The biomechanics of concussion: toward better diagnosis and prevention

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Screening and prevention of concussion

Problem:
• Number one risk factor for concussion is history of prior concussion
• Repeat concussions can contribute to permanent brain damage

Government solution:
• Lystedt Law in all 50 states to prevent repeat injury

Technology solutions:
• Screening
  – Must have a way to detect likely concussions: wearable sensors
• Prevention
  – Helmets prevent skull fracture, but can they prevent concussion?
What causes a concussion?

- Head translation vs. head rotation
Are all impact directions the same?
Concussion disrupts brain wiring
Axon and microtubule damage
Measure skull motion as a surrogate for brain
Soft tissue and textile motion at high-speed
Removed for proprietary purposes
Helmets and rotational acceleration

NOCSAE Drop Test
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