Clinician Portal: Enabling a Continuity of Concussion Care

 Concussion Vital Signs
www.CONCUSSIONVITALSIGN.com
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

 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:

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.

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

D. DO POST-INJURY TESTING:
Clinicians can CLICK and Administer Post-Injury Assessments.
Do Your Best! Administration 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*)
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.

---

<table>
<thead>
<tr>
<th>Percentiles</th>
<th>Neurocognitive – Neuropsychological Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Average:</td>
<td>&gt; 84</td>
</tr>
<tr>
<td>Average:</td>
<td>16 - 84</td>
</tr>
<tr>
<td>Below Average:</td>
<td>&lt; 16</td>
</tr>
</tbody>
</table>
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 students 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 athletes 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:

<table>
<thead>
<tr>
<th>Domain Scores</th>
<th>Subject Score</th>
<th>Baseline Compared to Peers</th>
<th>Valid Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurocognitive Index (NCI)</td>
<td>51</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Verbal Memory</td>
<td>52</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Visual Memory</td>
<td>100</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Psychomotor Speed</td>
<td>43</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Executive Function</td>
<td>40</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Cognitive Flexibility</td>
<td>40</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>CPT Correct Responses</td>
<td>538</td>
<td>Above</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Domain Scores</th>
<th>Baseline (Oct 7, 2014)</th>
<th>Post Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Score</td>
<td>Compared to Peers</td>
<td>Valid Score</td>
</tr>
<tr>
<td>Neurocognitive Index (NCI)</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Verbal Memory</td>
<td>51</td>
<td>Average</td>
</tr>
<tr>
<td>Visual Memory</td>
<td>52</td>
<td>Average</td>
</tr>
<tr>
<td>Psychomotor Speed</td>
<td>100</td>
<td>Average</td>
</tr>
<tr>
<td>Executive Function</td>
<td>43</td>
<td>Average</td>
</tr>
<tr>
<td>Cognitive Flexibility</td>
<td>40</td>
<td>Average</td>
</tr>
<tr>
<td>CPT Correct Responses</td>
<td>40</td>
<td>Average</td>
</tr>
<tr>
<td>Reaction Time*</td>
<td>538*</td>
<td>Above</td>
</tr>
</tbody>
</table>

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.

www.CONCUSSIONVITALSIGNS.com
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.