Does CTE call for an end to youth tackle football?

Despite press about a recent study, a link between hits to the head and CTE isn't clear-cut. More data and a risk-benefit analysis are needed.

By Jason Chung , Peter Cummings and Uzma Samadani
FEBRUARY 10, 2018 — 8:37AM

Noah Musser • Kansas City Star/TNS

The message sent to assembled media and onlookers was that eliminating tackle football for youth is the key to safeguarding the brains and futures of America's youth.

The truth is not so simple.

The scientific evidence linking youth casual sports play to brain injury, brain injury to CTE, and CTE to dementia is not strong. We believe that further scientific research and data are necessary for accurate risk-benefit analysis among policymakers for two reasons.

First, evidence-based science calls for research to be conducted under generally accepted principles. The case series presented by the Boston University group, primarily due to its ascertainment bias, is weaker

than the evidentiary standard sufficient to demonstrate an association or causation and conflicts with pathologic findings in other studies.

CTE pathology in the brain has been shown by British pathologists to be present in approximately 12 percent of normal healthy aged people who died at an average age of 81 years (Ling et al. Acta Neuropathologica). The presence of CTE pathology in the brain on autopsy has not been shown to correlate with neurologic symptoms before death.

To be clear, CTE pathology could be present in a normal person.

Indeed, even Dr. Goldstein's article was more measured than his press. His article speaks in terms of likelihoods and qualifiers in noting that "the causal mechanisms, temporal relationships, and contextual circumstances that link specific brain pathology to a particular antemortem insult are impossible to ascertain with certainty based solely on post-mortem neuropathology."

There is a disconnect between the categorical rhetoric in media and news releases describing "concussion" research on the one hand, and the muddled and contentious scientific reality on the other. As noted by Dr. Goldstein's own research, the pathology and link between head impacts and long-term neurological conditions such as CTE is still unclear, with questions of causation yet to be settled.

This is not to say that head impacts or injuries are desirable — far from it. But there is scientific ambiguity about the prevalence of CTE in the general population in comparison to professional athletes and also about the significance of its presence. In fact, after reviewing all available evidence, the consensus statement from the international conference on concussion in sports states:

"A cause-and-effect relationship has not yet been demonstrated between [CTE] and sport-related concussions or exposure to contact sports. As such, the notion that repeated concussion or subconcussive impacts cause CTE remains unknown."

Nothing in Dr. Goldstein's recent study changes this ambiguity, which brings us to our second point. Before enacting sweeping legislation or policy spurred by fears of CTE, policymakers must conduct a risk-benefit analysis based on a holistic survey of public health concerns.

American youth are currently more sedentary than ever before. Compelling evidence from multiple sources shows that organized sports offer youth a way off the couch and promote the adoption of an active lifestyle, thereby mitigating the risks of, among other conditions, obesity, high blood pressure, diabetes,

depression, osteoporosis, cardiovascular disease, stroke, drug use, teen pregnancy and, ironically, dementia.

The uncomfortable truth is that tackle football is the number one participation sport among high schoolers in America; it is accessible to children with diverse physiology in ways that other sports are not, and greater public consultation should take place to see if participation rates would remain as high for alternatives to tackle football.

Three recently published major studies found no increased risk for later-in-life brain diseases in men who played high school football (Jannsen et al., Mayo Clinic Proceedings; Savica et al., Mayo Clinic Proceedings, Deshpande et al., Jama Neurology). One might also speculate that children who engage in football would seek other less organized risk-taking behaviors if football were not an option.

Setting legislation and public policy is already a tricky process and overstating the degree to which scientific consensus exists may lead to pyrrhic victories. What we seek to establish are meaningful and durable standards based on validated and replicated diagnostic criteria so that the public health response to head impacts and CTE are not emotive or political, but data-driven. The political winds being as fickle as they are, laws and policies enacted without such scientific support will be vulnerable to backlash from those with deep economic and cultural ties to contact sports such as tackle football, to rejection by the scientific community, and to general confusion and misunderstanding by the public.

In the drive to protect young brains, there are not just two sides. Not everyone is a moral crusader or an NFL stooge. No reasonable person, least of all the professionals signing this letter, want to see youth injured. But when arguing for intervention based on public health or scientific principles, the data must inform the recommendation.

Additional data is required to make a truly informed decision regarding banning of sports. What is desperately needed are 1) funding from federal and private sources to launch longitudinal, multicenter statistically sound studies, 2) consistent coordinated measures and standards, and 3) facilitation from either government or a consortia of concussion research centers.

Only then will we know whether the perceived neurological risks of tackle football outweigh the benefits. And only then can we more confidently say that we are acting in the public interest.

