Reinforced composite based modeling of axonal injury - A physics based approach HARSHA GARIMELLA, REUBEN KRAFT, Penn State Univ — Sports related concussion/brain injury is a major health problem in the United States that is particularly common in contact sports like American football, hockey etc. Despite the significance and growing concerns about the potential long terms consequences of concussion, its biomechanical mechanisms are not fully understood. Since 1970s computational modeling proved to be an efficient tool for biomechanical modeling of human brain. Computational modeling coupled with recent advancements in brain imaging technology would provide us with a robust method in developing accurate constitutive models for computational analysis. This paper presents a physics based finite element modeling of human brain with axonal fibers using the concept of embedded finite element method and composite based modeling. Axonal strains, which play a major role in neurotrauma, can be obtained with much less complexity using this method. This model will be further developed to include the physics areas like diffusion (spread of disease), electomagnetism(EEG) etc.

Joseph Kulik
None

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