

Summary

The Musculo-Elastic Theory of anorectal function and dysfunction in the female

Part 1: Summary. Non surgical proofs of the Theory

PETER PETROS (*) - MICHAEL SWASH (**)

(*) Royal Perth Hospital, University of Western Australia

(**) Dept of Neurology, The Royal London Hospital, London, UK

The first paper sets out in detail the anatomical basis of the musculoelastic theory “*Anorectal dysfunction in the female is mainly caused by lax suspensory ligaments inactivating anorectal muscle forces*”. Hypotheses are presented for anorectal function and dysfunction, and the role of specific muscles, ligaments, and fascial structures in this process. A diagnostic algorithm is presented which pictorially represents causative relationships between symptoms and specific anatomical structures.

The aim of the experimental studies 1-7 was to challenge the various elements of the theory, in particular, the hypothesized role of the suspensory ligaments and muscle forces, for truth or falsity.

Experimental study No. 1. Video X-ray examinations challenge the musculoelastic theory’s predictions of four muscle vectors acting against suspensory ligaments during anorectal closure and three during defecation. These were successfully demonstrated.

Experimental study No. 2 is a clinical case report which demonstrates the importance of the pubourethral ligament in fecal continence during stress. Unilateral anchoring of the midurethral point of the anterior vaginal wall by forceps in an outpatient setting, mimicking the pull of this ligament/muscle system repeatedly controlled expulsion of a bolus during coughing.

Experimental study No. 3 used the vagino-levator reflex, in which vaginal stretching induces levator plate contraction, to test the Musculoelastic Theory’s prediction that levator plate contraction would close the rectum, and so increase intra-anal pressure. The intra-anal pressure increased, but to a lesser extent in patients with FI, illustrating the functional deficit in that disorder.

Experimental study No. 4 demonstrated equivalent pressure rise during squeezing, which interrupts defecation, and in straining, which accelerates defecation. The results indicate that raised intra-abdominal pressure per se is unlikely to play a role in anorectal closure.

Experimental study No. 5 challenged the incompetent internal anal sphincter theory of fecal incontinence. Normal morphology of the internal anal sphincter (IAS) was demonstrated in 61% of 80 consecutive patients who had normal EAS. This indicates that IAS damage per se is unlikely to be a major cause of FI.

Experimental study No. 6 is a case report of pre and post-operative ultrasound studies. These reinforce the Musculoelastic Theory’s prediction that the anorectal angle is a resultant of balanced contraction between the puborectalis muscle (PRM) and the posterior levator muscles.

Experimental study No. 7. Work by Associate Professor HP Dietz presented at ASUM in Auckland NZ, is quoted. Three-dimensional ultrasound studies in 403 patients demonstrated no relationship between the presence of even bilateral puborectalis muscle avulsion and fecal incontinence, and only a weak relationship with flatus incontinence. These findings are consistent with the Theory’s hypothesis: the role of puborectalis is not primarily anorectal closure. Its role is to stabilize the anorectum for closure by backward/downward stretching of the rectum.

Conclusion. These studies validate the role of the four directional muscle movements, and the importance of the pubourethral and uterosacral suspensory ligaments in the mechanisms of continence and defecation.

Key words: Musculoelastic theory; Integral Theory; Fecal incontinence; Ligaments; Connective tissue; Muscle damage.