Continence Project

Development of a Novel Faecal Incontinence Device

Funded by School of Mechanical Engineering University of Leeds

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Description of Research

Faecal incontinence (FI) is a condition which affects 6% of women <40 years of age and 15% of those who are older. Among men, FI is estimated at around 6-10% with the rate increasing with age. Currently there are conservative treatments for those patients with minor symptoms and surgical procedures for patients in more severe cases. However there is significant patient demand for a successful end-of-line treatment solution. Previous studies addressing end-of-line treatments include invasive surgical procedures and artificial anal sphincters, all of which have failed due to infection rates and tissue necrosis. This research aims to design a novel and active implantable device to control the severity of incontinence in patients requiring interventional treatment.

Numerous studies have attempted to develop an artificial anal sphincter device to mimic the natural function of the sphincter complex, such devices consist of a cuff which fits around the anal sphincters to occlude the canal and prevent the leakage of stool. The problems reported from this approach are that the large pressures applied to the tissue reduce blood supply and lead to tissue death and device erosion.

Park's post-anal repair, 1975, was a radical treatment approach which aimed to increase the anorectal angle. This was achieved by fixing sutures adjacent to the puborectalis muscle to provide additional support and assist its function. While success was reported, the procedure ultimately failed due to the limited materials available at the time. Using modern materials and technology, it is thought that a solution to the treatment of severe FI could be an artificial device to replicate the function of the puborectalis muscle. The novel device would apply pressure to the proximal anorectum, thus enhancing the anorectal angle and increasing resistance to faecal content of the bowel to reduce the frequency and severity of incontinence episodes.

Methodologies

For preliminary investigation, a test rig will be used to investigate the effect of varying the anorectal angle on faecal leakage. The rig models the pelvis and selected pelvic organs and muscles which are fundamental to the faecal excretory system. In order to create a model which closely represents the biological system, mechanical properties of the model constituents are to match the properties of the biological counterparts they imitate.

Key Results

No key results yet.

Links to Published Paper

No published papers yet.