Portable Assessment System (PAS) for In-Theater Assessment of mTBI

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TECHNICAL ABSTRACT

Background: No objective standard exists for diagnosing mild traumatic brain injury (mTBI). The high incidence of mTBI in sports and military environments demands accurate, timely diagnosis. Each mTBI affects a subject’s brain uniquely, yet research focuses on a single test to diagnose it.

Neuro Kinetics, Inc. (NKI) chose a different path focusing its research on a group of tests efficiently executed with a single device. NKI collected 300+ baselines of which 20 experienced a concussion clearly confirmed using a battery of 12 I-Portal tests.

NKI’s conclusions: (1) The variety of impacts that cause concussions and the differing physiology of the subjects, require a battery of oculomotor tests to detect a concussion. (2) A combination of oculomotor tests can successfully and repeatedly detect concussions.

Hypothesis: NKI can successfully modify the stimulus technology building a portable device to execute the necessary efficient battery of oculomotor tests to detect mTBI in the field, I-Portal PAS-ap. NKI will compare the test results for 10 normal subjects using the I-Portal PAS-ap and the I-Portal VNG (initial study device).

Specific Aims: (1) Develop Portable Version of NKI Eye Tracking Hardware. (2) Update Existing Software Platforms for Integration with I-Portal PAS Device. (3) Perform Validation Testing.

Study Design: The proposed I-Portal PAS is a head-mounted, high-speed, binocular eye-tracking goggle with sophisticated and sensitive algorithms for precision tracking, combined with a built-in stimulus display system that is integrated with NKI’s VEST raw data analysis package.

Relevance: Successfully diagnosing mTBI is, arguably, the biggest medical challenge of the last decade of war. Removing an mTBI Warrior from the front lines saves the life of the wounded Warrior, and their comrades. The proposed device will work to provide timely, objective data to triage the soldier, minimizing the risk of misdiagnosis.