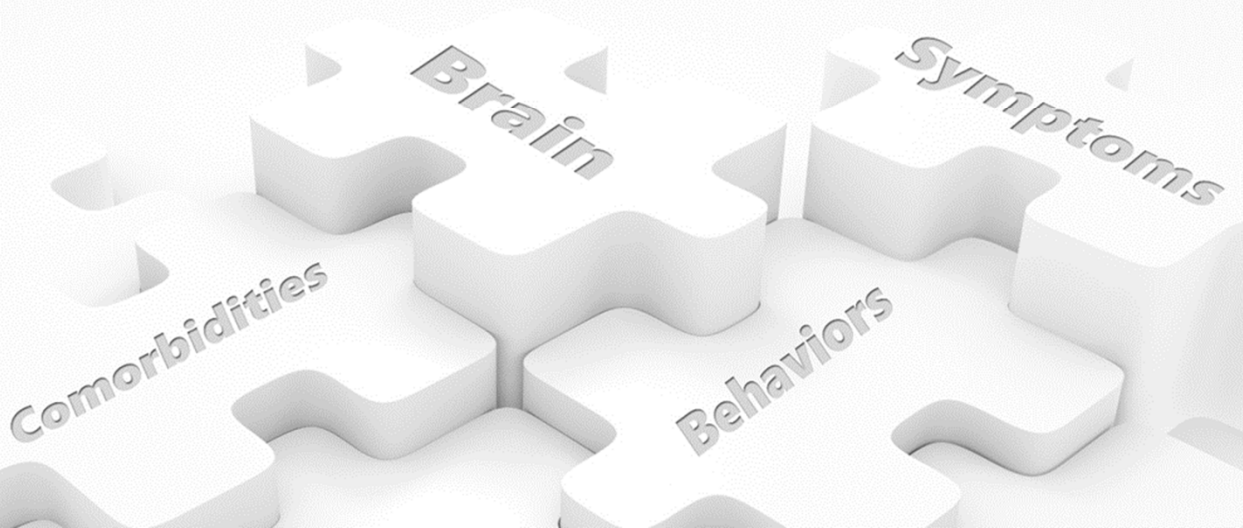


Concussion Vital Signs[®]



User Guide

www.CONCUSSIONVITALSIGNS.com



Contents

Concussion Vital Signs Purpose	3
Why use Concussion Vital Signs?	3
How can Concussion Vital Signs Help?	5
How to Become a Concussion Vital Signs User?	6
Concussion Vital Signs User Guide	7
HOW TO TEST: Baseline and Post-Concussion Assessment	8
Taking the Concussion Vital Signs Assessment	11
Account Administration Information: View REPORTS	12
Clinician Portal	17
Neurocognitive Report Information Background	19
Neurocognitive Clinical Domains Measured	24
Concussion Vital Signs Test Descriptions	25
Concussion Symptom Scale & History	26
Glossary	28
Appendix of Tools	29

Disclaimer & Copyrights

THE USER OF THIS SOFTWARE UNDERSTANDS AND AGREES THAT CNS VITAL SIGNS LLC. IS NOT ACTING AS A QUALIFIED HEALTH PROFESSIONAL OR MEDICAL PROVIDER (“Provider”), AND THAT THE SOFTWARE IS AN INFORMATION PROCESSING TOOL ONLY. The Software is not intended to replace the professional skills and judgments of Provider and its employees and contractors. Provider alone shall be responsible for the accuracy and adequacy of information and data furnished for processing and any use made by Provider of the output of the Software or any reliance thereon. Provider represents and warrants that it is a properly licensed healthcare provider and that all individual employees or contractors of Provider using the Licensed Product have sufficient credentials, training, and qualifications in order to understand and interpret the Licensed Product and its results. Provider further represents and warrants that it shall consider the results of use of the Licensed Product only in conjunction with a variety of other information in connection with relevant diagnostic and treatment decisions.

Copyright© 2003-2022 by CNS Vital Signs, LLC.

All rights reserved. No part of the contents of this book may be reproduced or transmitted in any form or by any means without the written permission of CNS Vital Signs®.

Concussion Vital Signs Purpose

Concussion Vital Signs is a free web-based neurocognitive assessment platform for schools developed by CNS Vital Signs to help health professionals, certified athletic trainers, school nurses, and coaches meet the public health needs of the growing number of individuals affected by a mild traumatic brain injury (mTBI) or concussion. Concussion Vital Signs provides a brief, web based neurocognitive testing solution (baseline and post-concussion), as well as a self-reported history, and post-concussion symptom rating scales. Neurocognitive evaluation assists qualified health professionals in collecting important information used in evaluating, monitoring, and managing concussions.

Concussion Vital Signs is a product of CNS Vital Signs, a world leader in the design and development of standardized neurocognitive assessment tools. As a clinical instrument, the CNS Vital Signs neurocognitive battery has been used to evaluate and manage patients by more than 10K clinicians in 52 countries.

“Neurocognition” refers to brain functions such as learning, remembering, concentrating, problem solving, and decision making. These processes are active in virtually all of our day-to-day activities. Neurocognitive testing helps clinicians evaluate and describe their patient’s neurocognitive health, such as impairments seen in concussion. Concussion Vital Signs is practical and scientifically robust. The practical advantages reflect the affordability and efficiency of the platform. Concussion Vital Signs is accurate and is noted for being relatively easy and quick to administer.

Why use Concussion Vital Signs?

Each year more than 300,000 sports-related traumatic brain injuries or concussions occur in the United States. Concussions can happen to any athlete of any age, male or female, in any sport. While such injuries may not always be preventable, clinicians and athletic trainers are able to use valid and reliable tools to recognize and treat concussions to make sure athletes are fully recovered before resuming play.

Sideline examinations, medical consults and even scans may miss subtle but significant problems impacting performance in the classroom, as well as the playing field. Across the spectrum of concussion management, Concussion Vital Signs helps clinicians collect objective evaluation and management endpoints for athletes of all ages.

Functionally, baseline (pre-season) neurocognitive testing utilizing the Concussion Vital Signs tests provides valuable information about an athlete. Should an athlete sustain a suspected concussion/head injury, this pre-season baseline testing provides the clinicians with valuable information to help assist in return to play decisions. Concussion Vital Signs is designed to give the athletic trainer and sports medicine staff maximum ease-of-use, assessment flexibility, and system reliability.

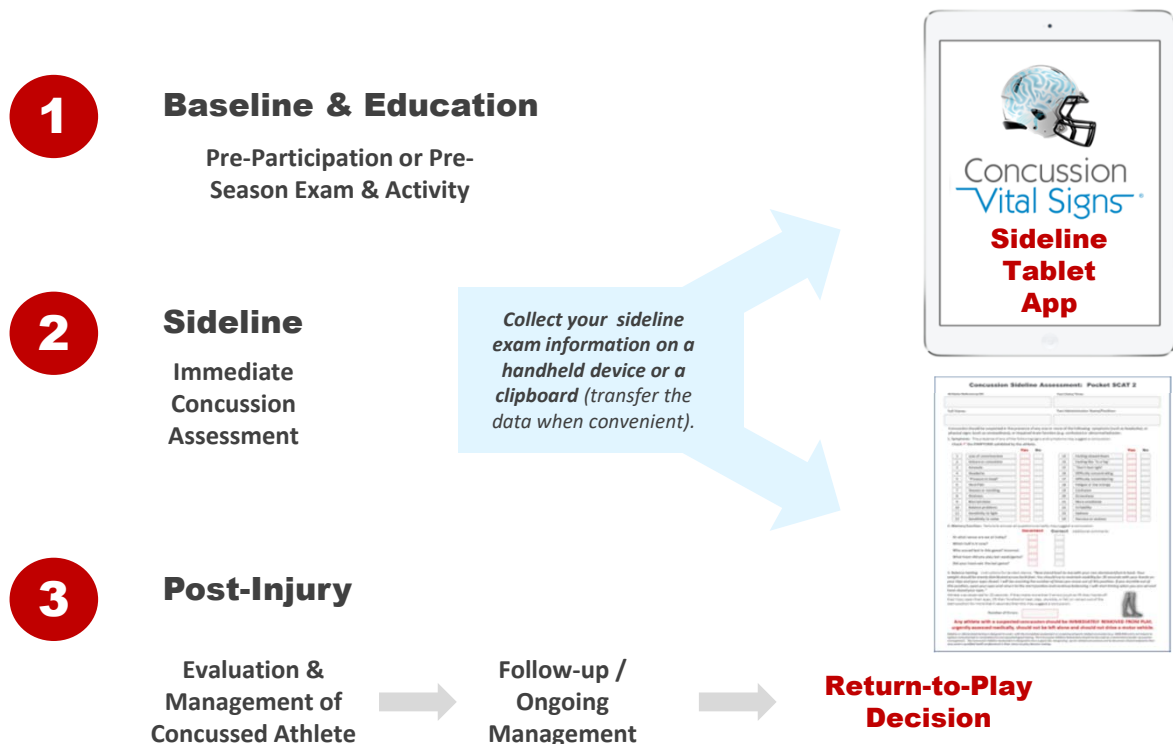
Why use Concussion Vital Signs?

Athlete Health: Concussions are not always easy to assess (like a sprained ankle or broken bone). Concussions are sometimes referred to as the invisible injury. Returning-to-play too soon after a first concussion can have devastating consequences e.g., second impact syndrome on an athlete's brain. *Concussion Vital Signs provides Valid & Reliable tools that can help a qualified health professional assess a athlete's status e.g., neurocognitive, symptoms, history, and sideline status.*

New Advances: Advancing medical knowledge has led to consensus guidelines supporting the proper management of sports related concussions (e.g., SCAT 3). *Concussion Vital Signs is optimized to assist every school and clinical practice in the longitudinal management of sports concussion.*

Risk Management: Many state legislatures and sports governing bodies (e.g., NCAA) have passed mandates or guidelines related to the proper management of sports related concussions. *Concussion Vital Signs is optimized to assist every school and clinical practice in the compliance of sports concussion mandates, policies, and plans e.g., flexible and efficient assessment platform that enables a systematic documentation.*

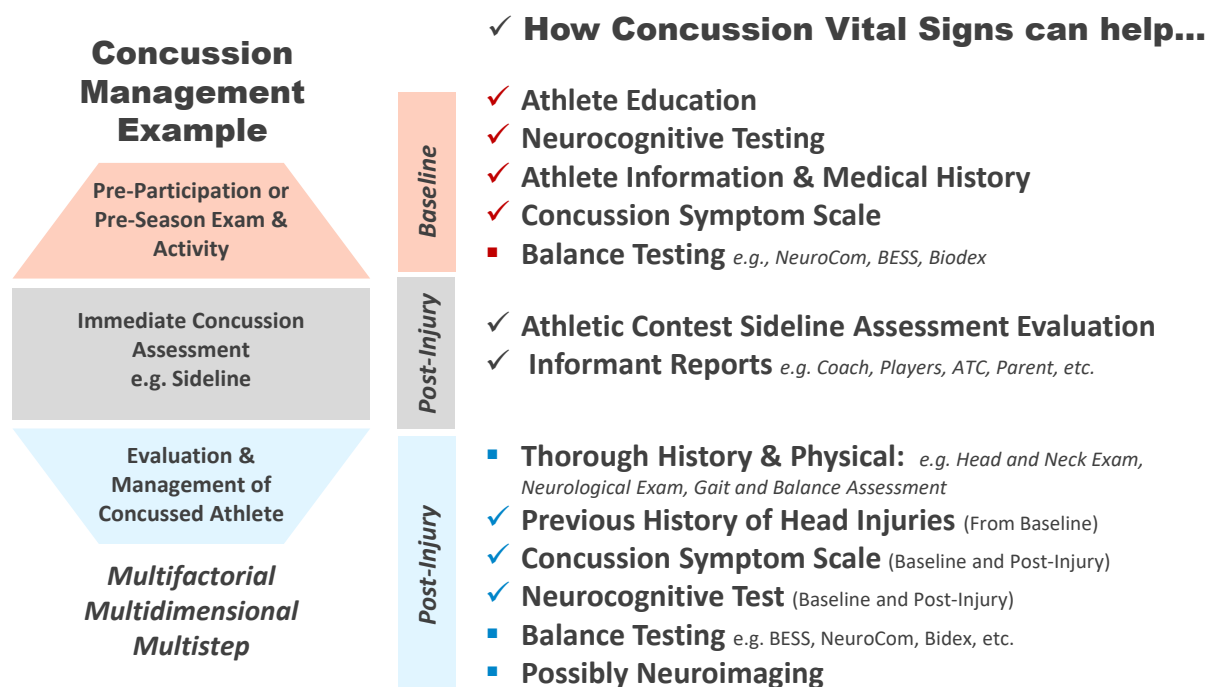
The Right Thing To-Do: With the recent growth in scientific knowledge about the possible effects of sports concussions many administrators are realizing the need for a more effective and reasoned approach to sports concussion management. *Concussion Vital Signs helps provide schools and club teams, in coordination with qualified health professionals, a platform to make the management (policy and plan) more efficient and coordinated.*



How can Concussion Vital Signs Help?

