the fact we routinely perform these tests with the band and crowd noise going wild. Whereas, in his clinic he dims the lights, pulls the blinds, closes the door and hangs a sign asking his clinic to be quiet during his testing procedures. However, I feel confident with my years of

experience in discerning whether noise and activity on sideline may be a factor.

The first page of the SCAT5 fails to uncover enough information to make a decision on the sidelines and as the sole medical provider on site, leaving to a quiet environment for the rest of the evaluation isn't practical. I will continue to inquire about symptoms and test cranial nerves on the sidelines to help aid my decision making.

**John Moyer, LAT, ATC:** At my secondary school, we always perform SCAT testing in a quiet controlled environment, be it a baseline test or a post-concussion test.

As athletic trainers, we demonstrate our value and worth as health care providers by providing the initial assessment of suspected concussion. As per state law in Pennsylvania, every secondary school is required to create and implement a concussion management program for every athlete suspected of exhibiting signs of concussion. Part of this concussion management program is having the AT make the initial assessment and then make the proper referral to a physician for confirmed diagnosis. It is state law that only an MD/DO or a neuropsychologist may provide the definitive concussion diagnosis.

**Grooms:** Performing the exam in a quiet controlled environment is extremely hard for my particular setting. Often times we only have one AT at a particular venue. Going to a controlled environment maybe ideal, but it is not realistic in my employment setting.

**BERLIN RECOMMENDATION: SCAT5 (under Key Points) recommends an athlete suspected of having a concussion be evaluated immediately by medical personnel or be referred to a medical facility for urgent assessment.**<sup>6</sup>

### Consideration for Concussion Plan:

**Wham:** Our protocol currently calls for an athlete to be removed from play and be assessed by an AT when a concussion is suspected. Based on the results of the assessment, a determination of whether EMS should be alerted to transport to the hospital is made. Our AT program provides services for football games (both home and away) and home events for our other sports so meeting this recommendation is no problem under these circumstances. However, in South Carolina high school

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athletics, ATs typically only travel with football teams. For other sports, the AT of the host school is relied upon to provide injury assessment for the visiting team in other sports. In situations where one of our teams is playing at a school without on-site AT services at the event, an adjustment to our concussion management protocol may be in order. Without an on-site assessment by an AT or other appropriately qualified health care provider, consideration for requiring coaches to refer an athlete suspected of having sustained a concussion to a medical facility for urgent assessment via ambulance or parent may be appropriate.

**Grooms:** In Illinois, if an official suspects an athlete of suffering a concussion, the athlete is removed from the game. The athlete is only able to return to play if they are cleared by a physician or an AT working under a physician. Officials are required to report to the state athletic association the suspected concussion, and the association then requires the athlete's school to complete a report about the incident, ideally insuring proper care is being undertaken.

At the same time, each school in Illinois is required to have a concussion oversight team, made up of administration, faculty, school nurse (required, if the school has one), AT (required, if the school has one) and physician (if the school can afford the expenditure). This committee is to ensure students who suffer concussion are being treated by the latest standards of care and developing return-to-learn and return-to-play protocols.

**Berlin recommendation: Baseline testing is helpful in interpretation of neurocognitive assessment results, but not necessary.<sup>7</sup>**

#### **Consideration for Concussion Plan:**

**Wham:** This recommendation provides support for utilizing computer-based neurocognitive post-injury testing for concussed athletes who don't have a baseline test. Our program has conducted computer-based neurocognitive baseline and post-injury testing since 2008 for athletes participating in high school-level sports (excluding golf, tennis, cross country, track and middle school-level sports). Given the time, effort and cost required for baseline

testing, some consideration will be given as to whether baseline testing should continue. I'm inclined to continue baseline testing for now, but this recommendation affirms that computer-based neurocognitive post-injury testing is valuable even without comparison to results of a baseline test.

**Jones:** This won't change my practice. We haven't baselined athletes with SCAT. We do utilize ImPACT as a tool and baseline our high contact sports.

**Moyer:** I feel that baseline testing is just one tool in the tool box for concussion assessment. The more tools we have to ensure the assessment of concussion and to ensure the safe return to sport for our athletes, the better. We do provide SCAT baseline exam for all athletes participating in contact sports.

**Grooms:** Neurocognitive testing is just one of the tools we use to determine if an athlete is able to return to play. All of our athletes and a great majority of our student body are provided a free baseline test. We will continue with this practice, despite the cost and time, for it is a valuable tool, but not the end-all tool.

**BERLIN RECOMMENDATION: Use of computer-based neurocognitive post-injury testing may be helpful not only for determining readiness for return to sport, but also in return-to-school decisions.<sup>1,7</sup>**

#### **Consideration for Concussion Plan:**

**Wham:** Our program adopted this practice several years ago. We have found the results of computer-based neurocognitive post-injury testing to be helpful in determining appropriate academic modifications during recovery. This recommendation provides support for our current practice.

**Jones:** This will not change my clinical practice. We already use ImPACT scores to help guide our teachers, counselors and determine academic accommodations.

**Moyer:** I feel the key word in this statement is "may." At my secondary school, we utilize computer-based neurocognitive baseline and post-injury testing at the request of a parent or physician. The attention span of the age group of athletes we are providing care for is extremely limited so the length

of a computer-based neurocognitive test may not provide accurate data in both the baseline and post-injury computer-based neurocognitive testing.

**Bart Peterson, MSS, ATC:** We have done this in the past prior to the release of the Berlin recommendations. Language arts teachers of students who have been identified with neurocognitive deficits in the "verbal memory" section are notified of the deficit and asked to work with the student if possible. In addition, writing assignments are changed, if possible, to accommodate for the deficit and allow the brain to continue to heal.

