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From a machine that reads minds to glasses that cure dry eyes, the astonishing breakthroughs that will change lives in 2009

# JUST MIND GOGGLING!

**WE OFTEN report on amazing new developments that will transform people's lives — but in many cases it could be years before patients actually enjoy the benefits. Here ISLA WHITCROFT highlights some breakthroughs that will actually make a difference to patients in the coming year — from the more mundane to the truly life-saving.**

## EYE PROBLEMS

### POOR SIGHT

FOR people with long or short sight the only cure is laser treatment to reshape the cornea. The major risk during this is the patient moving, which causes blurred vision.

Now, Moorfields Eye Hospital in London has installed a machine that prevents this happening. The £250,000 dynamic automatic rotational tracking system, as it is known, is the first of its kind in the UK and works by tracking the patient's movement.

As Professor David Gartry, of Moorfields, explains: 'The machine uses that information to compensate if the patient moves. If the patient rotates or tilts their eye by more than ten degrees, during the 30-second laser procedure, the machine will stop. If it's less than ten degrees, the machine compensates.

'This is a vital advance because currently five to 10 per cent of patients who have laser treatment experience blurred vision. It means the laser hasn't treated all the areas it needs to because the patient has moved their eyes or tilted their head during the procedure.

'With the introduction of this machine, we have reached the holy grail of eye lasers. That is, all the possible risks factors — apart from the oddities of human biology, of course — have now been eliminated.'

*AVAILABLE: Now. You can receive laser treatment at Moorfields by contacting the hospital through their private patient website at www.moorfields-private.co.uk or by calling 020 7566 2803.*

### DRY EYE

A LACK of lubrication in the eye is a common and unpleasant condition. Around 20 per cent of the population over the age of 65 suffers from dry eye, as it is known.

The condition, where you don't produce enough lubricating tears, is age-related. It often affects menopausal women because of the reduced levels of the hormone which helps produce lubrication.

'We prescribe drops to treat it, but the eye is sensitive — drops are chemicals and people can react to them,' explains consultant ophthalmologist Dr Rob Fuller of The Royal Devon and Exeter Hospital.

The other option is to use a hot compress over the eyes. Tears are formed of three layers, one of which is oily. Like all oily substances, when heated, this layer melts, creating better lubrication, says Dr Fuller.

'But using a hot compress is not high-tech and not very convenient. During this time, patients can't see or move about and they have to keep refreshing the towel. I felt in the 21st century there was room for something a bit more user friendly.'

So Dr Fuller developed eye-warm-

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ing goggles that can be plugged in and used while watching TV or reading. They use the power of moist warm air to warm up the eyes.

The goggles gently warm the eye to a temperature of 40c — warm enough to increase lubrication, but not so hot that they create steam, so you can still see for the ten minutes you need to wear them.

*AVAILABLE: Blephasteam goggles, costing about £150, will be available from your optometrist, ophthalmologist or online through www.spectrum-thea.co.uk by the end of the year.*

## CANCER

THE major advance is in non-invasive ways of treating certain cancers, particularly inaccessible cancers considered inoperable and sometimes untreatable — even with radiotherapy or chemotherapy.

This year, such patients may benefit from a therapy directly targeting these tumours:

### LUNG, SPINE AND OTHER CANCERS

THE CyberKnife System is a robot that performs 'radiosurgery' using radiation to destroy tumours in a painless, non-surgical way.

By combining a robotic arm with image guidance from X-ray cameras, the CyberKnife System can treat tumours with pinpoint accuracy and therefore with larger doses of radiation and less damage to surrounding tissue.

The machine can treat, for example, early-stage lung cancer, spinal tumours and even areas which have already undergone irradiation that would not be treated a second time but where the tumour has returned.

Patients with lung cancer who have undergone Cyberknife have a survival rate of around 90per cent, compared with 30per cent with conventional treatment.