*Sport-related concussion is a “hot topic” in the media and in medicine. It is a common injury that is likely underreported by pediatric and adolescent athletes. Football has the highest incidence of concussion, but girls have higher concussion rates than boys do in similar sports. A clear understanding of the definition, signs, and symptoms of concussion is necessary to recognize it and rule out more severe intracranial injury. Concussion can cause symptoms that interfere with school, social and family relationships, and participation in sports. Recognition and education are paramount, because although proper equipment, sport technique, and adherence to rules of the sport may decrease the incidence or severity of concussions, nothing has been shown to prevent them. Appropriate management is essential for reducing the risk of long-term symptoms and complications. Cognitive and physical rest is the mainstay of management after diagnosis, and neuropsychological testing is a helpful tool in the management of concussion. Return to sport should be accomplished by using a progressive exercise program while evaluating for any return of signs or symptoms. This report serves as a basis for understanding the diagnosis and management of concussion in children and adolescent athletes.” **Pediatrics 2010;126:597–615***

Concussions are complicated pathophysiological processes affecting the brain, caused by a traumatic force. Concussion assessment is many times difficult because of the complexity and multifactorial nature of the condition and usually requires a multidimensional approach to collecting important clinical endpoints. The Concussion Vital Signs assessment platform aids Athletic Trainers, coaches, players and qualified health professionals in the multistep process (baselining and post-injury) of collecting important information necessary to make a well-informed return-to-play decision.



How to Become a Concussion Vital Signs User?

Users can access the Concussion Vital Signs assessment platform by registering and...

Following these 3 Simple Steps:

1

Go to www.CONCUSSIONVITALSIGNS.com and **CLICK** on the 'REGISTER' button

Concussion Vital Signs®

Free Unlimited Testing for Schools

Home About Resources Test Info Reports Publications Pricing Info Contact

Concussion Management... Made Easier

Neurocognitive Testing > Sideline Tools > Concussion Symptoms Scale > Concussion History

Unlimited Baseline and Post-Injury Assessments... for Every Athlete

Athlete Testing
Baseline, Sideline, & Post-Injury

Clinician Portal
Clinic Based Post-Injury Testing

Administrator Login
View Reports & Manage Account

Register
Schools, Colleges, & Universities

Support
FAQs
Forgot My Password
Glossary of Terms

Concussion Vital Signs® which is designed for student athletes, aligns to current sports concussion management guidelines. This scientifically based system, used as part of a baseline protocol and as needed a post-injury evaluation helps facilitate confident return-to-play decisions, while helping to protect the future of student athletes in sports, academics, and life.

Copyright CNS Vital Signs, LLC. © 2003 - 2015 All rights reserved.
"Concussion Vital Signs" is a Trademark of CNS Vital Signs, LLC. All rights protected.

2

Complete the Application and CLICK the Register button.

After registering an email will be sent to you with **your login information**, instructions on test administration, and instructions on how to request a free training webinar.

Make Yourself a copy and/or Print of the Registration Letter for future reference.

3

You will be sent an activation email (check your junk email if you don't see the activation email). Once your account is activated you can BEGIN TESTING ATHLETES! Following your registration, you can immediately begin using the Concussion Vital Signs assessment platform and begin baselining athletes.

Note: The only charge you will incur is if you need the Concussion Vital Signs support services (see pricing webpage.). Most questions can be answered by the webpage information, FAQ's or support PDFs found at the Concussion Vital Signs website.

Concussion Vital Signs User Guide

Concussion Vital Signs is used by clinicians to assess (measure) the neurocognitive status (baseline) of athletes and to serial test (measure and monitor) to evaluate a subject's condition or outcome. The Concussion Symptom Scale and Concussion History help clinicians identify and track a patient or study subject's symptoms status. Managing and making the return-to-play decision for an athlete following a sports concussion is complex and requires the analysis of a number of sources of data. The decision should be determined by a team physician; ideally within the context of a multidisciplinary team.

Concussion Vital Signs provides a concussion management toolset and system that supports a clinician(s) evaluation and monitoring activities.

Concussion Vital Signs provides:

- **Unlimited Neurocognitive Baseline** (computerized neuropsychological assessment)
- **Unlimited Post-Injury Neurocognitive Testing** (computerized neuropsychological assessment)
- **Unlimited Concussion Symptom Scales** (self-reported)
- **Unlimited Concussion History** (self-reported)
- **Unlimited Automated Sideline Assessments**

Baseline neurocognitive testing can be conducted by technicians or proctors under the supervision or guidance of a clinician e.g., athletic trainer, school official, neuropsychologist, or team physician.

NOTE: Neuropsychologists have the training necessary to provide unique expertise in the assessment of neurocognitive functioning, testing, and post-injury neurocognitive and psychological assessment if additional expertise is needed.

Assessment Types

The BASELINE TESTING default is to have the athlete complete all seven neurocognitive tests, followed by a concussion symptom scale, and a concussion history. If the Symptom Scale is selected, the athlete will only be presented with a concussion symptom scale. Athletic Trainers will many times do the post injury neurocognitive testing only after the symptoms have been resolved.

One of the most unique features of the Concussion Vital Signs assessment is its auto-randomization of stimuli into an almost unlimited number of alternate forms. This allows for retesting patients without the confounding of significant content-related practice effects.

HOW TO TEST: Baseline and Post-Concussion Assessment

Testing Environment:

The testing environment should be free of distraction and quiet. Concussion Vital Signs is a performance test, and the testing environment should maximize the athlete's ability to focus and concentrate on doing their best! The athletes' responses will be recorded for both their **SPEED** and **ACCURACY**. Concussion Vital Signs is designed to be a challenging test.

Testing Tips:

Check the athlete's vision of the computer screen e.g., do they wear glasses... are they wearing them? **Is the athlete comfortable during testing** - seating, arm positions, recent restroom visit. **Check for any hand or arm injuries or seating challenges that might impede testing.** **Make sure the testing environment is free from distraction** - quiet room, closed door, need ear plugs, possibly headphones. **Turn off all cell phones, PDA's, etc.** **Remember it is important for the athlete to give their BEST EFFORT!**

To Begin ATHLETE TESTING:

- 1 Go to www.CONCUSSIONVITALSIGNS.com then... have the Athlete's CLICK the "Athlete Testing" button.

The screenshot shows the Concussion Vital Signs website. The top navigation bar includes links for Home, About, Resources, Test Info, Reports, Publications, and Pricing Info. The main heading is "Concussion Management... Made Easier". Below this, there are links for "Neurocognitive Testing", "Sideline Tools", "Concussion Symptoms Scale", and "Concussion History". A row of various sports helmets is displayed. A blue box on the right side of the page contains three options: "Athlete Testing: Baseline, Sideline, & Post-Injury", "Clinician Portal: Clinic Based Post-Injury Testing", and "Administrator Login". The "Athlete Testing" option is highlighted with a red dashed box and a red circle with the number "1". Below this, the "Athlete Testing" login form is shown, featuring a "User Name" field with "athletetest" entered, a "Password" field with masked characters, and a "Device Type" selection with "Laptop or Desktop" selected. A red circle with the number "2" is placed over the "Athlete Assessment Login" button. Below the button, there is a note: "If you have forgotten the Athlete Assessment Login you must contact your Account Administrator."

- 2 To BEGIN the assessment, ENTER the USERNAME and PASSWORD provided by your SPONSOR and CLICK the ATHLETE ASSESSMENT LOGIN button.

The initial Concussion Vital Signs testing screen will appear.

HOW TO TEST: Baseline and Post-Concussion Assessment

Athlete Identification:

- 3** ENTER the Athlete Reference/ID (Athletes Unique Identifier) and CLICK the Test Button.

IMPORTANT: The Athlete Reference /ID is generally assigned based on school policy and should be a unique identifier used throughout the athlete's career. *The baseline testing and post-concussion testing is enabled into a longitudinal report by the accurate recording of the Athlete Reference/ID.*



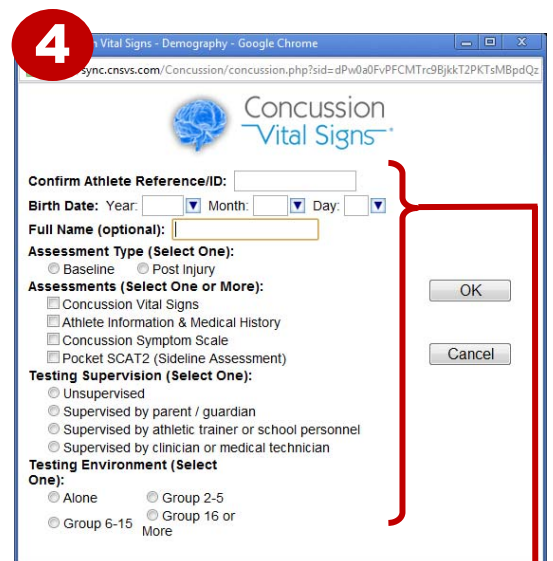
Testing Selection and Information:

- 4** RE-ENTER Athlete Reference/ID and ENTER BIRTHDATE using pull-downs, and Enter Full Name (Optional use to enable roster by name)

Then SELECT the:

- **Type of Assessment** (testing protocol) either Baseline or Post-Injury
- **The Assessments:** Concussion Vital Signs neurocognitive test, Athlete Information & Medical History, Concussion Symptom Scale, & Automated Sideline Assessment
- **Test Supervision Type**
- **Testing Environment**

CLICK OK



Concussion Vital Signs allows FLEXIBLE TESTING: (Select One or More) and can be Easily Adapted to your Concussion Management Plan

KEY Concussion Vital Signs ADVANTAGE:

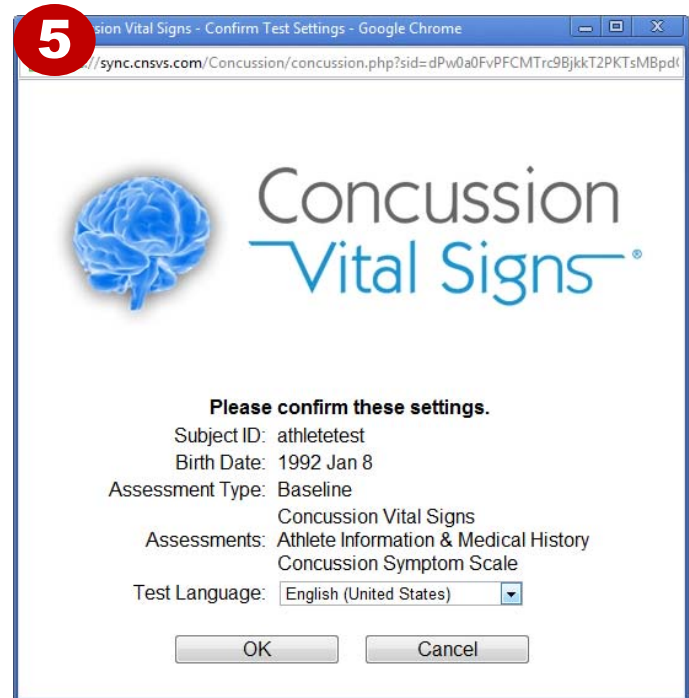
Besides the scientific validity of the Concussion Vital Signs tests, one of the key advantages of the Concussion Vital Signs Platform is the ability to easily customize a testing procedure. Clients can use the platform in numerous ways: (1) as a Baseline and selecting all three assessments, (2) systematically document the athlete's symptoms as part of the protocol e.g. use JUST the symptom scales as a way to confirm the resolution of symptoms, (3) If the athlete cannot remember their concussion history they can complete the history with the help of their parents by logging in at home and completing just the history information, and (4) Collect sideline concussion information using Sideline Assessment app "automated tool" using an internet connected tablet device e.g., iPad, Droid, etc.

