Eye movement

Our eyes are in continuous motion. Even when we attempt to fix our gaze, we produce so called “fixational eye movements”, which include microsaccades, drift, and ocular microtremor (OMT). Microsaccades, the largest and fastest type of fixational eye movement, shift the retinal image from several dozen to several hundred photoreceptors and have equivalent physical characteristics to saccades, only on a smaller scale (Martinez-Conde, Otero-Millan & Macknik, 2013). OMT occurs simultaneously with drift and is the smallest of the fixational eye movements (~1 photoreceptor width, >0.5 arcmin), with dominant frequencies ranging from 70 Hz to 103 Hz (Martinez-Conde, Macknik & Hubel, 2004). Due to OMT's small amplitude and high frequency, the most accurate and stringent way to record it is the piezoelectric transduction method. Thus, OMT studies are far rarer than those focusing on microsaccades or drift. Here we conducted simultaneous recordings of OMT and microsaccades with a piezoelectric device and a commercial infrared video tracking system. We set out to determine whether OMT could help to restore perceptually faded targets during attempted fixation, and we also wondered whether the piezoelectric sensor could affect the characteristics of microsaccades. Our results showed that microsaccades, but not OMT, counteracted perceptual fading. We moreover found that the piezoelectric sensor affected microsaccades in a complex way, and that the oculomotor system adjusted to the stress brought on by the sensor by adjusting the magnitudes of microsaccades [1].

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see Rapid eye movement.

see Saccadic eye movement.

The study of eye movements, in particular saccades, is increasingly used as a model for higher order networks. Besides testing motor control, it can also give insight into neurodegenerative processes and cognitive function [2] [3] [4] [5].

Infrared oculography is a non-invasive and accurate method of recording eye movements [6], and has entered clinical practice in expertise centers. Due to the extensive networks involved in the control of eye movements, both focal and more widespread neuronal processes can be investigated using this infrared oculography [7] [8] [9].

Eye movement refers to the voluntary or involuntary movement of the eyes, helping in acquiring, fixating and tracking visual stimuli. Specific systems are used in maintaining fixation, when reading and in music reading. A special type of eye movement, rapid eye movement, occurs during REM sleep.

The eyes are the visual organs of the human body, and move using a system of six muscles. The retina, a specialised type of tissue containing photoreceptors, senses light. These specialised cells convert light into electrochemical signals. These signals travel along the optic nerve fibers to the brain, where they are interpreted as vision in the visual cortex.

Primates and many other vertebrates use three types of voluntary eye movement to track objects of interest: smooth pursuit, vergence shifts and saccades.

These movements appear to be initiated by a small cortical region in the brain's frontal lobe.

This is corroborated by removal of the frontal lobe. In this case, the reflexes (such as reflex shifting the eyes to a moving light) are intact, though the voluntary control is obliterated.

Parinaud's Syndrome, also known as dorsal midbrain syndrome is a group of abnormalities of eye movement and pupil dysfunction.

There is a large body of literature demonstrating changes of oculomotor performance in diseases such as Alzheimer's and neurodegenerative dementias, Parkinson's disease, Multiple Sclerosis (MS), Spinocerebellar ataxia and Huntington's disease.

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