

Clinical Interview with David Roberts

Date: 26/02/2015 **Present:** D Roberts, D Jayne, I Eltilib, P Culmer, W Stokes, L Valdez

An hour was spent looking at dissected cadavers with anatomist David Roberts to explore and discuss the possibilities for implantation of an incontinence device.

During the visit, the following aspects of the device were discussed:

- Design of a mechanism to apply a load to the rectum
- Site for fixation to boney tissue
- Method of implantation

Device Conception

Puborectalis Sling

Upon examination of cadavers, it became apparent that a 'sling' device which mimics and reinforces the geometry and function of the puborectalis muscle would impose significant challenges for implantation. Such a device would need to attach to the pubic bone. High concentrations of nerves located in this region risk being damaged during implantation. Another concern was accessibility to the implant site which might involve a complex and invasive surgical procedure.

New Conception

In order to get around complications associated with implantation of the 'sling' design, it was suggested that a device which could push on the rectum posteriorly would be better suited. Such a device could fixate to the coccyx and occupy the narrow section of perineal body between coccyx and rectum. This space is easily accessible from below by tunnelling through the connective tissue between external anal sphincter and the coccyx. Figure 1 shows a simplified diagram demonstrating the location of the device with respect to anatomical landmarks.

Objectives

From the visit, the following tasks should be carried out in pursuit of the new concept:

- Meeting with Damien to image MRI scans of the sagittal plane, this would allow determination of dimensional parameters associated with the device's function
- 3D modelling of the biological rectum and perineal body to allow visualisation of the perineal body during defecation and understanding of its interaction with the rectum
- Development of an in vitro rig to determine the pressures required of the device to preserve continence
- Review of suitable soft actuation methods

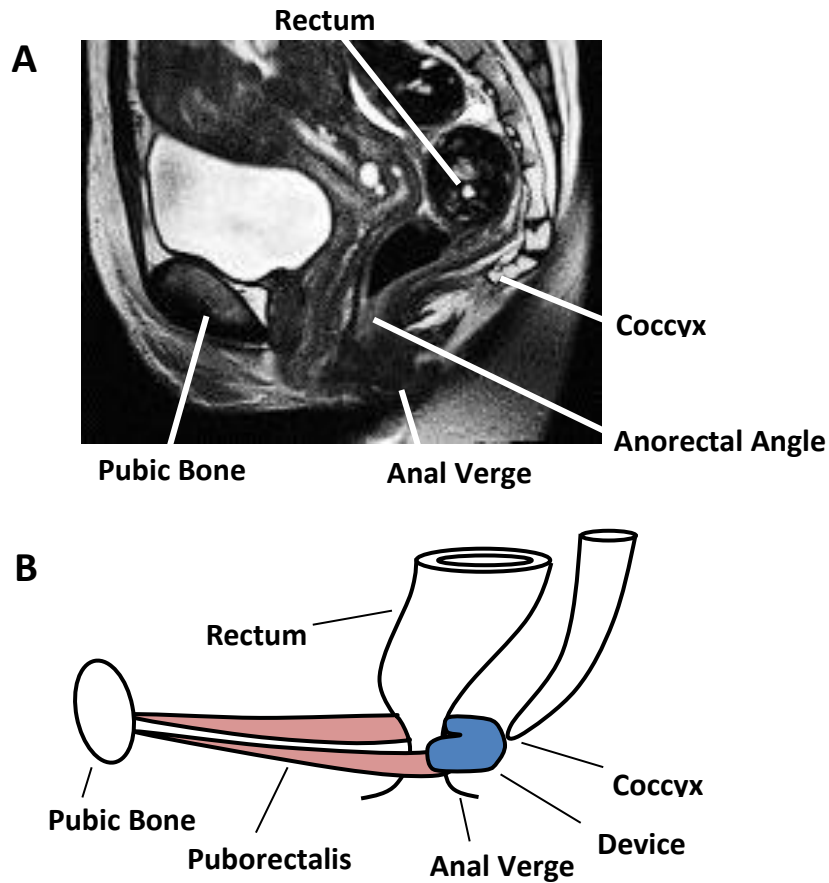


Figure 1: A, MRI image showing the pelvis in the sagittal plane [1]. B, diagram showing the location of the concept device with respect to anatomical landmarks.

1. Moan, R. *Swiss give new advice on MRI technique for female pelvis*. 2012 [cited 2015 2nd March]. Available from: <http://www.auntminnieurope.com/index.aspx?sec=ser&sub=def&pag=dis&ItemID=607221>