HOW TO TEST: Baseline and Post-Concussion Assessment

Confirm Test Settings:

- 5** A Confirm Test Settings box will appear to confirm the settings and allow you to select a language.

CLICK OK to begin the test.

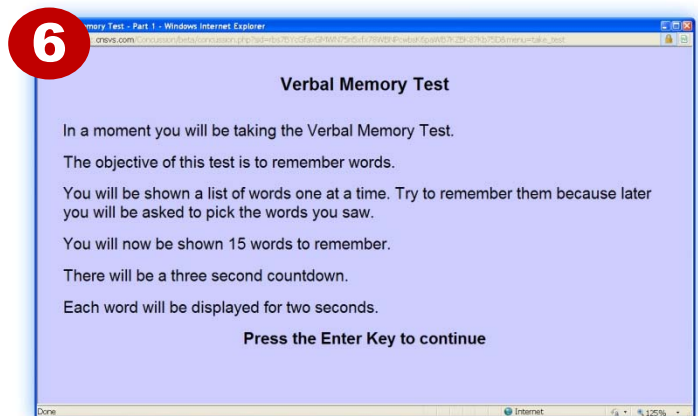


Testing Begins:

- 6** FIRST TEST WILL PRESENT ON THE COMPUTER SCREEN

The selected neurocognitive test will present in your browser. For example, in this scenario, the Verbal Memory Test presents first as part of the selected Baseline Assessment. The athlete will continue to take the test until its conclusion.

For the best possible results, it is important for the athlete give their best effort. The test subject should read the instructions carefully. It is important to point out the computer keys in use. Be sure the subject is familiar with the location of the space bar, the Enter key, the shift keys, the arrow key and the number row. The baseline assessment will take approximately 30 minutes to complete. Scales and history will take additional time.



Taking the Concussion Vital Signs Assessment

The Default Baseline Testing Sequence is:

- 6) Neurocognitive Tests (Page 13)
- 7) Con VS Concussion History
- 8) Con VS Concussion Symptom Scales. Each Symptom is recorded as '0' NONE and a Severity Index of 1 = MILD to 6 = Severe
- 9) Test Completion the athlete can now logout (NOTE: Viewing of the report can be made from the SUPERVISOR or ADMINISTRATOR account in the 'VIEW REPORTS' section (see page 15, section A).

Notes for the ATHLETE Test Administrators

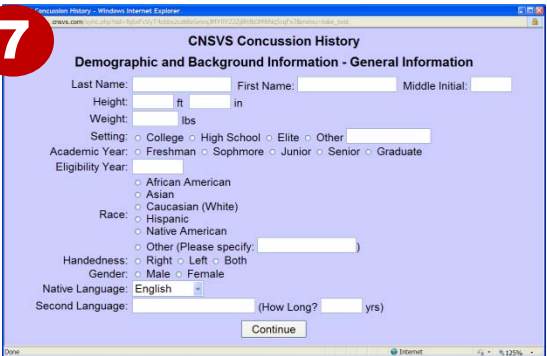
The Concussion Vital Signs Battery uses a standard algorithm (scoring less than chance) to assess testing effort by the athlete. The examiner should emphasize the fact that the Concussion Vital Signs test has embedded indicators of effort and if the athlete does not give their best effort, they will be required to retake the test. Each test, except for the first two memory tests and the continuous performance test (which comes at the end of the test) will have a practice period to allow the athlete to get comfortable with the format of each test.

Again... Reinforce that each athlete should carefully read the test instructions that precede each test. They should be encouraged not to take a break during testing, if they do so during one of the instruction pages the browser may time-out depending on the browser settings.

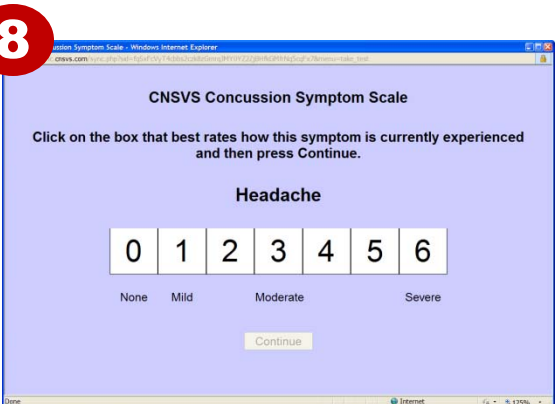
Other Testing Tips:

Ask the subject to take a seat and make themselves comfortable understanding it might take 45 minutes to complete the test. Check that the athlete can read the computer screen e.g., do they wear glasses, are they wearing them? Is the athlete comfortable during testing - seating, arm positions, recent restroom visit. Check for any hand or arm injuries or seating challenges that might impede testing. Make sure the testing environment is free from distraction – e.g., quiet room, closed door, minimize window view distractions. **Turn off all cell phones, PDA's.** Concussion Vital Signs is user-friendly and easily administered.

7



8



9



Account Administration Information: Access ACCOUNT

To ACCESS Your ADMINISTRATOR Account:

A Go to www.CONCUSSIONVITALSIGNS.com then... CLICK the "Administrator Login" button.

Concussion Vital Signs®

Home About Resources Test Info Reports Publications Pricing Info

Concussion Management... Made Easier

Neurocognitive Testing > Sideline Tools > Concussion Symptoms Scale > Concussion History

Athlete Testing
Baseline, Sideline, & Post-Injury

Clinician Portal
Clinic Based Post-Injury Testing

Administrator Login
View Reports & Manage Account

Register
Schools, Colleges, & Universities

Support
FAQs
Forgot My Password
Glossary of Terms

Concussion Vital Signs®

View Reports & Administer Account

By continuing, you accept the Concussion Vital Signs Licensing Agreement.

User Name:

Password:

Administrator Login

Forgot my password

Copyright 2012 CNS Vital Signs, LLC. All rights reserved.

B

B To ACCESS the athlete's assessment reports, ENTER the Administrator USERNAME and PASSWORD provided by Concussion Vital Signs and CLICK the ADMINISTRATOR LOGIN button.

C After LOGIN the ACCOUNT FOLDER will be presented. The account folder will allow the ADMINISTRATOR to VIEW REPORTS, view a LOG of account activity, an assessment HISTORY, Develop and access ROSTERS, and enable the EDIT of the ACCOUNTS profile, set-up rosters, retire athletic records, and an athlete's demography.

Preferences - Account - Act x

https://sync.cnsvs.com/Concussion/concussion...

Concussion Vital Signs®

Account ID: 1008 (Demo High School)

Account Users Rosters Retired Logout

Edit Account

Organization Type: High School
VAR Code(s): CVS
Promo Code:
Address: 123 Anywhere, Raleigh NC 27615
Org. Phone: 919-555-5555
Fax: 919-555-5556
Contact: Athletic Trainer
Title: ATC
Email: concussion@management.com
Phone: 919-555-5555
Cell Phone:

Total Stored Results: 1348

View Reports
View Log
Assessment History
Roster Report
Edit Demography

Account Administration Information: View REPORTS

D. VIEW REPORTS:

Clients can view reports by highlighting the desired athletes Subject ID and CLICKING the VIEW REPORT button at the bottom of the application.

The selected report will open in a PDF format.



D

Athlete ID	Full Name	Test Time (local)	Type	Assessments	Compl	Valid
020174rd	Roger Doger	2011-02-28 18:21:45	Post-Injury	VST, CSS	N	N
030174h	Larry Taylor	2011-02-28 18:17:58	Post-Injury	VST, CSS	N	N
010185mm	Mickey Martle	2011-02-25 17:26:09	Baseline	VST, AMH, CSS	N	N
040480wr	Will Rogers	2011-02-25 15:04:50	Baseline	VST, AMH, CSS	N	N
010185tt	Thurman Thomas	2011-02-24 11:41:31	Baseline	VST, AMH, CSS	Y	Y
010297bj	Bob Jones	2011-02-24 09:16:56	Baseline	CSS	N	N
040199jd	James Dean	2011-02-22 15:39:55	Baseline	VST, AMH, CSS	Y	Y
02128tfl	Tammy Lynn	2011-02-22 13:33:08	Baseline	VST, CSS	N	N
030591rb	Ronnie Bennett	2011-02-22 12:54:12	Baseline	VST, AMH, CSS	N	N
1071681pb	Perry Bean	2011-02-18 13:37:15	Baseline	VST, CSS	N	N
107190co	Chris Lesby	2011-02-15 15:35:07	Baseline	VST	N	N

E. VIEW LOG:

Clients can view a LOG of their testing activity including the Testing Time, Username, and a Log Entry of each activity.



E

Time (GMT)	User Name	Log Entry
05/10/2012 15:30:50	atcadmin	Viewed Audit Log
05/10/2012 15:30:46	atcadmin	Logged on
05/10/2012 15:26:22	athletetest	Logged on
05/10/2012 15:24:09	atcadmin	Viewed Reports
05/10/2012 15:23:42	atcadmin	Viewed Reports
05/10/2012 15:23:15	atcadmin	Viewed Reports
05/10/2012 15:15:36	atcadmin	Logged on
05/10/2012 15:10:29	athletetest	Logged off
05/10/2012 14:55:28	athletetest	Administered test session athlete
05/10/2012 14:55:27	athletetest	Starting VSCSS for athlete
05/10/2012 14:55:26	athletetest	Starting CPT for athlete
05/10/2012 14:55:25	athletetest	Starting SAT for athlete
05/10/2012 14:55:24	athletetest	Starting FTT for athlete
05/10/2012 14:55:23	athletetest	Starting VISM Part 1 for athlete



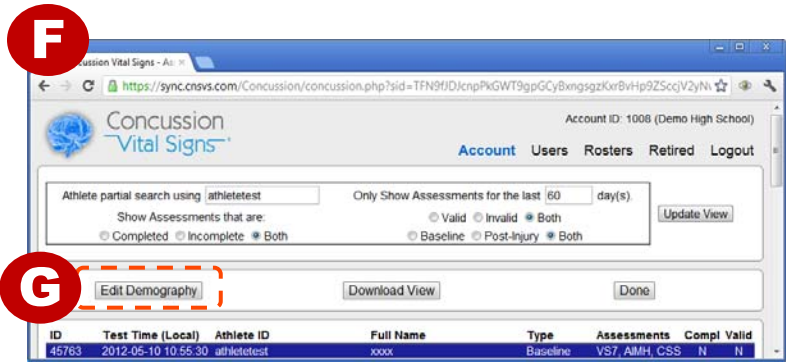
Helping to Solve the Return-to-Play PUZZLE...



Account Administration Information: Manage REPORTS

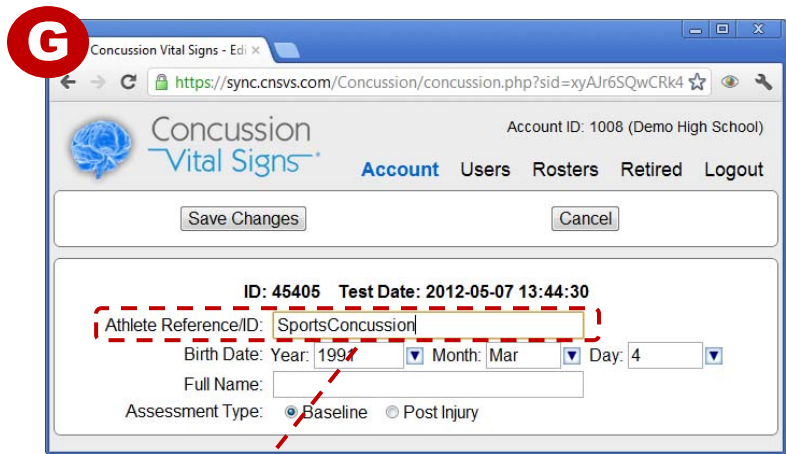
F. ACCOUNT HISTORY or EDIT DEMOGRAPHY:

Clients can view the HISTORY of testing including the Testing Time, Test Administrator, Athlete or Subject ID, Type of Test, what ASSESSMENTS were selected, and whether the assessment was completed.