'Cyberknife has the potential to replace surgery as the first form of treatment for cancer,' says Dr Nick Plowman, director of clinical oncology at St Bartholomew's Hospital.

*AVAILABLE: Now, privately from the Harley Street Clinic from January. See www.harleystreetclinic.com or telephone 020 7935 7700. The clinic is currently in talks regarding an NHS/private partnership.*

### LIVER CANCER

SECONDARY liver cancers and some primary cancers are often considered inoperable because they are located deep inside the liver and are tiny and numerous.

Now these patients can be treated with intra-arterial chemotherapy. Here, microscopic beads loaded either with a high concentrate of a chemotherapy or a radiotherapy drug are pumped in via a catheter to the main blood supply to the liver.

The drug disperses into all the smaller blood vessels in the liver meaning it can reach the deepest and most inaccessible of tumours.

'Trials have shown it can extend life span by an extra year for those with previously untreatable secondary liver cancer,' says Professor Gaines, an interventional radiologist at the Sheffield Vascular Institute.

*AVAILABLE: The treatment is now available at large cancer centres, such as The Christie in Manchester, and Hammersmith Hospital in London, but this will extend to ten or more regional cancer centres by the end of the year. Patients can ask to be referred to a centre using the treatment.*

## HEART DISEASE

AS WITH cancer treatment, the major advance heart patients will benefit from this year is minimally invasive techniques.

Every year, 100,000 people in the UK have surgery to repair a leaking heart valve.

The operation carries a 20 per cent risk of complications, including stroke. At St Mary's Hospital, Paddington, are now introducing a technique to make those risks a thing of the past.

The key is the Hansen Sensei Robot, a robotic arm that can be used to carry out procedures with greater accuracy. It passes thin wires along veins and arteries, and the information this supplies is used to 'map' the blood vessels, helping work in more technically difficult areas.

'This means we can treat patients who ordinarily would be unable to face the rigours of current surgical techniques, such as the elderly or those weakened from chronic heart disease,' explains consultant cardiologist Dr Iqbal Malik.

'We are also introducing 'miniaturised aortic valve surgery. It is low risk, leaves no scarring and has an excellent recovery rate,' he adds.

*AVAILABLE: Two centres; St Mary's Hospital, Paddington, and Castle Hill Hospital in Hull are introducing the mitral valve technique. St Mary's Hospital Paddington will also accept referrals for miniaturised aortic valve replacement. Call 0207 722 0297 for more information.*

## BRAIN DAMAGE

PATIENTS who have been brain damaged and are unable to communicate could benefit from a ground-breaking communication system due to be available this year.

Developed by Dr Paul Gnanayuthan, a computer researcher at the University of Portsmouth, it uses the patient's brain waves, eye and muscle movements to power a cursor on a keyboard. This enables the patient to communicate what they are thinking using basic words.

It works by attaching probes on to a band worn around the head which reads the brain signals and feeds them into the computer.

Dr Gnanayuthan has worked with several brain-damaged patients with remarkable results.

'One young man hadn't communicated after receiving a severe head injury,' he says, 'Using the brain wave machine, he was able to tell me he was angry, upset and scared.

'My machine is practical, easy to transport and can be used by anyone with a little training. In 2009 I hope to expand that programme so that many more people can communicate with the world again.'

*AVAILABLE: There is currently one machine in use. For more information email Dr Gnanayuthan at paul.gnanayuthan@port.ac.uk*

## DIABETES

A DRUG that targets diabetes and helps patients lose weight at the same time could be this year's wonderpill. Liraglutide works by gauging glucose levels and stimulating the release of insulin to deal with the glucose only when levels are too high.

This is a huge step for diabetics as current drug therapies can overstimulate insulin production.

Liraglutide has also been found to curb appetite.

