A Subconcussive Load Effect & Trauma Profile for Chronic Traumatic Encephalopathy: A Meta-analysis of New Trends

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BACKGROUND

• Visits to the ER for mild Traumatic Brain Injury (mTBI/Concussions) have risen by 62% within the last decade. The CDC considers improved awareness and sensitivity as possible explanations. Imaging techniques such as DTI & MRI, coupled with genetic assays and novel biomarkers allows for diagnosis of certain diseases years before disease onset has even begun. Recent technological advancements have provided a means to study biomechanical variables in sport related head impacts. Yet despite such improvements, too little is known about the neurologic sequelae of such repetitive head impacts to the brain. It should not be too surprising then that public health concerns over mild, asymptomatic repetitive impacts has intensified as new accounts of brain changes are being found in students who not only are the standard measures of cognitive surveillance, but also report no history of concussions or symptoms.

• Subconcussive trauma is defined by impacts that are asymptomatic but perhaps accumulate. Leverenz et al used neurocognitive testing and functional MRI to find measurable neurocognitive abnormalities.

• A growing number of unique CTE-confirmed cases have been found: a battered wife, an autistic person displaying a repetitive head banging behavior, our military servicemen and women, and even teenagers like Owen Thomas, a U Penn student who by all accounts lacked any identifiable concussive history.

• There exists a need to further investigate subconcussive trauma and its link to Chronic Traumatic Encephalopathy (CTE).

METHODS &AIMS

Meta-Trend Graph
- To determine if an inter-sport threshold exists
- To determine if subconcussive trauma can be characterized as “cumulative.”
- Offers important solutions to current debates

Pooled Review of Post-Mortem Case Studies
- To analyze differences in symptoms and death between football players and boxers
- Students T-test was used but unadjusted for cause of death

Concept Matrix
- To determine inter-sport trends
- To determine if a common impact profile exists

A Novel Soccer Cohort
- To define high exposure by position & heading technique

META-TREND GRAPH

A Median [850] Defines "Subconcussive Trauma"