Brainrot & Concussion Committee

Hello everyone,

I was told that I would have ten minutes to speak. If members of the panel have questions, will time be added for questions?

**I’d like to reserve (at least two) minutes for Q&A…..**

First, I would like to thank you for inviting me. Since speaking out against public financing of tackle football before the June Meeting of the Maryland State Board of Education, I moved back to my home in Ohio. I’m grateful that you would nevertheless include me in this discussion. I think I do have an unusual contribution to offer: a simple visual technique for impressing upon students, parents, teachers, and administrators the disturbing extent of sub-concussive hippocampal brain tissue loss.

Before going further, I would also like to thank the Chair for convening and the Staff for arranging this meeting, and Howard High School for offering to host. In my own home state of Ohio, to my knowledge, no organization quite like the Traumatic Brain Injury Taskforce of Maryland exists. Some states do not have such a body, and I am very relieved that Maryland has a body that is empowered to make firm medical recommendations on sports safety public record.

I would further like to specify at the outset that almost everything that I have brought to share with you today regarding the present and future state of tackle football and what is to be done about it reflects the best available evidence that I have found as of yesterday, September 15, 2014, and like any scientific knowledge, is subject to later readjustment, elaboration, recantation and refutation, as new pre- and post-season and longitudinal data emerges from imaging studies of the development of the adolescent *homo sapiens sapiens* brain. I would be the first to admit the limits of my knowledge, and the limits of the published literature. For instance, I do not have access to the latest kinematic data from Head Impact Telemetry System equipped helmets used in USA Football’s “Heads Up Football” Program Trials, nor do I have a direct index of how G-forces integrate into hippocampal volume loss. In short, I would like this to be the start of a frank conversation about tackle football, and not a end-all-be-all statement of my own feelings toward it, and I would ask you kindly not to take my statements out of their intended context.

Nevertheless, it is my firm belief that the efforts of this Task Force are misdirected, as evidence collected five years back, if not earlier, appears to to have been, by most measures, more than sufficient for a vigilant medical taskforce responsible for protecting youth from any and all forms of brain damage to implement a statewide and even nationwide ban of public financing of tackle football. The inevitable loss of hippocampual tissue in high- and extreme-G tackle football collisions show that K-12 tackle football and ice hockey leagues are operating outside of the liability shield of Hammond v. Board of Education of Carroll County, as the accumulating brain injuries and tissue loss sustained are well beyond the ordinary experience of parents and students, and not evident or foreseeable to the ordinary observer. The brain is literally insensate to neural damage.

Before you, you’ll find Hammond v. Board of Education of Carroll County. Please read Hammond v. Board of Ed carefully, and in full. There is no liability shield in Maryland for school districts when damage to the brain is neither visible nor familiar to the ordinary observer, the ordinary parent and ordinary student.

Only persons comfortable reading JAMA or the Journal of Neurotrauma have the capability of fully assessing the damage that tackle football wreaks on the adolescent brain. High-G Cumulative Brain Tissue Injury, what I call brain rot, is only observable under autopsy, diffusion tensor imaging, and/or pre- and post-season MRIs, or using the techniques seen in the *Relationship of Collegiate Football* paper, i.e. a cross-sectional cohort MRI study.

If the TBI Task Force only polices concussions, you’re only preventing and responding to the most severe injuries imaginable to K-12 neural tissue, injuries that occur over 80Gs and some 6600 rads/s. There’s a whole range of progressive injuries that set in within the 50-80G range, and the 2200 rad/s –6600 rad/s range that are utterly escaping your notice, and based on the paltry and wishy-washy documentation on non-concussive tissue loss, seem to have escaped your concern to date. Brain rot caused by nonconcussive linear and rotational acceleration is something that I feel you ought to consider addressing yourself to energetically. In education, we are in tasked with oversight of neural proliferation and patterning. If and when a sport retards or reverse neural proliferation and repetitively and violently disrupts neural patterning, in a manner that is invisible to the naked eye and beyond the comprehension and visual quantification of all but the most expert medical observers, we have a collective obligation to step in on behalf of the state and in the best interests of both students and parents, on the doctrine not of in loco parentis, but of *parens patriae*. There’s a gaping liability hole in Maryland for tackle football, with respect to non-concussion-related brain tissue loss and rot.

Let me illustrate this to you in an interactive and more graphical manner. I’m going to rely mostly on the Singh et al. paper. I won’t belabor the details of the study. To summarize, the most important part of this experiment was comparing 25 Division I football players who had never, ever been diagnosed with concussion to healthy age-, sex-, and education matched controls. The supratentorial brain volume was the same in each group, but the hippocampal brain volume came up short by over 500 microliters on both the right and left sides. That’s over half a milliliter on each side, or cumulatively roughly the size of two M&Ms.

