

Fluid-Structure Interaction Analyses of Amniotic Fluid with a Comprehensive Fetus Model Exposed to External Loading

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The number of motor vehicle collisions is increasing worldwide [1]. Motor vehicle collisions are predicted to become more prevalent problem in the future. It is projected that motor vehicle collisions will be the fifth most common cause of fatalities in the world [1]. A recent review of ‘traumatic injuries to the pregnant patient’ shows that a motor vehicle collision is the most common life-threatening injury for a pregnant woman [2]. In the United States, state-level studies have estimated the crash risk among pregnant front-seat passengers or drivers to be between 1.0% and 2.8% [3, 4, 5]. This study uses a comprehensive fluid-structure interaction models of a pregnant woman with fetus exposed to specific motor vehicle collisions. Two distinctive fluid domains are used, namely the fetus’ cerebrospinal fluid surrounding its brain, and the woman’s amniotic fluid surrounding the fetus, placenta and ovaries. Multitude of results is extracted from the simulations, e.g., the effect of amniotic fluid protecting the placenta, fetus’ brain, etc.

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