**Grooms:** Currently, we only use the ImPACT test to aid in the clearance phase of return to play. Our medical team currently doesn't want to use the test as a measure of severity. We believe, if the athlete is concussed, we don't need to stress the injured brain to determine return-to-learn protocols. At the same time, we want to limit the number of tests we are requiring the athlete to take, for we don't want to create test confusion by over-testing them.

**BERLIN RECOMMENDATION: Berlin recommendations specifically defined day two of graduated return-to-play (GRTP) protocol as walking or pedaling a stationary bike at a slow to medium pace.<sup>1</sup>**

#### **Consideration for Concussion Plan:**

**Wham:** In our concussion protocol, day two (light aerobic exercise) of the GRTP has traditionally consisted of a 15 minute stationary bike ride following by a 1 mile jog with the idea of increasing heart rate, but under 70 percent maximum heart rate. With this new definition of light aerobic exercise, we will make this stage a little less intense and add the 1 mile jog to following step.

**Jones:** This will not change my practice. We already instruct athletes about pace and rate of perceived exertion.

**Moyer:** I will admit that the GRTP protocol we utilize is a bit more aggressive than the new recommendations. I feel I will reassess our protocol to utilize as many recommendations from the Berlin consensus statement as possible.

**Peterson:** Depending on the sport, status of the student and availability of the athletic trainer to supervise, this has been our standard.

**Grooms:** This doesn't change our protocol, for this is already our practice. That being said, if an athlete is suffering from prolonged symptoms, we will have them lightly bike. We have noticed that if we are asking a highly active athlete to sit, this may increase their anxiety and feed into their symptoms. So our medical team has decided to implement light activity, as long as it doesn't make the symptoms worse.

**BERLIN RECOMMENDATION: The new Berlin recommendations agree with emerging research that controlled, sub-symptom-threshold, sub maximum exercise should be considered to speed recovery. The authors also suggest the addition of vestibular and cervical rehab along with psychological intervention be considered.<sup>8</sup>**

#### **Consideration for Concussion Plan:**

**Wham:** Emerging research regarding more active interventions has been accumulating over the past few years, but we had elected to wait until Zurich guidelines were updated before moving forward. As previously recommended, our protocol has focused on rest as the primary treatment in concussion recovery. Collaboration with our team physician group and the concussion center will likely be required for these changes to be adopted.

**Jones:** We are interested in the continued research and will defer to our concussion management specialists to guide us in altering our "rest until asymptomatic" protocol. We anticipate this affecting lengthy recoveries more so than those that resolve in a nice linear fashion. We have never been in favor of complete and total rest and always operated with the philosophy "if it increases your symptoms it should be avoided," which includes exercise.

**Moyer:** We have already implemented this practice at my secondary school. Demonstrating the value and worth of the AT in health care is enhanced by utilizing

the skills of other health care providers in a team approach to make sure our athletes are receiving the best care possible to ensure safe return to play and school.

**Peterson:** We have found this to be helpful in recent years and have been using this with success.

**Grooms:** We have found great success with this. We currently are using the Wii program to help our athletes recover quicker. During the Wii rehab session, we warn the athlete and their parent that the patient symptoms will most likely get worse, and that is OK. For 98 percent of our patients, they feel dramatically better the following morning compared to how they felt prior to session. We can't say that it is the rehab session that is making them better or if it is just dumb luck. We have not done any blind study, just observational data.

**BERLIN RECOMMENDATION: Thus far, efforts to reduce contact and "tackle training" for football does not show a decrease in sports-related concussion.<sup>9</sup>**

#### **Consideration for Concussion Plan:**

**Wham:** Our concussion management plan does not address tackle training; however, last year, our state high school governing body adopted further measures to limit contact in football. This year, our football coaches took part in the Heads Up program designed to train coaches to teach safer tackling techniques. Further research will tell, but I don't see how encouraging fewer blows to the head could be anything but a positive.

**Jones:** After a steep spike in concussions after concussion legislation, anecdotally, I've noticed a decline over the past few years. Whether it is due to USA Football's Heads Up tackling program, reduced contact time in practice or some other unknown factor, we can't be sure. Along the same timeframe, I have noticed an increase in shoulder/clavicle injuries. It would be interesting to see further research with using the shoulder as the point of contact to see if the anecdotal evidence of increased shoulder injuries can be shown scientifically.

**Moyer:** I feel we need to change the approach to football by our coaches by limiting contact and teaching proper tackling techniques in order to make the sport safer regarding the prevention of all injuries. Although the early research may show that this new approach may not reduce the incidence of concussion, I feel our mission as health care providers is to try and reduce the number of every type of injury associated with football.

**Peterson:** I believe in the high school and middle school populations you will not see a decrease in sport-related concussion with reduced contact and tackle training. The reason being that these adolescents are just learning to control their bodies, bodies that are constantly growing and changing. This growth and change creates too many uncontrollable factors in a body that is typically kinesthetically immature.

However, I believe that in the mature athlete the data will show decreased rate and incidence of sport-related concussion with reduction in contact and tackle training.

**Grooms:** We have found that our football concussion rates have dropped by our coach changing his practices to reduce contact days and by changing how we tackle.

In closing, the consensus statement from the fifth International Conference on Concussion in Sport is a great summary of the current literature on a significant injury, common in every athletic training facility. We encourage all ATs to review the Berlin Consensus Statement on Concussion in Sport, SCAT5 and related systematic reviews to identify areas that need to be revised in their own program's concussion management plan.

Given that concussion in secondary schools is tied to legislation dictating management in every state, ATs should be sure to review their state's concussion law and other policies to ensure any revisions are lawful. Staying current by utilizing the Berlin recommendations from the concussion experts should help to ensure clinicians are implementing best practices. §