G. EDIT DEMOGRAPHY:

Clients can view or change their ATHLETES' DEMOGRAPHY information by CLICKING the EDIT DEMOGRAPHY Button. The Edit Demography window allows Account Administrators to edit the demography of a given testing report. The accuracy of the Subject Reference/ID and DOB is important for enabling the longitudinal view of an athlete's record. *This window allows you to change the Subject Reference/ID and/or Birth Date as needed. CLICK "save changes" to make the necessary edits.*



Concussion Vital Signs Report	Test Date Local: February 6, 2009 13:10:46
Post Injury for: SportConcussion	Test Date GMT: February 6, 2009 18:47:11
Age: 20	Administrator: Athletic Trainer
Total Test Time: 36:25 (min:secs)	Language: English (United States)
Testing Supervision: Supervised by clinician or medical technician	Testing Environment: Alone

Domain Scores	Baseline (Aug 28, 2008)			Post Injury				
	Subject Score	Percentile	Valid Score	Subject Score	Percentile	Valid Score	At Baseline or Better	Within 5% of Baseline
Neurocognitive Index (NCI)		77	Yes		81	Yes	Yes	Yes
Verbal Memory	59	93	Yes	58	88	Yes	No	Yes
Visual Memory	55	92	Yes	58	98	Yes	Yes	Yes
Psychomotor Speed	205	81	Yes	201	75	Yes	No	Yes
Executive Functioning	55	68	Yes	56	70	Yes	Yes	Yes
Cognitive Flexibility	54	66	Yes	55	70	Yes	Yes	Yes
CPT Correct Responses	40	61	Yes	40	61	Yes	Yes	Yes
Reaction Time*	549	70	Yes	550	70	Yes	No	Yes
Reaction Time Detail								
Simple Reaction Time*	229	70	Yes	231	70	Yes	No	Yes
Choice Reaction Time Correct*	381	63	Yes	396	50	Yes	No	Yes
Shifting Attention Correct RT*	967	53	Yes	976	50	Yes	No	Yes

Account Administration Information: Manage ROSTERS

H. EDIT ACCOUNT:

Clients can view or change their ACCOUNT Information by CLICKING the EDIT Button from the Admin Account.

Concussion Vital Signs Account ID: 1008 (Demo High School)

Account Users Rosters Retired Logout

Save Cancel

Organization Information (School, College/University, Clinic, Hospital, or Club Information):

Complete Name*: Demo High School

Address*: 123 Anywhere Address 2: City*: Raleigh

State*: NC Zip Code*: 27615 Country: United States

Phone*: 919-555-5555 Fax: 919-555-5556

Primary Contact Information (Athletic Trainer, Athletic Director, Coach, School Nurse, Clinic Administrator, Doctor, etc.):

First Name*: Athletic Last Name*: Trainer Title*: ATC

Email*: concussion@manage Phone*: 919-555-5555 Cell Phone:

VAR Code(s): CVS

I. DEVELOP ROSTERS:

Clients can develop rosters by naming the roster and selecting the team members that have been tested.

Concussion Vital Signs Account ID: 1008 (Demo High School)

Account Users Rosters Retired Logout

Add Roster Cancel

Sport/Roster Name:

Select Athletes to assign to this Roster from the following list:

Athlete ID	Full Name	Additional Index
<input type="checkbox"/> 040199jd	James Dean	
<input type="checkbox"/> 040480bt	Barry Thomas	
<input type="checkbox"/> 040480wr	Will Rogers	
<input type="checkbox"/> 040480bt	Barry Thomas	
<input type="checkbox"/> 040480wr	Will Rogers	

J. MANAGE ROSTERS:

Clients can access and manage team rosters.

Concussion Vital Signs Account ID: 1008 (Demo High School)

Account Users Rosters Retired Logout

Add Roster

Sport/Roster Name

- Basketball Mens Varsity
- Basketball Womens Varsity
- Cheerleading
- cycling
- dance team
- fencing
- field hockey
- Football Varsity
- hockey club 2011
- ice skating
- JV Basketball girl
- JV cheerleading
- JV football
- mens bball
- mens hockey 2011
- mens varsity
- name of roster
- Soccer Mens Varsity
- Soccer Womens Varsity
- Softball Varsity
- southeast HS varsity womens soccer
- spring football

Concussion Vital Signs Account ID: 1008 (Demo High School)

Account Users Rosters Retired Logout

Sport/Roster: Varsity Football Additional Index: Update View

Show Assessments where: Baselines Post-Injuries Both are Valid Invalid Both

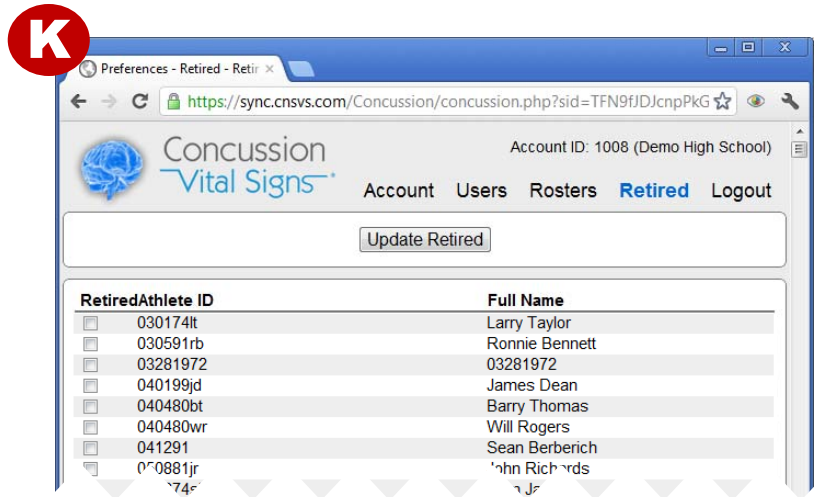
Download Roster Done

Athlete ID	Full Name	Sport	Additional Index	Last Baseline	Valid Last Post-Injury	Valid
010185mm	Mickey Mantle	Varsity Football		2011-02-25 17:26:09	N	
010185tl	Thurman Thomas	Varsity Football		2011-02-24 11:41:31	Y	
020100st	Sally Timms	Varsity Football		2011-02-07 12:45:18	N	
020174rd	Roger Doger	Varsity Football		2011-02-22 13:33:08	N	2011-02-28 18:21:45 N
021281tl	Tammy Lynn	Varsity Football		2011-02-17 15:35:03	N	
021790co	Chris Oglesby	Varsity Football		2011-02-22 12:54:12	N	
030174tl	Larry Taylor	Varsity Football		2011-02-28 18:17:58	N	
030591rb	Ronnie Bennett	Varsity Football		2011-02-22 12:54:12	N	
040480bt	Barry Thomas	Varsity Football		2011-03-03 10:53:27	Y	
040480wr	Will Rogers	Varsity Football		2011-03-15 15:15:15	N	
040480wr	Will Rogers	Varsity Football		2011-03-15 15:15:15	Y	

Account Administration Information: Manage Account

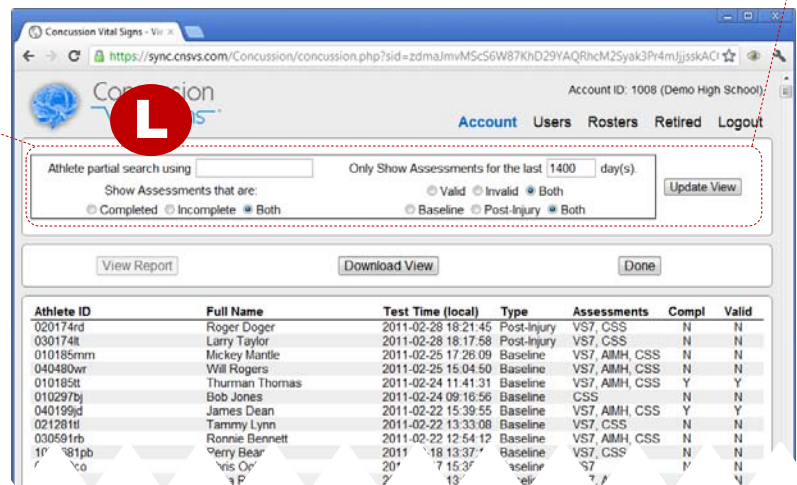
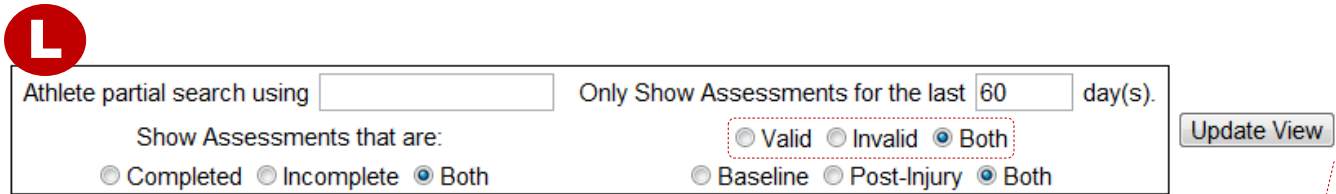
K. RETIRE ATHLETES:

Clients can RETIRE ATHLETE FILES following graduation, a trade to another team, etc.



L. ATHLETE SEARCH:

Clients can add efficiency to their testing process by using the search function at the top of several of the administration pages. The search function allows clients to identify incomplete and invalid tests for retesting purposes. These tests may need to be re-administered to have a valid testing performance.



Clinician Portal: Enabling a Continuity of Concussion CARE

The Clinician Portal advances sports concussion care by enabling a seamless continuity of CARE between the athlete and their desired clinician.

Schools and school systems can now better serve their athletes and parents. The CLINICIAN PORTAL allows athletes and parents to take their Concussion Vital Signs reports to any qualified health care professional whereby the provider can enter information from the report and obtain the concussion history for the athlete real-time.

The Clinician Portal will:

- Allow any qualified healthcare professional to easily access the available set of tests, scales and questionnaire records from Concussion Vital Signs, as well as administer a post-injury assessment if a post-injury assessment is warranted.
- Allow athletes the option of taking their Concussion Vital Signs records to their personal healthcare or alternatively, to the provider of record for the school.
- Allow sports medicine clinics, concussion clinics, neuropsychology clinics, and other healthcare institutions, to quickly, gather concussion history. Such a flexible robust system allows management and coordination of multiple patients from any number of schools or entities using Concussion Vital Signs for their concussion management platform.
- The CLINICIAN PORTAL supports clinical professionals and Concussion Vital Signs users by providing a better coordinated concussion management system.

Collaboration between athletes, parents and clinicians is vital for effective concussion management. **(A) CLICK the Clinician Portal Button**

The screenshot shows the Concussion Vital Signs website interface. At the top, there is a navigation menu with links: Home, About, Resources, Test Info, Reports, Publications, Pricing Info, and Contact. Below the navigation, the main content area features a header with the text "Made Easier" and "Symptoms Scale > Concussion History". On the right side, there is a vertical sidebar with several blue buttons: "Athlete Testing Baseline Post-Injury", "Clinician Portal Clinic Based Post-Injury Testing" (highlighted with a red dashed box and a red circle containing the letter 'A'), "Administrator Login View Reports & Manage Account", and "Register Schools, Colleges, & Universities". Below these buttons is a "Support" link. The main content area on the left contains text about key points, login, and details for clinicians. A red callout box with a dashed border points to the "Clinician Portal" button, containing the text: "Qualified Health Professionals can LOG IN to View an athletes concussion records or administer Post-Injury assessments as part of their evaluation and management process."

