

## **Head Surrogates for Assessing Repeated Blast Overpressure Exposures to Breachers**

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Blast overpressure and its associated effects (*e.g.*, secondary and tertiary effects from a blast incident) are believed to be responsible for a number of instances of traumatic brain injury (TBI). As the US role has reduced in combat theaters, symptoms associated with mild TBI (mTBI) have been reported by instructors in training classes in overpressure environments. These instructors are frequently exposed to repetitive low level blast. The quantification of the risks associated with this exposure and the biomechanical mechanism of possible brain injury are addressed in this paper.

This talk will discuss the techniques developed for quantifying such repeated exposures in breacher training environments using the NRL surrogate head/brain systems developed specifically for these applications. The presentation will show the NRL headform, with embedded instrumentation, such as pressure and acceleration sensors, as well as NRL cell pack that can expose live neuronal cell cultures to blast overpressures. The initial results from more than ten breaching exercises conducted with the US Marines and the Army training schools will be presented and future directions outlined. This work is expected to demonstrate a modular, portable device that can be utilized for assessing the external threat and insult to the brain (using surrogate brain materials) for training environments with repeated low-level exposures.

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