

Lazy eye treatment times could be drastically reduced, new research shows

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Treatment times for amblyopia — more commonly known as 'lazy eye' — could be drastically reduced thanks to research carried out at The University of Nottingham.

Amblyopia is thought to affect up to 2.5 per cent of people and accounts for around 90 per cent of all children's eye appointments in the UK. Occlusion therapy — patching the normal eye for lengthy periods to 'train' the affected eye — is the main treatment for amblyopia. However, this method can be distressing to children, is unpopular with parents and can adversely effect educational development. This type of therapy has been used in various forms since 1743 and has long been considered to only be effective up until late childhood.

The new treatments developed in the Visual Neuroscience Group in the University's School of Psychology have not only reduced potential treatment times by an unprecedented amount, they have also proved that it is possible to treat amblyopia in adults. Early results suggest gains, that would have required around 120 hours of occlusion therapy to achieve, can be produced after just 10 hours.

Adult test subjects have undertaken challenging visual tasks under computer-controlled conditions. Academics hope that these promising results could be used to develop a child-friendly game that could treat amblyopia. There is also the potential to use these new treatments to supplement occlusion therapy.

The £60,000 project — A Study of Perceptual Learning Effects in Amblyopia — has been funded by the College of Optometrists. Amblyopia is a developmental problem in the brain, not the eye. The part of the brain dealing with vision from the affected eye develops abnormally as a result of atypical visual experience early in life. This results in markedly different levels of vision in each eye which cannot be remedied with spectacles.

As well as looking at potential treatments for the condition, the study examines the level of neural plasticity in the adult brain — the ability of a neural system to change with experience.

The work is being carried out by Andrew Astle, a PhD student at the University.

"The results so far show a drastic improvement on patching, and disprove the long-held belief that adults cannot be treated for this type of condition," Andrew said. "However, the study is not complete and we're still looking for subjects to take part in the tests."

Work set to start in spring 2009 at the University will build on Andrew's results, examining amblyopia in children and examining the functional and structural organisation of the visual cortex. This EU-wide study has been funded by a European Consortium FP7 grant to the tune of 2.6m Euro. Professor Paul McGraw and Dr Ben Webb in the Visual Neuroscience Group will look at the effects and treatment of amblyopia in children. Other European institutions, including the University of Florence, the Max Planck Institute for Neuroscience and University College London, will examine the condition from the molecular level to its behavioural impact on animal models.

It is thought that results from this study could be translated to other conditions where recovery is limited due to restricted neural plasticity —

including brain tumours, stroke, degenerative diseases and trauma.

Professor McGraw said "Andrew's results suggest that the adult amblyopic visual system retains a great deal more neural plasticity than previously thought. Harnessing this plasticity offers a new way of treating this common condition and opens the door to developing novel pharmacological and behavioural interventions for a range of neurological deficits."

Source: University of Nottingham

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