Abstract Submitted
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Translational and angular accelerations measured inside a novel, physical model of a human head[1] JACOB MOLDENHAUER, STEPHEN SLAUGHTER, CORA KEIL, SYDNEY MCCLOSKEY, ANDREW CHANG, JAMES FRISBY, University of Dallas — Studies of collisions occurring during concussive level events, such as in athletic competitions and training sessions consistently report translational and angular accelerations in correlation with concussions. In fact, more severe concussions seem to occur from relatively higher angular accelerations rather than higher translational accelerations. Currently, most measurements are recorded from devices placed externally on the head or inside the helmet of an athlete. We present results obtained from placing inertial measurement units (IMUs) inside a physical model of a human head, brain and skin constructed from ballistic gel and other materials during concussive type collisions. We compare the translational and angular accelerations inside the head to those obtained outside the head in a consistent collision. While the translational accelerations are consistent within 1σ, $a_{in} = 34.8 \pm 2.1\, g$ and $a_{out} = 29.2 \pm 4.1\, g$, for inside and outside, respectively, the angular accelerations inside the head $\alpha_{in} = 7545 \pm 1004$ rad/s^2 consistently measure larger (more than 2σ) from those obtained outside the head, $\alpha_{out} = 3235 \pm 1000$ rad/s^2. This new data from inside a physical model of a head supports higher angular accelerations in mo

[1]Marcus Fund, Donald A. Cowan Physics Institute

Jacob Moldenhauer
University of Dallas

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