Using the Clinician Portal:

Concussion Vital Signs Baseline Report	
Athlete Reference ID: athletetest	Test Date Local: September 17, 2014 15:39:55
Full Name: John Doe	Age: 18
Administrator: Athlete Assessment	Language: English (United States)
Total Test Time: 31:12 (min:secs) for all tests in this report	Test Date GMT: September 17, 2014 22:39:55
Testing Supervision: Supervised by athletic trainer or school personnel	Testing Environment: Group 16 or More
Concussion Reference Code: 2T47GERB Used to view the most recent report or administer post-injury assessment at www.concussionvitalsigns.com	

Clinician Post-Injury Assessment Portal

Key points

- No cost post injury testing for clinicians supporting schools using Concussion Vital Signs
- No need to buy a concussion system for the practice.
- The first time you perform an in-office test with Concussion Vital Signs you will have registration. [\(click here to register\)](#)
- Inform athletes to bring copy of their report to the office visit. The clinician can see a longitudinal chronology of all test scores to date. The clinician can administer Concussion Vital Signs at no cost if needed.

Login

To view the most recent report or perform post-injury testing on a patient complete the form below.

Email Address:

Password:

Concussion Reference Code:

Athlete Reference ID:

Device Type: Laptop or Desktop Tablet

[Forgot my password](#)

By continuing, you accept the [Concussion Vital Signs Licensing Agreement](#).

Administer Post-Injury Concussion Assessment

View Most Recent Concussion Assessment

A. ACCESS ATHLETE RECORDS: Clinicians can view account records by using the two reference codes below on the Concussion Vital Signs Report.

B. REGISTER TO VIEW ATHLETE TEST RESULTS and do POST-INJURY TESTING: Clinicians can view test results by REGISTERING and logging into the athletes account.

Details

At no cost, clinicians can test, manage and coordinate care for multiple patients from any number are using Concussion Vital Signs for their concussion management platform.

For details on how to use the system, click on the "View Report" button.

Athlete ID	Full Name	Test Time (local)	Type	Assessments	Compl	Valid
SportConcussion		2009-02-06 13:10:46	Post-Injury	VS7	Y	Y
SportConcussion		2009-01-05 14:43:28	Post-Injury	VS7	Y	Y
SportConcussion		2008-08-28 13:23:10	Baseline	VS7	Y	Y

Registration

Required information is denoted by an asterisk (**)

Email Address:

Confirm Email Address:

Password:

Confirm Password:

First Name:

Last Name:

Organization:

Username Number:

Address:

City:

State:

Country:

By continuing, you accept the [CONCUSSION VITAL SIGNS LICENSING AGREEMENT](#).
Copyright © 2014 CNS Vital Signs, LLC. All rights reserved.

So in summary, each report has a history of scores attached and post injury testing can be administered at the office or at home. So both schools and the

The page at <https://dev.cnsvs.com> says:

You understand and agree to be invoiced \$15.00 US to administer this post-injury assessment.

Concussion Vital Signs

Athlete Reference ID:

Test Date: Year: 1988 | Month: Now | Day: 4

Assessment Type (Select One): Baseline Post Injury

Assessments (Select One or More): Concussion Vital Signs Athlete Information & Medical History Concussion Symptom Scale Pocket SCA12 (Baseline Assessment)

Testing Supervision (Select One): Unsupervised Supervised by parent/guardian Supervised by athletic trainer or school personnel Supervised by clinician or medical technician

Testing Environment (Select One): Alone Group 2-5 Group 6-15 More

C. VIEW ATHLETE TEST RESULTS Clinicians can view test results.

D. DO POST-INJURY TESTING: Clinicians can CLICK and Administer Post-Injury Assessments.

First time users

Before a clinician can test an athlete, a brief registration is required. A valid email must be link will be sent. The activation link in the email sent must be clicked on before access to the

If you require more granularity in neurocognitive testing or see complex cases you may want to use the CNS Vital Signs platform. (www.cnsvs.com).

Neurocognitive Report Information Backgrounder

There are two types of Concussion Vital Signs neurocognitive testing reports depending on the test administered. One of course, is the Baseline report. The second is the Post Injury report. Concussion Vital Signs reports are scored from seven venerable computerized neuropsychological tests measuring the speed and accuracy of an athlete’s neurocognitive performance.

Each neurocognitive testing report, both Baseline and Post Injury, presents the testing results as:

‘Subject Scores’ or raw scores computed from raw score calculations using the data values of individual subtests and are simply the number of correct responses, incorrect responses, and reaction times.

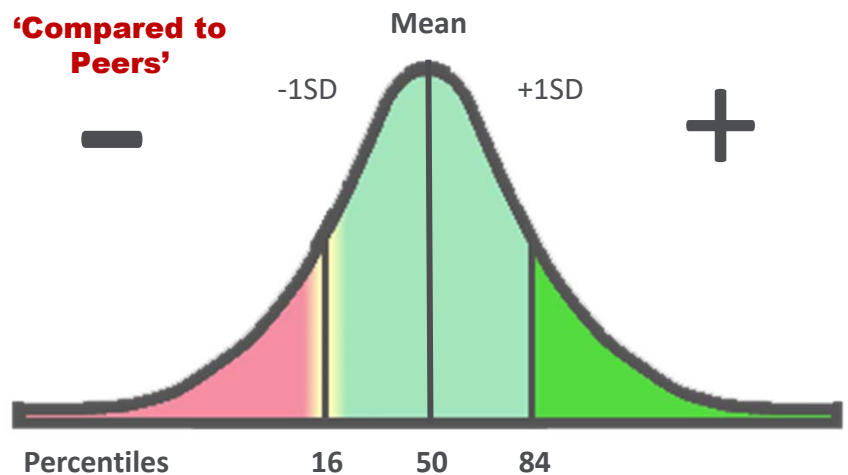
‘Compared to Peers’ or an index of how the athlete scored compared to other subjects (NORMATIVE) of the same age. The ‘Compared to Peers’ is based on percentiles rank and should be interpreted in conjunction with Subject Scores. Percentiles Scores may help by suggesting an improvement or decline from baseline to post-injury, but this can only be confirmed by comparing the Subject Scores.

‘Valid Score’ is a computed measure of an athletes likely testing effort. Testing results on all neuropsychological tests (computerized and paper & pencil) like Concussion Vital Signs can be considered invalid if the testing subject does not put forth good effort during the testing process. Testing subjects may also misunderstand or not read the instructions and score abnormally low on a particular test. If a testing subject tests abnormally low (NO on the Valid Score) then that would be a reason for retesting the individual. If they again score low (NO on the Valid Score) with what you perceive as the subject putting forth a good effort, then you should refer the subject for further clinical evaluation (this is rare). The test proctor should reinforce the need for the athlete to give a good testing effort and use the VALID SCORE (embedded indicators of effort) as a tool to help with the reinforcement. *NOTE: To learn more about the Valid Score calculations go to the FAQ section of the Concussion Vital Signs website.*

The Post-Injury report first page will display the Baseline scores along with current Post-Injury scores as well as whether or not current Post-Injury scores for the athlete returned to baseline, or within 5% of baseline.

The second page of the Post Injury report will produce graphs of all scores to date such that you have a longitudinal view of the testing performance, for all testing to date. For clinician, the report can be printed if needed as part of a patient chart and the PDF format typically can be uploaded to EMRs.

In addition, a Concussion Symptom Severity Scale and a Concussion History are reported when completed as part of the testing protocol.



Neurocognitive – Neuropsychological Resources

Above Average:	> 84	High Function and High Capacity
Average:	16 - 84	Low Average to Normal Function
Below Average:	< 16	Slight Deficit to Impairment Likely

Neurocognitive Report Evaluation Backgrounder

Evaluating the Baseline Report

Check that all test domains are valid. Test validity can be found in the column labeled 'Validity Score'. If there is a "NO" listed for any of the domains, it is suggested the test be re-administered until the athlete scores valid scores on all domains.

Note that Concussion Vital Signs is a subset of the clinical battery CNS Vital Signs and as such may identify athletes with a cognitive deficit. Athletes with extremely low scores that cannot improve upon retest may need to see a qualified healthcare provider for a more comprehensive workup. Low scores will be described in the "Compared to Peers" column on the report.

There are three possible groups in the Compared to Peers column, Below Average, Average and Above Average. Athletes scoring Above Average are scoring greater than one standard deviation higher than their student peers. Athletes scoring Below Average are score less than one standard deviation than their student peers. Average score fall between Above Average and Below Average. About 2/3 of student's peers will score Average.

Repeat baseline testing is encouraged if it is felt the athlete did not do their best or if the scores seem much lower than expected.

Evaluating the Post-Injury Report.

The athlete might be experiencing a deficit such that they are unable to register a valid score. This may be of clinical significance and if the athlete cannot score valid tests a referral to a qualified healthcare provider for a more comprehensive workup should be considered.

Check that the athlete has returned to "At Baseline or Better" and act accordingly per your concussion monitoring protocol. If an athlete is unable to return to baseline a referral to a qualified healthcare provider for a more comprehensive workup should be considered.

Concussion Vital Signs is not a substitute for a neurological workup or comprehensive neurocognitive testing. Similarly, the Concussion Vital Signs testing is not exhaustive and performance within normal limits should not be taken as lack of evidence for cognitive disorders.

Clinician Portal: Enabling Coordinated Care with Qualified Health Professionals

It is important to understand that the report displays a '**Concussion Reference Code**' allowing clinicians assisting post-injury evaluation decisions to better access an athlete's test reports and administer an in-office post-injury test at no cost.

To access just CLICK the Clinical Portal button on the right-handed side of the Concussion Vital Signs homepage. In those cases where testing is administered in clinician offices the report will be available for printing at the office as well as being archived in the school Concussion Vital Signs account.

Neurocognitive Report Evaluation Backgrounder

Concussion Vital Signs Neurocognitive Domain Dashboard BASELINE Example:

Concussion Vital Signs Baseline Report	
Athlete Reference/ID: athletestest	Test Date Local: September 17, 2014 15:39:55
Full Name: John Doe	Age: 18
Administrator: Athlete Assessment	Language: English (United States)
Total Test Time: 31:12 (min:secs) for all tests in this report	Test Date GMT: September 17, 2014 22:39:55
Testing Supervision: Supervised by athletic trainer or school personnel	Testing Environment: Group 16 or More
Concussion Reference Code: 2T47GERB Used to view the most recent report or administer post-injury assessment at www.concussionvitalsigns.com	

Domain Scores	①	Baseline	③
	Subject Score	Compared to Peers	Valid Score
Neurocognitive Index (NCI)		Average	Yes
Verbal Memory	51	Average	Yes
Visual Memory	52	Average	Yes
Psychomotor Speed	190	Average	Yes
Executive Function	43	Average	Yes
Cognitive Flexibility	40	Average	Yes
CPT Correct Responses	40	Average	Yes
Reaction Time*	538*	Above	Yes
Reaction Time Detail			
Simple Reaction Time*	284*	Average	Yes
Choice Reaction Time Correct*	432*	Average	Yes
Shifting Attention Correct RT*	856*	Average	Yes

The Concussion Vital Signs BASELINE Report presents testing results in

- ① **Subject (raw) Scores**
- ② **Compared to Peers** Results can be used to evaluate or monitor an athlete's condition.
- ③ **Valid Score** results help clinicians know if the athlete gave an acceptable effort during testing.

Neurocognitive Domain Dashboard Post-Injury Example:

Concussion Vital Signs Post-Injury Report	
Athlete Reference/ID: athletestest	Test Date Local: October 8, 2014 12:30:45
Full Name: John Doe	Age: 18
Administrator: Head ATC	Language: English (United States)
Total Test Time: 23:01 (min:secs) for all tests in this report	Test Date GMT: October 8, 2014 19:30:45
Testing Supervision: Supervised by athletic trainer or school personnel	Testing Environment: Alone
Concussion Reference Code: 2T47GERB Used to view the most recent report or administer post-injury assessment at www.concussionvitalsigns.com	

Domain Scores	Baseline (Oct 7, 2014)			Post Injury				
	Subject Score	Compared to Peers	Valid Score	Subject Score	Compared to Peers	Valid Score	At Baseline or Better	Within 5% of Baseline
Neurocognitive Index (NCI)		Average	Yes		Average	Yes	Yes	Yes
② Verbal Memory	51	Average	Yes	49	Below	Yes	No	Yes
Visual Memory	52	Average	Yes	48	Average	Yes	No	Yes
Psychomotor Speed	190	Average	Yes	192	Average	Yes	No	Yes
Executive Function	43	Average	Yes	59	Above	Yes	Yes	Yes
Cognitive Flexibility	40	Average	Yes	56	Average	Yes	Yes	Yes
CPT Correct Responses	40	Average	Yes	40	Average	Yes	Yes	Yes
Reaction Time*	538*	Above	Yes	514*	Above	Yes	Yes	Yes
Reaction Time Detail								
Simple Reaction Time*	284*	Average	Yes	252*	Average	Yes	Yes	Yes
Choice Reaction Time Correct*	432*	Average	Yes	420*	Average	Yes	Yes	Yes
Shifting Attention Correct RT*	856*	Average	Yes	617	Above	Yes	Yes	Yes

Notice in the example above that the athlete (1) had many average scores at his/her baseline, (2) the verbal and visual memory scores are still slightly impaired post-injury as compared to baseline, and (3) most of the scores have returned to baseline. A qualified health professional would refer to other clinical endpoints (symptom resolution, balance testing, neurological exam, etc.) before concluding that the athlete is able to return-to-play.

