INSTITUTE OF OPHTHALMOLOGY

our vision is your VISION

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Summary of current research interests

Vision impairment is seldom life threatening, nevertheless, it is among the most disabling of medical conditions, especially in older adults. In 1999, the Institute of Ophthalmology inaugurated a new division devoted to the study of vision impairment (low vision), its impact, and its rehabilitation. The division's activities are distributed among three interwoven laboratories. The Low Vision Psychophysics Laboratory concentrates on the study of everyday task performance by people with vision impairment. The Vision Impairment Population Laboratory is devoted to the study of the impact of vision impairment in the population. The Clinical Low Vision Research Laboratory is dedicated to evaluating and advancing state of the art low vision care.

Key achievements

- Development of Rapid Serial Visual Presentation (RSVP) as a low vision aid and to study visual processing in low vision
- Development of a real time opto-electronic scotoma simulator for studying the loss of central vision in conditions like Age-related Macular Degeneration (AMD)
- Salisbury Eye Evaluation (SEE) study; a comprehensive longitudinal study of the causes and impact of vision impairment in an elderly population
- First longitudinal evaluation of oculo-motor adaptation in patients with newly acquired macular degeneration (PhD project of Dr. Michael Crossland)
- Most comprehensive study to date of binocular visual function in patients with AMD (PhD project of Dr. Stamatina Kabanarou)

Research Projects

Topography of the cortical representation of the visual field
(with Professor Anthony Morland, York University)
The principal research objective is to determine whether cortical reorganisation occurs in patients with retinal lesions caused by age–related macular degeneration (AMD) and Juvenile Macular Degeneration (JMD). Using a combination of psychophysical techniques and functional MRI we will determine whether areas of primary visual cortex, deprived of sensory input by retinal lesion, over time become activated by other retinal areas. In both cross-sectional and longitudinal experiments we will determine when in the disease process reorganisation occurs and how it is related to the behavioural adaptations adopted by patients.

Salisbury Eye Evaluation (SEE) study
(with Professor Sheila West, Johns Hopkins University)
The SEE study was initiated in August, 1992 as a longitudinal investigation of the relationship between visual impairment and physical disability in a population-based cohort of people 65-84 years of age. We have completed the baseline evaluation and eight years of follow-up examination of our cohort of 2,520 participants. From these data we have shown that there are substantial age-related deficits in multiple measures of visual function and that these deficits are associated with increased physical disability, reduced social interaction, and self-perceived difficulties with daily visual tasks. The SEE study has broadened the scope of vision assessment compared to previous population-based studies by including tests of contrast sensitivity, glare, stereoacuity, and visual fields. We are continuing to evaluate the longitudinal data from the SEE study to determine the incidence of visual impairment to gain a better understanding of the interaction of vision loss with cognitive status.

AMD-READ: Assessment and optimisation of macular function with special regard to reading and motor control
(with Professor Dr. Suzanne Trauzettel-Klosinki, University of Tübingen)
Age-related macular degeneration (AMD) causes central visual field loss, resulting in reading disability. The main objective of the project is to develop tools for testing and optimising macular function. This includes the development and evaluation of a screening method for early detection of AMD based on low contrast letter perimetry, as well as methods to assess residual function particularly with regard to assessing reading eye movements. These diagnostic tools will include standardised protocols for data acquisition and analysis that can be used in low vision clinics throughout Europe.

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Peripheral retinal locus of fixation in patients with bilateral macular disease (with Dr. Angela Rees)

Many patients with age related macular degeneration (AMD) have blind spots in the centre of their vision and must learn to use their side vision for everyday tasks like reading and recognising faces. If they learn to use a specific retinal area off to the side it is termed the preferred retinal locus (PRL). The majority of patients place their PRL to the left of their blind spot. However a PRL below the blind spot should be optimal as it provides a larger uninterrupted area for reading and mobility. The purpose of this study is to investigate which factors determine PRL location and specifically, whether the PRL develops in the area of peripheral retina with the best remaining visual function.

Modernising the low vision clinic: the utility of a trained low vision support worker (with Dr. Michael Crossland)

The low vision clinic at Moorfields Eye Hospital has existed in its current form since the late 1960s and is believed to be the busiest low vision clinic in the world. It has been argued that the service provided in the Moorfields low vision clinic, whilst efficient, concentrates on the prevision of low vision aids rather than taking a multi-disciplinary approach as currently advocated by low vision service providers worldwide. This randomised controlled clinical trial will evaluate the effectiveness of a multi-disciplinary rehabilitation programme using a trained low vision support worker (LVSW). After the conventional low vision appointment, the LVSW will provide additional training to improve the patient's handling of their low vision aids, will ensure that the patient has accessed the full range of low vision services available to them and will act as a named contact for any queries the patient has with regard to their visual impairment.

Publications

Click here for complete publications list

Crossland MD, Sims M, Galbraith RF, Rubin GS. Evaluation of a new quantitative technique to assess the number and extent of preferred retinal loci in macular disease. Vision Res 2004;44(13): 1537-46.

Rubin GS, Bressler NM. Effects of verteporfin therapy on contrast on sensitivity: Results From the Treatment of Age-Related Macular Degeneration With Photodynamic Therapy (TAP) investigation- TAP report No 4. Retina 2002;22(5):536-44.

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Useful Links:

- International Society for Low Vision Research and Rehabilitation (www.islrr.org)
- Macular Disease Society (www.maculardisease.org)
- Fight for Sight: The British Eye Research Foundation (www.fightforsight.org)