New device for rapid, mobile detection of brain injury

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When accidents that involve traumatic brain injuries occur, a speedy diagnosis followed by the proper treatment can mean the difference between life and death. A research team, led by Jason D. Riley in the Section on Analytical and Functional Biophotonics at the U.S. National Institutes of Health, has created a handheld device capable of quickly detecting brain injuries such as hematomas, which occur when blood vessels become damaged and blood seeps out into surrounding tissues where it can cause significant and dangerous swelling.

A paper describing the team's proof-of-concept prototype for the hematoma detection device appears in the Optical Society's (OSA) open-access journal Biomedical Optics *Express*. The device is based on the concept of using instrumental motion as a signal in near-infrared imaging, according to the researchers, rather than treating it as noise. It relies on a simplified single-source configuration with a dual separation detector array and uses motion as a signal for detecting changes in blood volume in the tough, outermost membrane enveloping the brain and spinal cord.

One of the primary applications for the finished device will be the rapid screening of traumatic brain injury patients before using more expensive and busy CT and MRI imaging techniques. In cases where CT and MRI imaging facilities aren't available, such as battlefields or on the scene of accidents, the team believes near-infrared imaging will help to determine the urgency of patient transport and treatment, as well as provide a

means of monitoring known hematomas at the bedside or outpatient clinic.

More information: Paper: "A hematoma detector – A practical application of instrumental motion as a signal in near infra-red imaging," *Biomedical Optics Express*, Vol. 3, Issue 1, pp. 192-205 (2012).

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