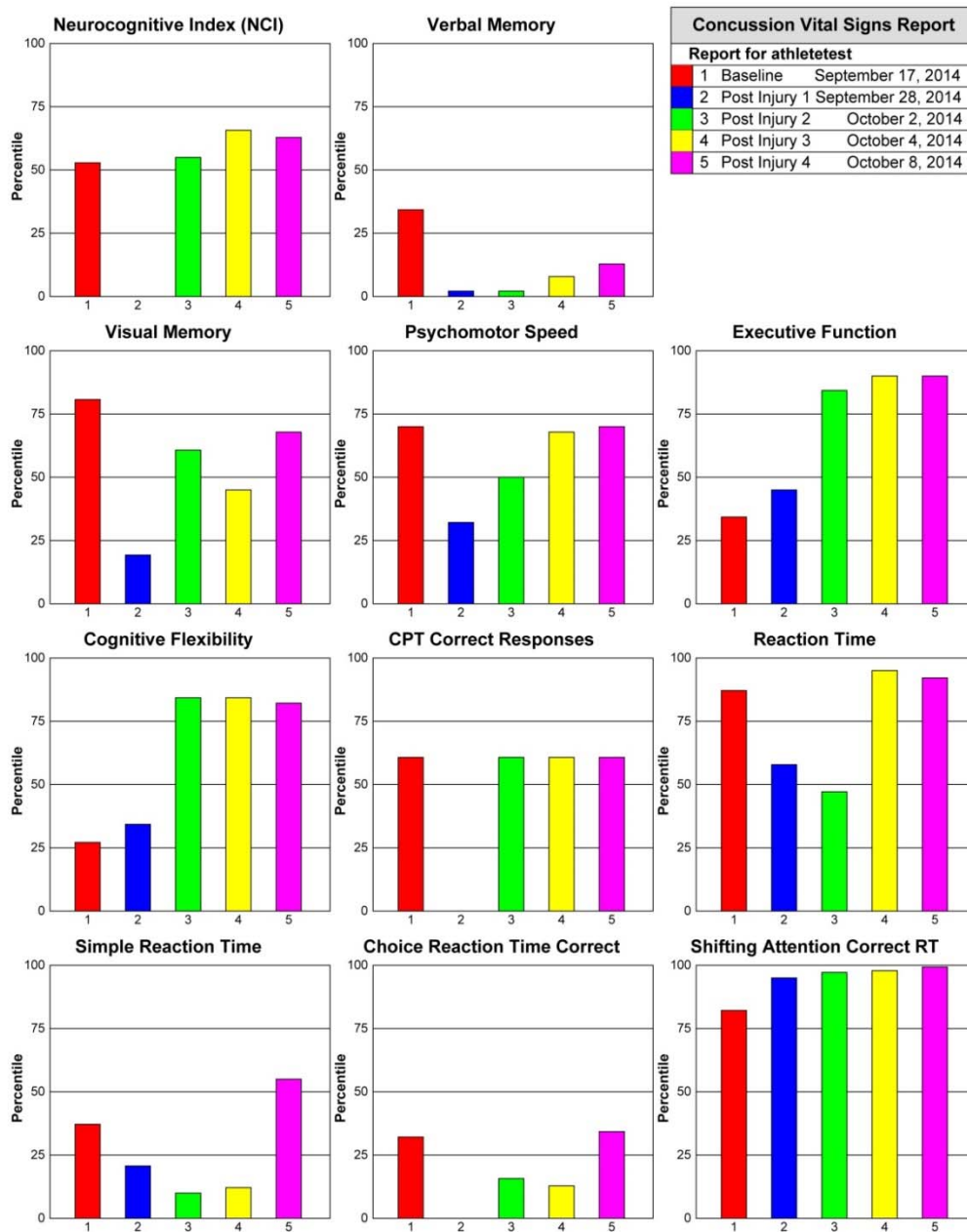
Neurocognitive Report Evaluation Backgrounder

Longitudinal Post-Injury Report Example:

Each Concussion Vital Signs Report presents the POST-INJURY results in a graphic format that provides clinicians with a longitudinal view. **To enable a longitudinal view of the athlete's condition, the ATHLETE REFERENCE/ID must remain consistent across all their testing (Baseline and Post-Injury). The entire test must be re-administered if the athlete has any "No" values in the Valid Score column.**

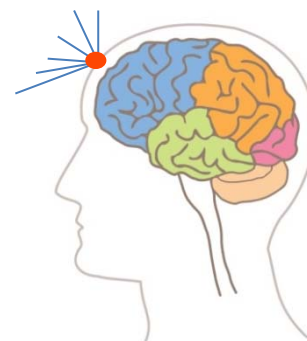
NOTE: Athletes suffering from a concussion may display low scores or deficits in different domains depending on the direction and force of the blow to the head. Not all athletes that suffer from a concussion provide clear demonstration of neurocognitive deficits. Concussion Vital Signs does not assess the cause of changes in cognitive performance. Testing results should be

interpreted by a qualified health professional. **Remember, it is better to be safe. Any athlete suspected of having a concussion should be removed from play, and then seek medical evaluation. Consult a doctor after a suspected concussion. Medical clearance should be given before return-to-play.**



Report Evaluation Question & Answers

- 1. Who should interpret the Concussion Vital Signs neurocognitive test results? *Answer:*** State legislation and medical guidelines generally require a medical or physician release for athletes to return-to-play. Interpretation of the Concussion Vital Signs neurocognitive test results should be done by a qualified health professional. As expressed in the Consensus statement on concussion in sport held in Zurich, November 2008. "Neuropsychologists are in the best position to interpret NP tests by virtue of their background and training. However, there may be situations where neuropsychologists are not available and other medical professionals may perform or interpret NP screening tests."
- 2. What does NCI (Neurocognitive Index)mean? *Answer:*** The Neurocognition Index – NCI, reflects the overall neurocognitive functioning of the athlete test taker. It is an average of all the domains into a global summary score. Because many concussions are complex and diagnosis is difficult, it usually requires clinicians to take a multidimensional approach to their assessment. Therefore , the NCI and the other neurocognitive domain scores should be taken in context with the symptom scores, history and physical, as well as other tests and relevant clinical endpoints.
- 3. What is "Executive Functioning"? *Answer:*** Executive Functioning , sometimes called executive control system, is generally considered a frontal lobe (see *blue* section of the brain) cognitive system that controls and manages other cognitive processes. It is considered a higher-order brain function which includes attention, behavioral planning and response inhibition, and the manipulation of information in problem-solving tasks. Sometimes referred to as the "command and control" function (frontal lobe), the executive function can be viewed as the "conductor" of many cognitive skills. The SAT - Shifting Attention Test (rules, categories, rapid decision-making) results are used to calculate this frontal lobe domain.
- 4. Since Concussion Vital Signs has tests that measure frontal lobe cognitive function, is it a good assessment tool for attention deficit or AD/HD? *Answer:*** YES! CNS Vital Signs is used throughout the world as a clinical and research tool to evaluate and manage AD/HD. The tests used in AD/HD clinics are similar to the ones in the Concussion Vital Signs battery. Should an athlete score poorly after giving their best effort, in the frontal lobe domains (*Executive Function, Cognitive Flexibility, CPT Correct Responses*), it may be prudent to refer the student for further evaluation. CNS Vital Signs Neurocognitive tests are used extensively to help assess conditions such as AD/HD. Helping student athletes identify and effectively address their cognitive challenges can have dramatic benefits for them personally and can help them be more successful academically, athletically, and vocationally.
- 5. If the student athlete does not have a baseline, can he/she be given a post-injury test? *Answer:*** YES! Baseline testing can serve as a valuable "premorbid" (state prior to condition) point of comparison for the testing that is conducted after the concussion injury. However, even if baseline neuropsychological testing has not been performed, post-injury neurocognitive testing can still be a very useful source of information about the effects of the concussion. Using standardized PERCENTILE scores can help clinicians identify poor cognitive function performance which can be an important indicator that the brain is not working normally. However, there are many reasons test performance can be abnormal, including concussion.
- 6. What combinations of what test scores should cause school personnel/clinicians to pause and look for some underlying condition? *Answer:*** Every student athlete is different; there is no "one-size fits all" answer to assessing concussion. Neurocognitive domain score performance may vary depending on a number of factors that include testing effort, type of blow to the head, location or site of the blow, and the patient's individual history. The Consensus statement on concussion in sport held in Zurich, November 2008 states "...the assessment of cognitive function should be an important component in any return to play protocol. It must be emphasized, however, that NP assessment should not be the sole basis of management decisions; rather it should be seen as an aid to the clinical decision-making process in conjunction with a range of clinical domains and investigational results."



Neurocognitive Clinical Domains Measured








Concussion Vital Signs valid and reliable clinical domains assist in the evaluation and management of sports related concussions. The percentile scores come from 1900+ peer norms from ages 8 to 90.

Clinical Domains	Clinical Domain Score Calculations	Clinical Domain Description
Neurocognitive Index (NCI)	The average of the Composite Memory, Psychomotor Speed, Cognitive Flexibility, Reaction Time, and Complex Attention Domains.	Measure: An average score derived from the domain scores or a general assessment of the overall neurocognitive status of the patient. Relevance: Summary views tend to be most informative when evaluating a population, a condition category, and outcomes.
Verbal Memory	Verbal Memory is the score for the Verbal Memory Test. VBM Correct Hits Immediate + VBM Correct Passes Immediate + VBM Correct Hits Delay + VBM Correct Passes Delay	Measure: How well subject can recognize, remember, and retrieve words. Relevance: Remembering a scheduled test, recalling an appointment, taking medications, and attending class.
Visual Memory	Visual Memory is the score for the Visual Memory Test. VIM Correct Hits Immediate + VIM Correct Passes Immediate + VIM Correct Hits Delay + VIM Correct Passes Delay	Measure: How well subject can recognize, remember and retrieve geometric figures. Relevance: Remembering graphic instructions, navigating, operating machines, recalling images, and/or remember a calendar of events.
Psychomotor Speed	Psychomotor Speed is the combined score for both the Finger Tapping and the Symbol Digit Coding Test. FTT Right Taps Average + FTT Left Taps Average + SDC Correct Responses	Measure: How well a subject recognizes and processes information i.e., perceiving, attending/responding to incoming information, motor speed, fine motor coordination, and visual-perceptual ability. Relevance: Distractibility, fitness-to-drive, occupation issues, obsessive concern with accuracy and detail.
Executive Functioning	Executive Function reflects performance on the Shifting Attention Test. SAT Correct Responses - SAT Errors	Measure: How well a subject recognizes set shifting and manages multiple tasks simultaneously. Relevance: Ability to sequence tasks and manage multiple tasks simultaneously as well as tracking and responding to a set of simple instructions.
Cognitive Flexibility	Cognitive Flexibility reflects performance on the Shifting Attention and Stroop Tests. SAT Correct Responses - SAT Errors - Stroop Commission Errors	Measure: How well subject is able to adapt to rapidly changing and increasingly complex set of directions and/or to manipulate the information. Relevance: Reasoning, switching tasks, decision-making, impulse control, strategy formation, attending to conversation.
CPT Correct Responses	CPT Correct Responses is the number of correct responses on the Continuous Performance Test.	Measure: Ability to track and respond to information over lengthy periods of time and/or perform mental tasks requiring vigilance quickly and accurately. Relevance: Self-regulation and behavioral control.
Reaction Time*	Reaction Time* is the average reaction time on parts 2 and 3 of the Stroop Tests. (ST Complex Reaction Time Correct + Stroop Reaction Time Correct) / 2	Measure: How quickly the subject can react, in milliseconds, to a simple and increasingly complex direction set. Relevance: Driving a car, attending to conversation, tracking and responding to a set of simple instructions, taking longer to decide what response to make.
Reaction Time Detail		
Simple Reaction Time*	Simple Reaction Time* is the average reaction time on part 1 of the Stroop Tests. Time required to press the spacebar from the time a word first appears on the display. Average Reaction Time on Part 1 of the Stroop Test	
Choice Reaction Time Correct*	Choice Reaction Time Correct* is the average correct reaction time on the Continuous Performance Test. Time required to press the spacebar from the time a B first appears on the display.	
Shifting Attention Correct RT*	Shifting Attention Correct RT* is the average correct reaction time on the Shifting Attention Test.	

