

Summary

“For most of the researchers the challenge always lies behind converting the theories into applicable objectives, in this study we did our effort to grasp this target.”

Pelvic floor dysfunction (PFD) has broad spectrum of clinical conditions, divided into anterior, middle and posterior compartments. The latter housing the anorectum, hence the name Anorectal dysfunctions which in turn divided into 2 categories 1) Anal incontinence, 2) Constipation.

Anorectal dysfunctions may affect both males and females with subsequent social, psychological & economical impactions. They have overlap pathologies & different underlying causes make their evaluation a difficult task.

The aims of this study were to answer the following questions:

- A)** Do we need to revise our findings, which based only on maximum straining phase in anorectal dysfunctions?
- B)** Is there any difference in the supportive measurements between maximum straining & evacuation phase yielding a reason for obtaining baseline measurements for evacuation phase?
- C)** Does the evacuation phase can elicit the anal sphincter thinning in simple anal diseases (anal fissure, hemorrhoids and perianal fistula)?

Embryological background and general anatomical considerations of pelvic floor muscles & anal canal sphincter complex including normal MRI anatomy (static & dynamic) were described, followed by reviewing the literature on normal physiology of defecation & continence. Then anorectal dysfunctions with highlight on clinical assessment, neurophysiological tests, and radiological investigations, followed by MRI assessment (static, dynamic & defecography).

We studied four groups: control (5 males & 5 females) mean age 34.20 ± 8.80 yrs, AI (10 males & 10 females) mean age 45.67 ± 14.48 yrs, OD (6 males & 6 females) mean age 41.00 ± 9.38 yrs and simple anal diseases (10 cases). All the cases were referred from the surgery clinic for further assessment, while the control group subjects were recruited from infertility clinic. All participants underwent the same preparation. This include intra rectal gel, the same MRI technique and the evaluation of the images was done in the workstation. For the referred clinicians the reports were based on *Elsayed R (2013)* report.

In the static MR images, the anal sphincter complex and pelvic floor muscles were evaluated for any of the following: muscle tear, or scarring, detachment and/or thinning.

All the control had normal static MRI findings. While the AI cases had anal sphincter injury. The most frequent type of injury was scarring. In the OD group no anal sphincter injury was detected except in one case

All subjects in the three groups (cases & control) underwent dynamic MRI examination including evacuation. All of them were evaluated by the

following criteria: A) supportive measurements (H&M- Lines, LPA, ILca & WLH) B) pathological findings: anorectal junction descent, rectocele (presence & size), in addition to other structural abnormalities. These criteria were evaluated in both phases (maximum straining & evacuation); except (ILca & WLH) were only evaluated in the maximum straining phase. We found statistical significant difference ($p < 0.01$) between the measurements in maximum straining & evacuation phase between all groups (except H-line) and within each group; however in paired comparison we found the control Vs. AI showed no significant difference except in LPA opposite to OD which showed high significant difference.

We found the rectocele merely a female pathology, and the size increased during evacuation phase. The evacuation phase was able to elicit many functional & structural abnormalities (intussusception, rectal prolapse, peritoneocele, rectocele & sigmoidocele).

We found in the simple anal disease group reduction of the full thickness of the anal sphincter during evacuation more than control did, this was in harmony with the hybrid law by Farag A. We believed further assessment and researching would give insight into this theory.

The new applications and modifications in this study included the following:

- We increased the amount of intrarectal gel for control & OD group from 80-100ml to 140ml-180ml to facilitate the sensation of rectal filling and ease the anal canal opening, this simple modification was able to minimize the time & the failed evacuation attempts.

- We added new planes to the sagittal evacuation, axial & coronal oblique, which we believe it will be a promising technique.
- We added the males in all groups, to our knowledge they haven't been studied in a dedicated research for MRI evaluated their anorectal dysfunction.
- We studied the hybrid law in the simple anal diseases.