

Understanding Concussions

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Concussions are unique injuries. I will do my best to help you understand what they are, how they happen, and how our treatments help in the healing process. Concussions are indeed very scary injuries, but most cases resolve to a full recovery.

The best approach to understanding concussions is to realize this is a FUNCTIONAL injury and not a STRUCTURAL injury. That is, it is more like a computer CRASHING as opposed to SMASHING a computer into pieces with a hammer. Just like a computer crashing, the common symptoms of a concussion tend to result from increased work or stimulus to the brain. Anything that makes your brain work harder can increase these symptoms. These can include school work, lights, noises, thinking, physical exertion, TV, texting, video games, and so on. The more activities you add on can result in increasing headaches and prolonging the healing process. I think this is very similar to trying to open up programs on a computer that is already crashing. The more you try to do, the worse things get and the slower the crash resolves itself. It is important to realize that the brain causes headaches to signal you to stop. Resting can include removing themselves from the activity, finding a dark room, lying down, etc.

Often times an emergency room may do any number of studies in the initial evaluation of a head injury. X-rays, CT scans, or MRI's may be done, but it is important to realize that they were done to rule out other more serious injuries. Because a concussion is a functional injury and not a structural injury, these studies do not provide any information about a concussion. A false sense of security can be made from having a normal CT scan, but in most cases these are not needed in the evaluation of a concussion unless another injury was suspected.

There are, however, many useful tools in the evaluation of a concussion. Most importantly are the evaluations of the doctor and the clinical diagnosis of this injury. This is determined by the way a person was hurt, the signs and symptoms after the injury, and the physical exam to rule out other injuries. We often can use the computerized testing in the evaluation of a concussion. Again, with the injury being a functional injury, many skills can be tested to help in this evaluation. The computer testing evaluates reaction time, motor speed, and a variety of information processing abilities that may be reduced while suffering from a concussion.

A simple way to understanding the computer testing is to think about it as a decathlon race. Attempting to run this race would be quite difficult with an injured ankle. The more injured the ankle, the worse you would perform on the race. Most concussions initially test with the results showing "<1 %," or "last place," just as you would most likely finish last place with an injured ankle. The results are given in percentage rankings, so scores are expected on average to be most commonly averaging out to around the 50%. This is similar to someone's height, or a person's income. It is actually most common to have a variety of scores with a mix of highs and lows. In fact, most people score in the 20-80% and have an average around the 50%.

The computer testing is often quite intense. It is very challenging and usually results in worsening of headaches when administered. I highly recommend early morning testing for this reason. The later the test is given in the day, the higher the likelihood of worsened headaches. This would be similar to walking around on a broken ankle all day and then testing the ankle by running a race. In addition, early in the day testing provides a more accurate evaluation.

Baseline concussion scores may be helpful when available, but they are not absolutely necessary. We can use the information provided about grades, academic performance, special classes in school, and the medical history to determine the approximate percentage of the testing results.

Concussion Testing Examples:

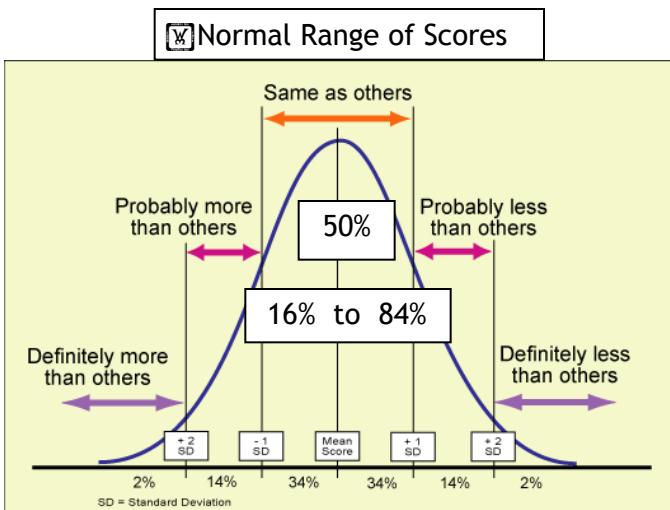
Typical Initial Concussion Scores:

Verbal Processing (English, Words)	<1%
Visual Processing (Math, Shapes)	<1%
Motor Speed	<1%
Reaction Time	<1%

These are examples of Typical Normal or “Passing” Concussion Scores. Each Test Example is someone’s scores:

Here are 5 examples: Test Example: A B C D
E

Verbal Processing (English, Words)	50%	80%	20%	40%	25%
Visual Processing (Math, Shapes)	50%	30%	70%	50%	40%
Motor Speed	50%	40%	30%	20%	33%
Reaction Time	50%	60%	80%	55%	80%



This is a graph that shows a normal population of people. The center line (where most people are) is the 50%. The “Same as others” section is where most people’s scores are considered normal (16%-84%).

As you can see, passing scores are highly variable. There is not one specific score that is needed to “pass” as every individual is different. Scores are not like grades made in school and it is very **uncommon** to have scores in the 90th to 100 percentiles. As you can see from the graph, the most common scores range between 16% - 84%.

Concussion Clearance:

Clearance from a concussion involves several things to happen. First, the individual needs to have a COMPLETE resolution of symptoms. That is for example, no headaches, dizziness, or other neurologic difficulties. Second, the individual must progress to regular school academics. This includes the ability to tolerate classes all day and performing at their normal capacity for school work (homework, quizzes, testing) prior to a return to athletics. Third, we would like to utilize the computerized testing if the individual is at least 12 years old. This way we can have objective data that shows the person's progress. Finally, we will begin a step-wise return to physical activities.

The step-wise return to activities involves a gradual slow return over the course of 3-7 days. Each station should be performed on separate days and the individual should not be allowed to progress if he/she is having any signs or symptoms consistent with their concussion (that is, headaches, dizziness, etc.) Often, the athletic trainers at the school may assist in this progression, but the parents may monitor this progression prior to the final clearance.

The final clearance is only obtained after the completion of the return to play program. The clearance physician note will state that this must be achieved prior to full practice and game participation.