An * denotes that "lower is better" in the Subject Score column, otherwise higher scores are better. With Percentile scores, higher is always better.

Concussion Vital Signs Neurocognitive Test Descriptions

Concussion Vital Signs contains seven venerable neuropsychological tests and the clinical domains, scored from the tests, measures the speed and accuracy of an athletes brain or neurocognitive function.

CORE Tests	Neurocognitive Function	Test Description
<p>Verbal Memory (VBM) Approx. 3 Minutes</p>	 <ul style="list-style-type: none"> ■ Verbal Learning ■ Memory for Words ■ Word Recognition ■ Immediate and Delayed Recall 	<p>VBM measures recognition memory for WORDS. Fifteen words are presented, one by one, on the screen every two seconds. For immediate recognition, the participant has to identify those words nested among fifteen new words. Then, after six more tests, there is a delayed recognition trial.</p>
<p>Visual Memory (VIM) Approx. 3 Minutes</p>	 <ul style="list-style-type: none"> ■ Visual Learning ■ Memory for Geometric Shapes ■ Geometric Shapes Recognition ■ Immediate and Delayed Recall 	<p>VIM measures recognition memory for FIGURES. Fifteen geometric figures are presented, one by one, on the screen. For immediate recognition, the participant has to identify those figures nested among fifteen new figures. Then, after five more tests, there is a delayed recognition trial.</p>
<p>Finger Tapping (FTT) Approx. 2 Minutes</p>	 <ul style="list-style-type: none"> ■ Motor Speed ■ Fine Motor Control 	<p>FTT test requires athletes to press the Space Bar with their right index finger as many times as they can in 10 seconds. They do this once for practice, and then there are three test trials. The test is repeated with the left hand.</p>
<p>Symbol Digit Coding (SDC) Approx. 4 Minutes</p>	 <ul style="list-style-type: none"> ■ Information Processing Speed ■ Complex Attention ■ Visual-Perceptual Speed ■ Information Processing Speed 	<p>SDC test consists of serial presentations of screens, each of which contains a bank of eight symbols above and eight empty boxes below. The participant types in the number that corresponds to the symbol that is highlighted. Only the digits from 2 through 9 are used; this is to avoid the confusion between "1" and "l" on the keyboard. The computer program does not allow a person to use a numerical pad. This prevents the potential for a distinct advantage for those who are skilled at using the numerical pad or for those that are right- versus left-handed.</p>
<p>Stroop Test (ST) Approx. 4 - 5 Minutes</p>	 <ul style="list-style-type: none"> ■ Executive Function ■ Simple and Complex Reaction Time ■ Speed-Accuracy Trade-Off ■ Information Processing Speed ■ Inhibition / Disinhibition 	<p>Stroop test has three parts. In the first part, the words RED, YELLOW, BLUE, and GREEN (printed in black) appear at random on the screen, and the participant presses the space bar as soon as the athlete sees the word. In the second part, the words RED, YELLOW, BLUE, and GREEN appear on the screen, printed in color. The participant is asked to press the space bar when the color of the word matches what the word says. In the third part, the words RED, YELLOW, BLUE, and GREEN appear on the screen, printed in color. The participant is asked to <i>press the space bar</i> when the color of the word does not match what the word says.</p>
<p>Shifting Attention (SAT) Approx. 2.5 Minutes</p>	 <ul style="list-style-type: none"> ■ Executive Function: Shifting Sets ■ Reaction Time ■ Information Processing Speed ■ Speed-Accuracy Trade-off 	<p>SAT test is a measure of ability to shift from one instruction set to another quickly and accurately. Participants are instructed to match geometric objects either by shape or by color. Three figures appear on the screen, one on top and two on the bottom. The top figure is either a square or a circle. The bottom figures are a square and a circle. The figures are either red or blue (mixed randomly). The participant is asked to match one of the bottom figures to the top figure. The rules change at random (i.e., match the figures by shape, for another, by color).</p>
<p>Continuous Performance (CPT) Approx. 5 Minutes</p>	 <ul style="list-style-type: none"> ■ Sustained Attention ■ Choice Reaction Time ■ Impulsivity 	<p>CPT test is a measure of vigilance or sustained attention or attention over time. The athlete is asked to respond to the target stimulus "B" but not to any other letter. The stimuli are presented at random.</p>

The entire test must be re-administered if the athlete has any "No" values in the Valid Score column. A percentile Score of 50% is AVERAGE.

Concussion Symptom Scale Report

Concussion Vital Signs Concussion Symptom Scale Post-Injury Example:

Post-Injury Concussion Symptom Scale	
Athlete Reference/ID: athletetest	Test Date Local: October 8, 2014 12:30:45
Full Name: John Doe	Age: 18
Administrator: Head ATC	Language: English (United States)
Total Test Time: 23:01 (min:secs) for all tests in this report	Test Date GMT: October 8, 2014 19:30:45
Testing Supervision: Supervised by athletic trainer or school personnel	Testing Environment: Alone
Concussion Reference Code: 2T47GERB Used to view the most recent report or administer post-injury assessment at www.concussionvitalsigns.com	

Rates how this symptom is currently experienced, Absent (0 - None) or Present (1 - Mild to 6 - Severe).

CSI - Symptoms*	Baseline (Sep 17 2014)		Post-Injury	
	Absent	Present	Absent	Present
1 Headache	0		0	
3 Nausea	0		0	
5 Poor balance	0		0	
6 Dizziness	0		0	
7 Fatigue or loss of energy	0		0	
9 Drowsiness or feeling sleepy	0		0	
14 Feeling like "In-a-fog"	0		0	
15 Difficulty concentrating		2	0	
16 Difficulty remembering	0		0	
10 Sensitivity to light	0		0	
11 Sensitivity to noise	0		0	
17 Blurred vision	0		0	
24 Feeling slowed down	0		0	

Additional Concussion Symptoms**	Baseline (Oct 7, 2014)		Post-Injury	
	Absent	Present	Absent	Present
8 Difficulty falling or staying asleep		2	0	
12 Irritability, easily annoyed or frustrated	0		0	
13 Sadness	0		0	
2 Feeling numbness or tingling	0		0	
18 Ringing in the ear	0		0	
19 Neck pain	0		0	
20 More Emotional	0		0	
21 Feeling Nervous	0		0	
22 Feeling anxious or tense	0		0	
23 Feeling Confused	0		0	
4 Vomiting	0		0	

Do Symptoms get worse with Physical Activity: No

Do Symptoms get worse with Mental or Academic Activity: No

Acknowledgements: Concussion Vital Signs Symptom Scale contains a representative sample of well recognized sports concussion symptoms similar to those found in the CSI - Concussion Symptom Inventory, SCAT2, and the Neurobehavioral Symptom Inventory.

* (CSI) Concussion Symptom Inventory: An Empirically Derived Scale for Monitoring Resolution of Symptoms Following Sport-Related Concussion; Christopher Randolph, Scott Millis, William B. Barr, Michael McCrea, Kevin M. Guskiewicz, Thomas A. Hammeke, James P. Kelly; Archives of Clinical Neuropsychology 24 (2009) 219-229; Public Domain

** SCAT2 - Sport Concussion Assessment Tool 2: This tool has been developed by a group of international experts at the 3rd International Consensus meeting on Concussion in Sport held in Zurich, Switzerland in November 2008. British Journal of Sports Medicine, 2009, volume 43, supplement 1.

*** Neurobehavioral Symptom Inventory: Cicerone, KD: J Head Tr Rehabil 1995;10(3):1-17

Concussion History

CNSVS Concussion History (page 1 of 2)	
Subject Reference/ID: athlete1	Test Date: October 29, 2010 14:33:19
Lastname, Firstname, MI: Public, John Q	Age: 27
Administrator: Athletic Trainer	Language: English (United States)
Total Test Time: 5:07 (min:secs) for all tests in this report	Test Date GMT: October 29, 2010 18:33:13
Testing Supervision: Supervised by athletic trainer or school personnel	Testing Environment: Group 2-5
<i>This scale was administered using CNS Vital Signs</i>	
Demographic and Background Information - General Information	
Height: 6 ft 5 in	Weight: 280 lbs
Sport Setting: High School	Eligibility Year: 2011
Academic Year: Senior	
Race: Caucasian	
Handedness: Right	Gender: Male
Native Language: English	
Second Language: Spanish	How Long? 2yrs
Demographic and Background Information - Education	
Years of Education Completed (e.g. high school or senior is 11 years): 11yrs	
SAT (total): 1600 out of 2400	
Received speech therapy:	No
Attended special education classes:	No
Repeated one or more years of school:	No
Diagnosed attention deficit disorder (ADD) or hyperactivity (ADHD):	Yes
Diagnosed learning disability:	Yes
Demographic and Background Information - Sports	
Primary Sport: Football	
Primary Sport Position: Defensive Lineman	
Years you have played this primary sport at current level: 6	
Total number of years you have played this primary sport: 8	
Secondary Sport: Basketball	
Secondary Sport Position: Center	
Years you have played this secondary sport at current level: 8	
Total number of years you have played this secondary sport: 10	
Concussion & Medical History	
Number of times diagnosed with a concussion: 2	
Injury 1	
Approximate Date of Injury: October/1995	Days Lost: 6
Was this concussion sports related?	Yes
Did this concussion result in a loss of consciousness?	Yes
Did this concussion result in confusion?	No
Difficulty remembering events immediately before injury?	No
Difficulty remembering events immediately after injury?	Yes
Injury 2	
Approximate Date of Injury: September/1998	Days Lost: 8
Was this concussion sports related?	Yes
Did this concussion result in a loss of consciousness?	Yes
Did this concussion result in confusion?	Yes
Difficulty remembering events immediately before injury?	No
Difficulty remembering events immediately after injury?	Yes
Injury 3	
Approximate Date of Injury: /	Days Lost: /
Was this concussion sports related?	
Did this concussion result in a loss of consciousness?	
Did this concussion result in confusion?	
Difficulty remembering events immediately before injury?	
Difficulty remembering events immediately after injury?	
Indicate whether you have experienced the following:	
Treatment for headaches by physician:	No
Treatment for migraine headaches by physician:	No
Treatment for epilepsy/seizures:	No
History of brain surgery:	No
History of meningitis:	No
Treatment for Substance/alcohol abuse:	No
Treatment for psychiatric condition (depression, anxiety etc.):	Yes
Current Medications: adderall	

Concussion Vital Signs Enables the Systematic Documentation of Important Clinical Endpoints Helping to Support Improved Return-to-Play Decision Making

Demographic and Background Information - Education

- Years of Education Completed (e.g. high school senior is 11 years):
- SAT - ACT (total):
- Received Speech Therapy:
- Attended Special Education Classes:
- Repeated One or More Years of School:
- Diagnosed Attention Deficit Disorder (ADD) or (ADHD):
- Diagnosed Learning Disability:

Demographic and Background Information - Sports

- Primary Sport:
- Primary Sport Position:
- Years you have played this primary sport at current level:
- Total number of years you have played this primary sport:
- Secondary Sport:
- Secondary Sport Position:
- Years you have played this secondary sport at current level:
- Total number of years you have played this secondary sport:

Concussion & Medical History

- Number of times diagnosed with a concussion:
- Injury 1 (**Up to 3 Injury's can be reported**)
- Approximate Date of Injury:
- Days Lost:
- Was this concussion sports related?
- Did this concussion result in a loss of consciousness?
- Did this concussion result in confusion?
- Difficulty remembering events immediately before injury?
- Difficulty remembering events immediately after injury?

