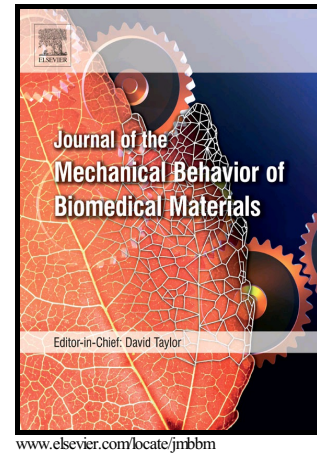


Author's Accepted Manuscript

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PII: S1751-6161(17)30442-3
DOI: <https://doi.org/10.1016/j.jmbbm.2017.10.012>
Reference: JMBBM2532

To appear in: *Journal of the Mechanical Behavior of Biomedical Materials*

Received date: 18 July 2017
Revised date: 3 October 2017
Accepted date: 8 October 2017

Cite this article as: G.J. Appleby-Thomas, B. Fitzmaurice, A. Hameed, J. Painter, M. Gibson, D.C. Wood, R. Hazael and P.J. Hazell, On differences in the equation-of-state for a selection of seven representative mammalian tissue analogue materials, *Journal of the Mechanical Behavior of Biomedical Materials*, <https://doi.org/10.1016/j.jmbbm.2017.10.012>

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On differences in the equation-of-state for a selection of seven representative mammalian tissue analogue materials

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Abstract

Tissue analogues employed for ballistic purposes are often monolithic in nature, e.g. ballistic gelatin and soap, etc. However, such constructs are not representative of real-world biological systems. Further, ethical considerations limit the ability to test with real-world tissues. This means that availability and understanding of accurate tissue simulants is of key importance. Here, the shock response of a wide range of ballistic simulants (ranging from dermal (protective / bulk) through to skeletal simulant materials) determined via plate-impact experiments are discussed, with a particular focus on the classification of the behaviour of differing simulants into groups that exhibit a similar response under high strain-rate loading. Resultant Hugoniot equation-of-state data (U_s - u_p ; P - v) provides appropriate feedstock materials data for future hydrocode simulations of ballistic impact events.

1. Introduction

Ballistic testing is necessary in order to optimise protection (armour) against differing threats. However, in order for such tests to be accurate, it is important that targets sitting behind protective materials should also be able to reproduce real-world effects as accurately as possible. Access to appropriate tissue analogues for such applications is therefore of particular importance, primarily due to issues of target

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