

Clinical Interview with Damian Tolan

Date: 30/09/2015 Time: 15:00-16:00 Present: , P. Culmer, W. Stokes, S. King

Damian Tolan was visited at St. James' University Hospital and an hour was spent discussing the clinical needs in radiology and faecal incontinence (FI).

Impaired pelvic floor function, effect on FI and treatment

Discussions were based around a test rig for the development of a puborectalis assistive FI device in relation to the normal biological system. In addition, the patient criteria for such a device were considered.

Background

- In patients whom experiences a lot of rectal descent, the pelvic floor is generally very poor
- Pelvic floor tone usually weakens with age however various factors can also cause a weak pelvic floor (e.g. collagen degenerative disorder etc.)
- Pelvic floor meshes generally fail due to the material not being flexible and compliant

Overview of imaging methods

There was discussion as to how closely the medium used to simulate faecal matter should mimic normal faeces.

- For dynamic MRI, an ultrasound jelly is used as the imaging medium
 - Dynamic MRI used for prolapse etc.
 - Jelly is dissimilar to faeces but allows imaging of rectal descent etc.
- For CT imaging, barium contrast is used
 - Damian uses non-viscous mixture of Ready Brek and injects using a syringe

Biomechanical study on intra-rectal pressure

Understanding the intra-rectal pressure under various conditions (rest/squeeze/strain) is crucial for the development of an active and adaptive device.

Upon defecation, intrinsic contraction of the rectum increases pressure, in addition to abdominal pressure.

To simulate this system in vitro, the rectal pressure and pelvic floor morphology upon defecation should be investigated:

- Carry out a series of tests which measure this pressure
 - In females via a pressure probe in the vagina (trans-vaginal pressure measurement)
- Pelvic floor morphology should be observed
 - Take measurements as they void
 - Strain and relaxed
 - During study, use MRI data to create MRI criteria for FI device
 - Determination of 3D measurements
 - What is normal?

Technical requirements

- FI device might be best suited to patients with a good pelvic floor
 - Good for younger patients
 - Generally patients with sphincter damage are incontinent but still have pelvic floor tone
- Need a female test rig model
 - Female and male pelvic anatomy are very different
 - Female target market
- Another project could look at 3D modelling compliance of the pelvic floor
 - Development of a compliant mesh for patients with impaired pelvic floors

Interesting papers by Dominic Weishaupt who is a pelvic floor specialist at the Institute of Radiology and Nuclear Medicine in Zurich