Indicate whether you have experienced the following:

- Treatment for Headaches by Physician:
- Treatment for Migraine Headaches by Physician:
- Treatment for Epilepsy / Seizures:
- History of Brain Surgery:
- History of Meningitis:
- Treatment for Substance / Alcohol abuse:
- Treatment for Psychiatric Condition (depression / anxiety etc.):
- Current Medications:

Glossary

- **Baseline** – A standard test by which things are measured or compared.
- **Battery** – A selection of tests.
- **Concussion** - A violent collision or shock; an injury to part of the body, most especially the brain, caused by a violent blow, followed by loss of function.
- **Neurocognitive** - a term used to describe cognitive functions closely linked to the function of particular areas, neural pathways, or cortical networks in the brain.
- **Neuropsychology** – A specialty of psychology concerned with the study of the relationships between the brain and behavior, including the use of psychological tests and assessment techniques to diagnose specific cognitive and behavioral deficits.
- **Norms or Normative** – A statistical description of the test performance of a well-defined group that serves as a reference by which to gauge the performance of the other individuals who take the test
- **Percentile Scores** - indicates the subject's test performance relative to that of the group on which the test was standardized. It records the percentage of this group whose scores were lower than that obtained by the subject
- **Raw Scores** – Are the original testing results (data) from the athlete that has not been transformed by calculation.
- **Report** – A formatted output generated from a subject's test session data.
- **Subject** – A person or patient who takes the test.
- **Subject Reference** – The alphanumeric code that identifies the Subject taking the test.
- **Supervisor or Administrator** - The primary Concussion Vital Signs account holder.
- **Administrator Login** - LOGIN used by the primary Concussion Vital Signs account holder to access testing information. e.g., View Reports.
- **Test** – A single test, such as the Verbal Memory Test.
- **Test Administrator** – Persons who facilitate the process of having the subject take the assessment (e.g., athletic trainer, testing technician, school nurse, clinician, etc.).
- **Athlete Testing Login** - LOGIN used for baseline and post-concussion testing of athletes.
- **Testing Session or Session** – The act of the subject completing one or more tests in succession.
- **Valid Score** - the application of proven methods to arrive at a true score.



Concussion Vital Signs Sideline Assessment

Acknowledgements: Adapted from Pocket SCAT2 - Pocket Sport Concussion Assessment Tool 2. This tool was developed by a group of international experts at the 3rd International Consensus Meeting on Concussion in Sport held in Zurich, Switzerland in November 2008. British Journal of Sports Medicine, 2009, volume 43

Athlete Reference/ID:

Test Date/Time:

Full Name:

Test Administrator Name/Position:

Concussion should be suspected in the presence of any one or more of the following: symptoms (such as headache), or physical signs (such as unsteadiness), or impaired brain function (e.g. confusion) or abnormal behavior.

1. Symptoms: The presence of any of the following signs and symptoms may suggest a concussion.

Check the SYMPTOMS exhibited by the athlete.

		Yes	No			Yes	No
1	Loss of consciousness	<input type="checkbox"/>	<input type="checkbox"/>	13	Feeling slowed down	<input type="checkbox"/>	<input type="checkbox"/>
2	Seizure or convulsion	<input type="checkbox"/>	<input type="checkbox"/>	14	Feeling like "in a fog"	<input type="checkbox"/>	<input type="checkbox"/>
3	Amnesia	<input type="checkbox"/>	<input type="checkbox"/>	15	"Don't feel right"	<input type="checkbox"/>	<input type="checkbox"/>
4	Headache	<input type="checkbox"/>	<input type="checkbox"/>	16	Difficulty concentrating	<input type="checkbox"/>	<input type="checkbox"/>
5	"Pressure in head"	<input type="checkbox"/>	<input type="checkbox"/>	17	Difficulty remembering	<input type="checkbox"/>	<input type="checkbox"/>
6	Neck Pain	<input type="checkbox"/>	<input type="checkbox"/>	18	Fatigue or low energy	<input type="checkbox"/>	<input type="checkbox"/>
7	Nausea or vomiting	<input type="checkbox"/>	<input type="checkbox"/>	19	Confusion	<input type="checkbox"/>	<input type="checkbox"/>
8	Dizziness	<input type="checkbox"/>	<input type="checkbox"/>	20	Drowsiness	<input type="checkbox"/>	<input type="checkbox"/>
9	Blurred vision	<input type="checkbox"/>	<input type="checkbox"/>	21	More emotional	<input type="checkbox"/>	<input type="checkbox"/>
10	Balance problems	<input type="checkbox"/>	<input type="checkbox"/>	22	Irritability	<input type="checkbox"/>	<input type="checkbox"/>
11	Sensitivity to light	<input type="checkbox"/>	<input type="checkbox"/>	23	Sadness	<input type="checkbox"/>	<input type="checkbox"/>
12	Sensitivity to noise	<input type="checkbox"/>	<input type="checkbox"/>	24	Nervous or anxious	<input type="checkbox"/>	<input type="checkbox"/>

2. Memory function: Failure to answer all questions correctly may suggest a concussion.

	Incorrect	Correct	Additional comments:
At what venue are we at today?	<input type="checkbox"/>	<input type="checkbox"/>	
Which half is it now?	<input type="checkbox"/>	<input type="checkbox"/>	
Who scored last in this game? Incorrect	<input type="checkbox"/>	<input type="checkbox"/>	
What team did you play last week/game?	<input type="checkbox"/>	<input type="checkbox"/>	
Did your team win the last game?	<input type="checkbox"/>	<input type="checkbox"/>	

3. Balance testing: Instructions for tandem stance *"Now stand heel-to-toe with your non-dominant foot in back. Your weight should be evenly distributed across both feet. You should try to maintain stability for 20 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes."*

Athlete was observed for 20 seconds. If they make more than 5 errors (such as lift their hands off their hips; open their eyes; lift their forefoot or heel; step, stumble, or fall; or remain out of the start position for more than 5 seconds) then this may suggest a concussion.



Number of Errors:

Any athlete with a suspected concussion should be IMMEDIATELY REMOVED FROM PLAY, urgently assessed medically, should not be left alone and should not drive a motor vehicle.

Sideline or abbreviated testing is designed to assist with the immediate assessment or screening of sports related concussion (e.g. SIDELINE) and is not meant to replace computerized or comprehensive neuropsychological testing. The Concussion Sideline Assessment should not be used as a stand alone tool for concussion management. The Concussion Sideline Assessment is designed to be a support for recognizing sports related concussions and to document clinical endpoints that may assist a qualified health professional in their return-to-play decision making.



Do Your Best! Instructions

1. SPEED and ACCURACY

You will be measured based on the speed and accuracy of your responses. This is not an IQ test; it is a measure of your brain function performance.

2. FOLLOW INSTRUCTIONS

Carefully follow the instructions. Failure to understand the instructions can produce an invalid test score requiring a retake.

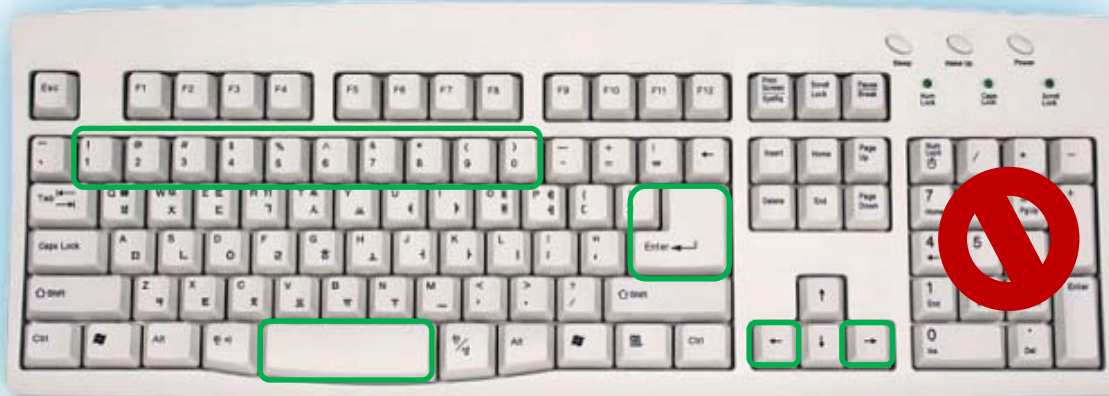
3. TURN OFF CELL PHONE

Turn off and put away all electronic devices. It is important for you to focus on giving your best effort.

4. COMFORTABLE?

Do you need to use the facilities? Do you have a headache, hand injury? Do you wear glasses? Are you dizzy, drowsy / sleepy?

How to Record your Responses



- **ENTER** key, to start and advance each test or rating scale
- **SPACE BAR** as the primary response key for most of the tests
- **ARROW KEYS** used for the Shifting Attention Test
- **NUMBER ROW** keys for other tests and the medical rating scales (*The keypad is disabled*)

Optimal Baseline and Post-Injury Testing: Concussion Vital Signs is a web-based “video-game” type performance test that measures your neurocognitive function. Neurocognitive testing is a test of brain function and NOT IQ. Baseline testing is an important part of concussion management. The results of the neurocognitive baseline and post-injury testing can help doctors and qualified health professionals in assessing, monitoring, and managing concussion.

It is Important to DO YOUR BEST!

Read and Initial that you understand the following then sign below:

_____ I understand that I should put forth my best effort and that my **testing scores are based on the ACCURACY and SPEED of my responses.**

_____ I understand that failure to **PUT FORTH MY BEST EFFORT** can produce invalid test scores and I may have to retake the entire test again to generate a valid assessment.

_____ I understand that **I MUST READ and FOLLOW the INSTRUCTIONS** carefully and that not reading and following the instructions can produce invalid test scores and I may have to retake the entire test again to generate a valid assessment.

_____ I understand that **I will ONLY USE THE KEYS on the KEYBOARD circled below** to record my responses and **I WILL NOT use the “KEYPAD”** as that will cause me to have an invalid test and I may have to retake the entire test again to generate a valid assessment.



_____ **I have turned off and put away my cell phone and other electronic devices.**

_____ **I WILL DO MY BEST!**

CHECK THE TESTING ISSUES THAT APPLIES TO YOU CURRENTLY: I have a headache, I have colorblindness, I have a hand injury, I need to wear glasses to read, and I am not wearing them, I am dizzy, I am drowsy / sleepy.

PRINT Name: _____

SIGNATURE: _____ DATE: _____

Parent History Information Instructions



Optimal Concussion Information: Concussion Vital Signs is a web-based concussion management program designed to support the most current sports concussion guidelines. The results of an athletes' concussion history can help doctors and qualified health professionals in assessing, monitoring, and managing concussion. Parents and guardians are generally the best to complete this portion of our concussion information as many times a concussed individual has no memory of the event. **Please follow the instructions:**

Step 1. **GO TO** www.concussionvitalsigns.com

Step 2. **CLICK** on athlete assessment LOGIN



Step 3. **ENTER**

User Name: _____

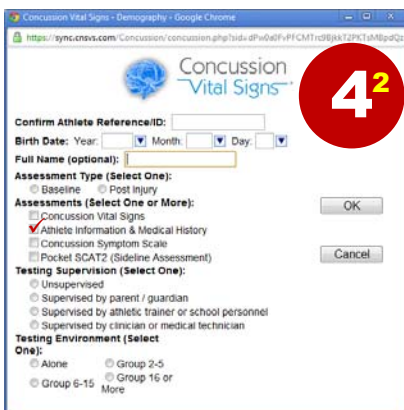
& Password: _____



Step 4. **Enter ATHLETE ID, SELECT, and ENTER INFORMATION**

Enter Athlete ID: _____

And **CLICK** the Test Button



Re-enter the student-athlete's ID, Date-of-birth, first and last name... then **CLICK** the Baseline bubble and **CHECK** the box **Athlete Information & Medical History** and **CLICK** the OK Button. Confirm test settings and **CLICK** the OK Button. Complete the medical history and LOGOUT. Results will be sent automatically and securely to the school via the web.