*AVAILABLE: Late 2009 on prescription.*

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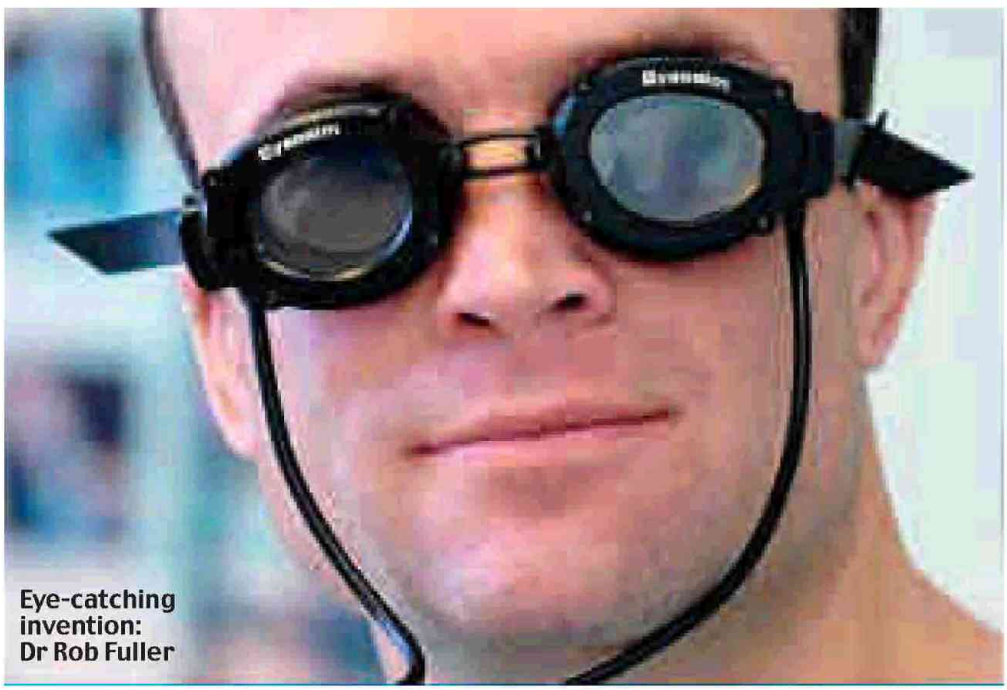
## CHRONIC PAIN

**WHETHER it's joint and muscular pain, backache or the aches and pains associated with ageing, if there is no surgical solution patients have to rely on long-term pain relief.**
**Chronic pain is usually treated with a group of painkillers called non-steroidal anti-inflammatories, with diclofenac one of the most popular treatments.**
**Now, a spray-on form of pain relief, Mobigel Paineze, containing diclofenac at 4 per cent strength makes it the strongest form of diclofenac available without prescription.**
**Clinical trials have shown the gel form penetrated to the area of pain 20 times faster than other similar products.**
*AVAILABLE: Over the counter at pharmacists from February.*



**Eye-catching invention: Dr Rob Fuller**

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# WALK THIS WAY FOR EVERLASTING ARTIFICIAL HIPS

THIS year, patients can benefit from new longer-lasting hip replacements. Current replacement joints consist of a metal head working inside a polyethylene hip.

However, the polyethylene is worn down by the metal so most patients need a replacement of the artificial joint after ten to 15 years.

'The search has been on for years to find a harder-wearing substance to use for socket replacement,' says Dr Ahmed Shair, director of the Orthopaedic and Spine Specialist Hospital in Peterborough.

'This year, we will see the introduction of what we call "highly cross-linked" polyethylene hip replacements. The polyethylene is treated with a process involving radiation and high temperatures to provide stronger bonding between the particles before being molded into a hip socket.

'Trials proved that compared with current hip replacements, the new hips showed 70 to 90 per cent less wear and tear over the first two years of use. It is too early to say whether we have achieved a replacement hip that will last for life, but it is a big step in that direction.'

*AVAILABLE: Being introduced throughout 2009. Ask your orthopaedic consultant if your NHS trust is using the new hip replacement.*