# Quantitative Pupillometry

Looking into the brain fast and reliably.

Neurological and cognitive examinations, the current clinical standard for monitoring cognitive load and change, are subjective, time consuming, and often inaccurate. One method for objectively measuring cognitive changes is quantitative pupillometry—an emerging method for classifying concussions that analyzes digital video recordings of an individual's eye(s) in order to measure pupil size and light sensitivity (*pupillary light reflex*, or PLR)**.** Changes in pupil response have been correlated with brain stem and hypothalamus injuries (1), blast-induced mTBIs (2), non-blast induced mTBIs (3, 4), neurodegenerative diseases (5-7), and conditions affecting cognitive capacity (8-10). Recent efforts in studying quantitative pupillometry has led to significant breakthroughs for autism, drugs, and immunoresponse monitoring (11). Quantitative pupillometry shows significant improvement in the ability to track cognitive changes and rapidly monitor a patient in an objective manner.

Our patented mobile based pupillometer, Reflex, provides a user-friendly application for cognitive evaluation by leveraging high-tech video analysis in a familiar easy to use form (12). The application allows subjects to quickly administer tests to patients with suspected injuries to obtain real-time results to determine if cognitive markers of a neurological issue are present. Each video analysis provides a set of key biomarker measurements that can be easily tracked to diagnose and monitor injury or disease. Similar systems that have decreased mobility and cannot operate in ambient conditions come with a large upfront cost with limited flexibility (13). Reflex solves these issues while reaching previously unattainable sub-pixel accuracy with ground-breaking new algorithms.

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