Abstract Submitted
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**Novel method to dynamically load cells in 3D-gel culture for primary blast injury studies**[1] DAVID SORY, Institute of Shock Physics, Imperial College London, ANABELA CEPA-AREIAS, DARRYL OVERBY, Imperial College London, WILLIAM PROUD, Institute of Shock Physics, Imperial College London, INSTITUTE OF SHOCK PHYSICS, DEPARTMENT OF BIOENGINEERING AND ROYAL BRITISH LEGION CENTRE FOR BLAST I COLLABORATION — For at least a century explosive devices have been reported as one of the most important causes of injuries on battlefield in military conflicts as well as in terrorist attacks. Although significant experimental and modelling efforts have been focussed on blast injury at the organ or tissue level, few studies have investigated the mechanism of blast injury at the cellular level. This paper introduces an in vitro method compatible with living cells to examine the effects of high stress and short-duration pulses similar to those observed in blast waves. The experimental phase involved high strain rate axial compression of biological cylindrical specimens within a hermetically sealed sample holder made of a biocompatible polymer. Numerical simulations were performed in order to characterize the loading path within the sample and assess the loading conditions. A proof of concept is presented so as to establish a new window to address fundamental questions regarding primary blast injury at the cellular level.

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