



Wellcome Trust Translational Award for Warwick Design Surgical Instrument

Capsularhexis Tool

In the field of ophthalmic surgery there is no room for error. Complications harm the patient and cost the NHS. The task of removing cataracts and replacing them with artificial lenses is one of the most common operations carried out world-wide. Nevertheless it requires a very high level of skill from the surgeon to make the opening (continuous curvilinear capsularhexis) in the anterior capsule that holds the lens. This is particularly demanding in paediatric patients.

Mr John Stokes, a top UK ophthalmic consultant at Nottingham NHS Trust, conceived a device to reduce the necessary skill level and failure rate of this procedure. The NHS Innovation East Midlands approached Warwick Design with the challenge of turning the idea into a practical instrument.

Initial concepts were developed employing micro manufacturing techniques in various high tech materials. Warwick Design used porcine eyes to develop the device to working model state.

The potential for this device has been recognised by the Wellcome Trust who are providing £300 000 of funding after a very rigorous evaluation process.

Warwick Design's long experience in developing high tech products will be put to good use in resolving the many challenges that lie ahead and turn an idea into a market leading product.



Description:
 Whilst cataract surgery is one of the most commonly performed operations in the world, the majority of complications occur in the opening of the anterior lens, a central circular opening (capsulorrhexis). This most challenging procedure is performed using a needle or forceps to literally "tear" a circle in the capsule. This crude method can produce irregular, inaccurate openings and errant tears run down hill, out of control. Paediatric cataract surgery is often significantly more difficult due to the elasticity of the lens. The Wellcome Trust is supporting the project and has awarded a Translational award of almost £300K. This investment will develop the novel, single use, ophthalmic cutting device which creates an unrivaled precise and predictable capsulorrhexis. This tool will make the procedure quicker and reducing the skill and experience necessary in performing the procedure.

Benefits:
 The team's main objectives were to focus on the following:

Patient and Surgeon Benefit: Improved Accuracy and Success Rate
 Due to the challenge posed by performing the capsulorrhexis in infants and young children, the resultant size of the capsulorrhexis may be highly variable. Complications such as peripheral extension of the radial tear occur more commonly in paediatric surgery. This may result in difficulties implanting an intraocular lens due to lack of capsular support, necessitating secondary lens implantation at a later date. In addition small capsulotomies can result in capsular phimosis, capsular fibrosis and capsular contraction syndrome. Excessive manipulations during the procedure can cause iris damage, prolapse or iridodialysis. This project will further develop a tool with which to accurately perform cataract surgery in both adults and children, reducing the potential for such errors. Whilst the tool does not "deskill" the procedure, it makes the most complicated and yet most important part of the surgery a great deal easier, improving the success rate, especially in children and reduce the incidence of secondary complications.

