

Child Brain Versus Adult Brain with TBI

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Video Link: <http://www.brainline.org/content/multimedia.php?id=3510>

Dr. Jeffrey Barth: There is a difference between the adult brain and the child brain when it comes to traumatic brain injury and I am going to focus just on mild concussion at this time. The child's brain appears to be more vulnerable to injury and it appears that it takes longer to recover from a mild head injury. In our research at University of Virginia Medical School, we have looked at mild head injury in football players primarily and this is an age group that is at the end of development of the brain, so it is almost a mature brain. And to make a long story short, our research suggests that the mature brain recovers within five to ten days of any concussion. So, in college football for example most of our concussions on the field result in the player being out for a few days and slowly working themselves back once they are symptom-free and that usually is by the next game.

In children, it may be a very different story and when I say children I mean anywhere up to about 21 or 25. The brain continues to develop until about 25, but the vulnerability is probably at the middle school and the high school level for the brain not quite being mature at the point. And we know that is the case, the frontal lobes certainly aren't as developed as the rest of the brain. The brain develops from the bottom up and from the back forward. So, the last thing that kicks in is the frontal lobes and that is the area of judgment and so on. So, that is a good reason not to give your kids the car keys at age eight. We at least wait until 15 or 16 these days and of course you can't vote until a certain age, you can't drink until a certain age. That probably reflects a lot of neurodevelopment that the frontal lobes have not yet developed.

In the case of children having brain injuries we have some animal models which look at this issue. And there what we have found is with mice at least, and you of course can argue that mice are not people, but in mice, if you give a mature mice a mild head injury, it takes about five to ten days just like our football players for the glucose utilization that I talked about earlier and the metabolism to get back to normal. In the immature mice and this was research done at UCLA by Dr. David Hovda, he found that it took between six and ten times longer for those mice to recover their glucose utilization and metabolism. So, if we want to extrapolate from that literature, we would have to say that children are more vulnerable to the effects of any kind of either concussive blow or acceleration-deceleration injury.