Dynamics of Concussion

Erin Kenzie
Project origins
Methods

➢ Sought to understand factors and processes relevant to recovery using systems maps & models
➢ System dynamics: feedback, nonlinear dynamics, causal structure; create maps of knowledge
➢ Iterative process:
  ○ Literature review
  ○ Expert interviews
  ○ Group workshops
Early phases
Concussion As a Multi-Scale Complex System: An Interdisciplinary Synthesis of Current Knowledge

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Traumatic brain injury (TBI) has been called “the most complicated disease of the most complex organ of the body” and is an increasingly high-profile public health issue. Many patients report long-term impairments following even “mild” injuries, but reliable criteria for diagnosis and prognosis are lacking. Every clinical trial for TBI treatment to date has failed to demonstrate reliable and safe improvement in outcomes, and the existing body of literature is insufficient to support the creation of a new classification system.
The Dynamics of Concussion: Mapping Pathophysiology, Persistence, and Recovery With Causal-Loop Diagramming
Interactive model

Explore the diagram in Kumu.

Available at: www.dynamicsofconcussion.com
What the model *is . . .* and *isn’t.*

- Preliminary reflection of current knowledge
- Snapshot of the ‘big picture’
- Qualitative
- Exploratory

- Comprehensive
- Inclusive of all aspects of heterogeneity
- Statistical or mathematical
- Data-driven
Benefits and possibilities of this approach

- Reveal patterns, gaps in knowledge, and connections
- Classification / sub-typing: help understand how variables (e.g., biomarkers) fit together
- Starting point for computational modeling
- Iterative reflection between data-driven & conceptual models
- Continuously updated “living” model
- New directions?
References


Kumu.io
Thank you!

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www.dynamicsofconcussion.com