

Clinical Interview with David Jayne

Date: 18/12/2014 **Time:** 14:00-15:00 **Present:** A. Neville, M. Bryant, W. Stokes, S. King

David Jayne was visited at St. James' University Hospital and an hour was spent discussing the clinical needs in colorectal surgery and faecal incontinence (FI).

Background

There are several artificial sphincters already on the market for the treatment of faecal incontinence, including active (AMS Artificial Sphincter) and passive (FENIX) devices. There has also been a lot of work done on stimulated and unstimulated graciloplasty, in which a muscle from the inner thigh is transposed around the anal canal. All these devices and innovations have their limitations and therefore entirely new approach to continence restoration is needed.

Pelvic Floor and Puborectalis Reinforcement or Augmentation

In almost all cases FI is accompanied by an underlying lack of support from the pelvic floor. In conjunction, patients with weak pelvic floors tend to have poor Puborectalis function, which is crucial for maintaining continence. The diagram in figure 1 shows the Puborectalis muscle and its influence on the anorectum.

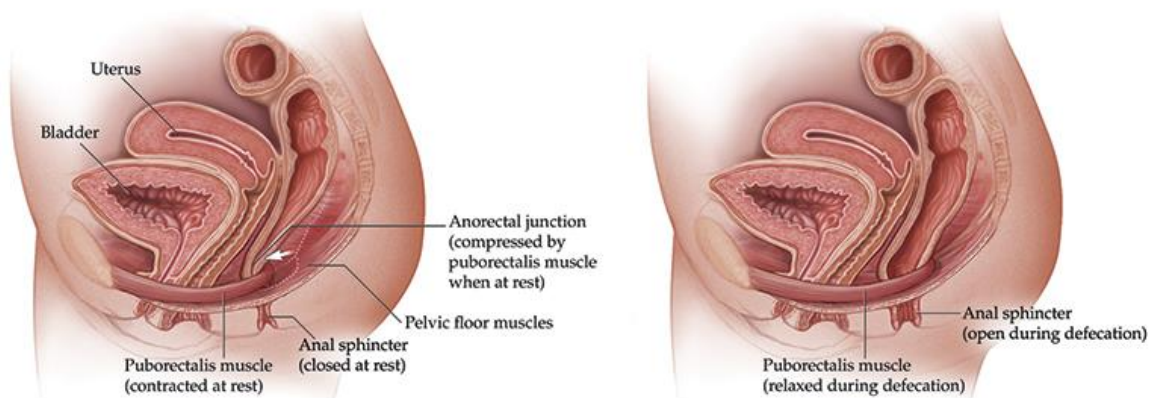


Figure 1: Puborectalis muscle at rest and during defecation [1].

[1] Mayo Foundation for Medical Education and Research, *Treating patients with pelvic floor dysfunction*. 2014. [Date accessed: 19th December 2014]. Available from: <http://www.mayoclinic.org/medical-professionals/clinical-updates/general-medical/treating-patients-with-pelvic-floor-dysfunction>

History

A number of operations have been proposed in the past to restore the function and dynamics of the puborectalis muscle. One procedure was known as the Parks postanal repair. Devised in 1975 the procedure used sutures to restore the anorectal angle. Despite short-term success, the benefits gained were transient as the repair failed to maintain the acute anorectal angle. This was probably due to the limited properties of materials available, inadequate modification to the anorectal angle and poor patient cooperation with post-operative care [2].

Opportunities for Future Work

There is scope for development of a medical device which modifies the Puborectalis or pelvic floor function. These procedures would be appropriate for a large proportion of patients who experience FI and have the ability to 'push' but may not be suitable for the minority with the most extreme cases.

The opportunity to obtain an electric stimulator was discussed. This could be used to investigate its effects on piezoelectric materials, which may give an indication of how it would augment human muscle.

Puborectalis

1. Use of a more suitable artificial material and fixation method (than Parks postanal procedure) to tighten the Puborectalis muscle against the anorectal junction.
2. Puborectalis muscle fixation to the pubic bone – potential for suitable fixation of a suture or sling.
3. Reinforcement of the whole muscle or just a section.
4. Passive material would require 'pushing' from the patient, active material could be actuated to relax during defecation.

Pelvic Floor

1. Electric mesh which could stimulate the pelvic floor to restore tone.
2. Potential for stimulation of innervation to the pelvic floor (similar to SNS).

[2] Parks, A. (1975). "Royal Society of Medicine, Section of Proctology; Meeting 27 November 1974. President's Address. Anorectal incontinence." Proceedings of the Royal Society of Medicine **68**(11): 681.