

PubMed



Abstract**Full text links**Acta Otolaryngol Suppl. 1995;520 Pt 1:9-15.**Real time binocular detection of horizontal vertical and torsional eye movements by an infra red video-eye tracker.**Kingma H¹, Gullikers H, de Jong I, Jongen R, Dolmans M, Stegeman P.**Author information****Abstract**

So far it has only been possible to detect horizontal and vertical eye movements during real time; torsional eye movements have to be calculated from video-tape that have been processed several times, and each investigation takes considerable time. We developed a real time binocular infra red video eye tracker for routine clinical examination which allows real time graphical visualization of horizontal, vertical and torsional eye movements with a bandwidth of 12 Hz (25 Hz refresh frequency). Eye movements in three dimensions can now be obtained as easy as has been done before with electronystagmography for the horizontal component. In contrast to previous systems described, we analyze only those parts of the video-frame that are essential for detection of all three eye movements. This results in a huge data-reduction accompanied by a speed-up of analysis. The black pupil centre is detected by an iterative process of analyzing several horizontal and vertical lines of the even video field. The algorithm searches for regions of minimal intensity. Horizontal and vertical eye rotation is then calculated and transformed into Fick's coordinates. Based upon the centre of the pupil four concentric segments are defined in the iris to detect torsion and to enable correction for false rotation. Torsion is detected by cross-correlation of each segment and estimated from the outcome of the correlation coefficients. All transformations are established by predefined stored transformation matrices thus making real time calculations for transformation unnecessary. After corrections for eccentricity and assuming that fixation of the subjects tested was perfect, accuracy appears to be within 0.3 degrees-1.0 degrees for all three dimensions. Linearity after all corrections is within 4-9% within a visual field of 60 x 40 degrees (horizontal x vertical).

PMID: 8749067 [PubMed - indexed for MEDLINE]

MeSH Terms

LinkOut - more resources

PubMed Commons[PubMed Commons home](#)

0 comments

[How to join PubMed Commons](#)