Not all of that tissue loss occurred in college. The total hippocampal volume loss was 1.2 mL over 10.5 years of mixed K-12 and collegiate play. Let’s split responsibility for the brain volume loss equally between K-12 collisions and collegiate collisions. There’s good reason for this admittedly fuzzy half-and-half accounting inference. At younger ages, the brain hasn’t myelinated yet. Even if brain tissue loss accumulates at only one-quarter the rate distributed smoothly from 5th to 12th grade, you’ll arrive at 0.6 mL estimate of hippocampal loss by the day of a linebacker’s high school graduation. Plus, the acceleration / deceleration profiles are already reaching

The brain is an amazingly adaptable instrument: neural tissue can invade and repurpose lesser-used areas of the brain to compensate for chronic and acute neural injury. In a recently discovered medical ase in China, a woman managed to survive without a cerebellum. Her symptoms? It took her six years to learn how to produce speech, and seven years to walk. She still suffers coordination and fine motor problems, as you would imagine, given that she’s missing the most densely packed part of her brain, representing a full half of her total neural population.

It’s only preventable on-field with constant helmet-embedded accelerometers. To my knowledge, this taskforce does none of this basic brain safety monitoring (Pre-and Post-Season MRIs, Diffusion Tensor Imaging, Hippocampus Volumetry, or Monitoring and Removal from Play Rules tied to conservative G and rad/s thresholds) for any colliding students or any collision sports in Maryland.

My point is that by treating concussions and traumatic brain injury as the only threat to students neural tissue, it’s rather like treating only the most gruesome compound tibia fractures—the ones that poke through the skin, or in the case of a concussion, breakthrough into behavior—and refusing to diagnose, treat, or proactively prevent exposure to the oft-repeated experience of hairline neural tissue fractures that leads to hippocampal brain volume loss and eventual brainrot, in the form of the tau protein staining found in 31 out of 32 NFL player autopsies. — the sort that brings early onset dementia, ALS, and, in combination with ungainly 35+ average linebacker Body Mass Index Scores, a lifespan roughly 18 years shorter than comparable age-, sex-, education- and ancestral origin-matched peers.

Years ago in Baltimore City Public Schools, students competed in boxing, another sport responsible for early brain-rot. Then, in a match between City College and Polytechnic, a student named Robert Breslau was knocked out and his limpid body was photographed and printed in the Sports Section of the Baltimore Sun. The story provoked an outraged public to stop the sport of boxing in public education.

Tackle football is like boxing, but the brain damage is hidden behind the false security of a helmet. Football, like boxing, is a brutal, man-mutilating sport with brain accelerations and decelarations that exceed, by an order of magnitude, all sensible natural limits. Consenting and well-informed adults over the age of majority should be free to participate if privately financed, but the notion that the public should foot the bill for such a sport strikes me as ludicrous.

If you were to quiz the K-12 football players in this state on whether or not the brain has pain receptors or nociception built within it, the students will guess wrongly far worse than random chance. Not one in 100 students knows that a lobotomy of the brain needs no anesthetic at all. When the tibia of a student breaks, or when the structural integrity of a student’s spleen is ruptured, as in the case of Hammond v. BOECC, the student falls to the ground in agony. When the structural integrity of the brain is threatened, students hardly feel a thing, and hairline fractures to the brain often go unnoticed, even by the best baseline-post-game functional test apparati.

Alright, let me walk you through the stack of papers before you.

Let’s now please turn to the scientific report titled “Relationship of Collegiate Experience and Concussion With Hippocampal Volume and Cognitive Outcomes”.

To get a sense of scale, take a look at the combined hippocampal volume before you. The orange region represents a rough approximation of how much brain tissue we are missing.

According to a study by the Cleveland Clinic, the football helmets of today are not any safer than the leatherback helmets of yesteryear. The only helmets that are significantly improved are smart helmets that measure and remotely beam peak linear and rotational acceleration. In theory, if every student playing football in Maryland at any age level were equipped with these helmets and schools set a max G limit that triggers removal from play for all players involved in a collision, and parents receive the data from their own childrens’ helmets beamed to them immediately, and parents can hold the coach accountable for pulling their child from play if and when their child ever hits the parents maximum deceleration tolerance, and a graphic informed consent process conducted by an outside party were conducted for all collision sport players at the start of the season, and schools could afford the $1,000 helmets for each player that would make this system work…. And on and on, then, and only then, would I, were I in your shoes, myself be ready to let a limited number of Maryland schools play tackle football in the 2015-16 school year.

After the recent Ray Rice fiancé-beating cover-up, do you really trust the National Football League, or its subordinate affiliate, USA Football, to conduct a safety trial for Heads Up Football on its own? Do you trust Roger Goodell to provide you with evidence he’s gathered that undermines the position of middle school and high school collision sport training? Do you trust the NFL Commissioner to speak honestly to parents about how much brain tissue their children are losing in the vain hope of being one of the 2,000 NFL Athletes who have the pleasure of dying 18 years early, typically in a state of immense and unnecessary suffering?

the comprehensive research you will need to clear tackle football for next season, in a timely manner?

Do you trust Roger Goodell to exhibit all the ev

So what am I asking for? I am asking that Maryland suspend the sport indefinitely, until tackle football, or its most recent incarnation, Heads Up Football, passes a clinical safety trial. Give the NFL and USA Football a large incentive to run a representative number of pre and post season MRIs for tackle football players. Please get your ducks in a row, and send notice that the sport will not be renewed for the next school year.

School Safety

INTRODUCTION

I trust that your combined wisdom and expertise on medical imaging modalities exceeds my own.

School Safety Department