

Operating Microscope

Although operations have been performed on the brain for hundreds of years, it remained a small niche on the fringe of medicine for a long time due to the inability to adequately visualise the fine detail necessary to make surgery reliable and safe. Modern neurosurgery was therefore only born in the 1960's when early pioneers introduced the operating microscope to the speciality. For the first time surgeons were able to visualise structures in unprecedented detail. Not only did microscopes provide magnification but enormously enhanced lighting in the narrow dark spaces of the brain.

Since that time, microscope technology has relentlessly marched on continuously improving the optics, lighting and manoeuvrability of systems. However they have remained limited in that they can only see what the human eye can see. The next revolution in neurosurgery has been the introduction of new fluorescent dyes to highlight structures otherwise indistinguishable to the human eye. These techniques require a new generation of microscopes which Smile for Wessex has raised funds for putting the Wessex Neurological Centre at the leading edge of neurosurgery.

The microscope has led to massive improvement in the accuracy and safety of surgery for two large groups of patients. For patients with brain tumours, surgery is notoriously difficult due to the similarity in appearance of brain tumours and healthy brain. It is therefore extremely difficult for the surgeon to decide whether they are removing enough to eradicate the tumour, or too much risking removing normal brain and causing injury to the patient. The new microscope addresses this problem. Patients are given a dye intravenously before surgery begins which collects in the tumour cells. This dye fluoresces and can be clearly seen using the special filters on the microscope and brightly lights up the areas that need to be removed distinguishing them from the surrounding healthy brain.

For patients with brain aneurysms the problem surgeons face is that while the traditional microscope allows them to see the outside of blood vessels in incredible detail, it does not tell them what is happening inside. Thus they have no idea whether a blood vessel is blocked or blood is flowing inside it. The difference for a patient is between a full recovery or a stroke. The new microscope allows us to visualise the dye injected into the blood and so see it flow through the vessels telling the surgeon whether anything is needed to establish better flow.

Thus since its introduction the microscope has benefitted hundreds of patients with brain tumours and aneurysms by more accurately removing their tumours and preventing strokes.