Jason Chung is senior researcher and attorney at New York University Sports and Society. Peter Cummings is a forensic pathologist and neuropathologist and assistant professor of anatomy and neurobiology at the Boston University School of Medicine. Uzma Samadani is an associate professor in neurosurgery at the University of Minnesota and Rockswold Kaplan endowed chair for traumatic brain injury at Hennepin County Medical Center. This article is submitted on behalf of 26 brain injury experts in neurosurgery, neuropsychology, neurology, neuropathology and public policy at 23 universities and hospitals in the United States and Canada.

The additional signatories are:

Lili-Naz Hazrati, associate professor of neuropathology at the University of Toronto; clinician-scientist at the Hospital for Sick Children, Toronto.

John Leddy, professor of clinical orthopaedics and rehabilitation sciences at the SUNY Buffalo Jacobs School of Medicine and Biomedical Sciences.

Barry Willer, professor in the Department of Psychiatry at the SUNY Buffalo Jacobs School of Medicine and Biomedical Sciences.

Rocco Armonda, president of ThinkFirst, a brain injury prevention foundation; director, neuroendovascular surgery and neurotrauma, and co-director, neurocritical care; professor of neurosurgery, Georgetown University Hospital and Washington Hospital Center.

Jason H. Huang, chair, Department of Neurosurgery at Baylor Scott and White Medical Center in Temple, Texas, and professor of surgery at Texas A&M University College of Medicine.

Kenneth Blumenfeld, adjunct clinical faculty, Department of Neurosurgery at the University of California, San Francisco; immediate past president of the California Association of Neurologic Surgeons; AANS delegate to the AMA.

Richard B. Rodgers, assistant professor of clinical neurosurgery and director of neurotrauma at the Indiana University School of Medicine.

James MacDonald, clinical associate professor of pediatrics and family medicine at the Ohio State University College of Medicine, Division of Sports Medicine, Nationwide Children’s Hospital.

Michael W. Kirkwood, founder and co-director of the Children's Hospital Colorado Concussion Program and associate clinical professor of Physical Medicine and Rehabilitation at the University of Colorado School of Medicine.

David R. Howell, lead researcher for the Sports Medicine Center at Children's Hospital Colorado and assistant professor of orthopedics at the University of Colorado School of Medicine.

Gary S. Solomon, professor of neurological surgery, associate professor of orthopedic surgery and rehabilitation and psychiatry and behavioral sciences; co-director, Vanderbilt Sports Concussion Center at the Vanderbilt University School of Medicine.

Mark E. Halstead, associate professor of pediatrics and orthopedics at Washington University in St Louis and director of the Sports Concussion Clinic at St Louis Children's Hospital.

Francis X. Shen, associate professor of law at the University of Minnesota and senior fellow in law and neuroscience at the Harvard Massachusetts General Hospital Center for Law, Brain and Behavior and the Harvard Law School Petrie-Flom Center.

Mark Herceg, director of the Center for Brain Health and the Center for Concussion at Gaylord Specialty Healthcare in Wallingford, Conn.

William B. Barr, director of the neuropsychology division, Department of Neurology, at New York University Langone Health.

Arthur Maerlender, associate research professor and director of clinical research, Center for Brain, Biology and Behavior at the University of Nebraska-Lincoln; research director for the Big Ten-Ivy League Traumatic Brain Injury Research Collaboration.

Mayumi Prins, professor, UCLA Department of Neurosurgery and Brain Injury Research Center and associate director of the UCLA Steve Tisch BrainSPORT program.

Gregory Murad, associate professor and residency program director at the University of Florida Lillian S. Wells Department of Neurosurgery.

Peter Le Roux, neurosurgeon at the Brain and Spine Center at the Lankenau Medical Center in Pennsylvania.

Vernon B. Williams, director, Center for Sports Neurology and Pain Medicine at the Kerlan-Jobe Orthopaedic Clinic, an affiliate of Cedars-Sinai.

Michael G. Fehlings, professor of neurosurgery and vice chair of research, Department of Surgery, Halbert Chair in Neural Repair and Regeneration, co-chairman of spinal program, University of Toronto, Head Spinal Program; senior scientist, McEwen Centre for Regenerative Medicine, Toronto Western Hospital, University Health Network.

P. David Adelson, director, Barrow Neurological Institute at Phoenix Children's Hospital, Diane and Bruce Halle Endowed Chair in Pediatric Neurosciences; chief, pediatric neurosurgery.

Shelly Timmons, neurosurgeon and professor, Department of Neurosurgery; vice chair, administration, and director of neurotrauma at the Pennsylvania State University Milton S. Hershey Medical Center; president, American Association of Neurological Surgeons.