

## Brainline Talks With Dr. James Kelly

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Video Link: <http://www.brainline.org/content/multimedia.php?id=749>

### Concussion Screening Standards

#### Dr. James Kelly

There have been multiple attempts to create guidelines for diagnosing and managing concussion and sports. And some of them existed back in the '80s even. Mostly they were done by individuals who knew a lot about this. But as more evidence grew and more scientific support could be marshaled around decisions, then groups of us, various groups, have put together guidelines that look at that very issue. How do you decide a concussion occurred? Who do you have to worry about? How long do they stay out? When do they go back in the long-term sense? I mean, some people would say maybe here three is too many concussions and that sort of thing.

So, over the last ten years, much more scientific evidence has been brought to bear to that kind of decision making, especially in the last decade. The American Academy of Neurology group wrote guidelines in 1997. And when those were published, they became, over the next several years, the most widely acknowledge and used. But other groups have come in since then. And there have been international groups. And there isn't really uniform consensus that's uniform, nationally or internationally.

But the evidence is growing as to what it is we need to use in our decision making. Neuropsychological testing has played a much more prominent role. We're moving towards computerized neuropsychological testing. And to some extent, I think just the awareness of the concussion issue in the sports world has been elevated in that span of time largely by high profile professional athletes who've had their own concussions for whom then that whole issue became important to the sport. It's not just happening at a low level infrequently. But when it happens to prominent athletes who can't play as a result and the team has changed, the sport then comes under a different level of scrutiny. That has really brought it to the attention of the sports world probably more than anything.

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There are actually several neuropsychological tests that can be done mostly on laptops or PC computers. And they either use a mouse or some really rapid kind of a switch like device. Because you need millisecond level response time in order to really make use of that computer process. And so a simple reaction time and other complex reactions that we can do actually then can be measured in milliseconds literally. Now, that sensitivity can help us in some ways and cause trouble in other ways.

Because the sensitivity is so great that any fluctuation in our own attention span, a distraction we may have, a bad night sleep, having a cold, whatever, can influence that response time. And it's not brain dysfunction from a concussion. And so the sensitivity is helpful in some ways, but creates problems on the computer level in terms of the lack of specificity. It's picking up anything that effects brain function. And so we have to be very careful as to what those computer results are used for. It doesn't necessarily mean a brain injury occurred.

#### Dr. James Kelly

That's the big problem that we have with this is that you can even look worse on your baseline than you do later on because of whatever those issues might be that we just mentioned. You know, being distracted by something that's going on in your life. And so under those circumstances, we need to have multiple baselines and average them. And for some of these tests that we've been ... not me, but I've been participating in, in helping people learn about it.

As I've taken the test as a subject, just to look to see, okay. How does this work? What's the face validity of the test? Do I believe that it's really doing what they say it's doing? Does it interact in a normal way in a human performance sense that I think is a meaningful test and those sorts of things. As we've done them, we've had to take the test ourselves multiple times to get good at it. So you reach a baseline that is different than the first performance in many areas of these tests.

And so I think in order to have a true baseline, it's not a single snapshot of how you are right now. It's how you are three times today, four times tomorrow and twice the next day. So that you have repeated measures that then can be averaged. What we really want to know is what's the range of your normal? So that if you drop out of that when I test you again after some event, can I meaningfully say that that baseline was the you uninjured or unaffected and now there's a change. Because otherwise, if I just have a single snapshot, it's not a true baseline. And even with paper and pencil tests that we were doing in pro sports before the computers came into it, even then it was true.

And so we'd have baselines. And some of the athletes after a concussion would do better on the second test than we did on the baseline. Then you'd shrug your shoulders and say, you know, how do I make sense of that? Everybody gets better with repeated exposures to things. That's why we study in school. You know, you go over it again and try a different angle. You listen to something that's different and get the material in while the more exposures to a test, the better you get at it. And there isn't a single baseline one time test that's truly meaningful