

Fecal Incontinence in Women and Its Reconstructive Surgery

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ABSTRACT

Fecal continence (FI) depends on a closed and empty anal canal, the function of which is influenced by one inherent and one acquired factors. The inherent factor is the presence of an intact healthy internal anal sphincter (IAS). The acquired factor is gained by toilet training, keeping high sympathetic tone at the IAS causing its continuous contraction and keeping the anal canal empty and closed.

The IAS is a collagen-muscle tissue cylinder that surrounds the anal canal and is surrounded in its lower part by the external anal sphincter (EAS). Medical imaging (MRI and 3DUS) shows lacerations in the collagen chassis of the IAS and an open anal canal in women with FI.

Childbirth Trauma (CBT) causes seen lacerations in the perineum and non-visible trauma in the collagen chassis of the vagina and the intimately lying IAS leading to posterior vaginal wall prolapse and FI.

In this paper we introduce a new concept of defecation, fecal continence and the importance of the IAS in maintaining fecal continence. Mending the torn collagen chassis of the IAS is the corner stone of re-gaining fecal continence. In addition we describe a novel reconstructive operation for the repair of fourth degree perineal tear where we correct FI and correct the torn layers in consecutive anatomical order. The torn collagen chassis of the IAS is exposed and mended by interrupted sutures. The vaginal flaps are overlapped and mended over the mended IAS. The two levator ani muscles are approximated and the perineum is repaired. Traditionally, the treatment of complete perineal tears is achieved by repairing the EAS either end-to-end or by overlapping the two ends of the EAS which often results in failure to gain fecal continence.

INTRODUCTION

Fecal incontinence (FI) is failure to control the passage of stools and/or flatus. It is quite common in women especially seen in those women near and/or after menopause who had vaginal deliveries. Childbirth trauma causes injuries to the collagen chassis of the internal anal sphincter (IAS). Control of the passage of feces and/or flatus can only be achieved by keeping the anal canal empty and closed all the time until there is a need and/or a desire to evacuate the rectum at suitable social circumstances [1-4].

The internal anal sphincter (IAS) [4-7] is a collagen-muscle tissue cylinder that surrounds the anal canal and is surrounded in its lower part with the external anal sphincter (EAS). The collagen is the strongest soft tissue in the body, and the muscle is plain muscle fibers that lie on top and intermingle with the collagen fibers in its mid-section. The muscle has its nerve supply from the thoraco-lumbar sympathetic nerve plexus (T10-L2) through the superior then the inferior hypogastric nerves. Toilet training leads to high sympathetic nerve tension at the IAS, causing its sustained

contraction all the time closing the anal canal until there is a need and/or a desire to pass flatus and/or feces at suitable social circumstances.

After toilet training on desire and/or need to evacuate the rectum at suitable social circumstances, controlled by healthy alert central nervous system (CNS) the person will inhibit the acquired high sympathetic tone at the IAS thus relaxing it and opening the anal canal either for a moment to

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pass flatus or for a longer time to expel stools. Then he/she relaxes the EAS which is a voluntary muscle, and also relaxing the levator ani muscles straightening the angle between the rectum and the anal canal to allow easy expulsion of the gut contents. There will be also voluntary contractions of the diaphragm and the abdominal muscles, increasing the abdominal pressure, helping in expelling all the rectal contents. After expelling the gut contents the EAS, a voluntary skeletal muscle, contracts sequentially its three parts: the deep, then the superficial and the subcutaneous parts to ensure leaving the anal canal empty and closed.

FECAL INCONTINENCE (FI)

Fecal incontinence is the sequel of failure of one of the above cited functions. Failure of toilet training leaves the person in the first stage of defecation. Failure of the CNS leads to transient FI as in temporary failure e.g. severe fear. Permanent failure e.g. stroke, multiple sclerosis (MS), DLE, leads to long standing FI.

A very common cause of FI in women is CBT. CBT leads to visible perineal lacerations and more common non-visible lacerations in the collagen chassis of the IAS and the posterior vaginal wall leading to vaginal wall prolapse and FI. The damage to the collagen chassis of the IAS not the lacerated EAS is the main cause of FI.

RECONSTRUCTIVE SURGERY [8,9]

In cases of FI and posterior vaginal wall prolapse, we correct the FI and the lacerated prolapsed posterior vaginal wall. We use hydro-dissection injecting 1/200,000 adrenaline on normal saline sub-vaginally and in the perineum. We expose the torn collagen chassis of the IAS by separating the torn collagen chassis of the IAS clear from the posterior vaginal wall, the lacerations in the anterior wall of the IAS will appear. Start mending the torn collagen chassis of the IAS using slowly absorbed suture material (vicryl number one zero) by simple interrupted stitches; this may take 4-6 simple stitches. Approximate the two-levator ani muscles, using number one slowly absorbed suture material, leave the thread on pairs of artery forceps untied until later after overlapping the two longitudinal flaps of the posterior vaginal wall; two stitches to approximate the levators may be enough. Strengthen the posterior vaginal wall by overlapping the two longitudinal vaginal flaps; also, we add extra support to the mended IAS, correct the posterior vaginal wall prolapse and narrow the patulous vagina. We approximate the two levator ani muscles by tying the threads by surgical knots. Finish by repairing the perineum.

Fecal incontinence (FI) following complete perineal tear is corrected by this new reconstructive operation: Reconstruction is done by five main steps: 1-Repair of the IAS, 2-Repair of rectal mucosa, 3-Repair of vaginal mucosa by overlapping the two vaginal flaps, 4-Repair of EAS, 5-Repair of the perineum.

DISCUSSION

Anybody action is a nerve-muscle action controlled by an alert healthy nervous system. Fecal continence depends on a closed and empty anal canal created by two factors: one is an inherent factor and the other is acquired. The inherent factor is the presence of a healthy intact IAS which is a collagen-muscle tissue cylinder that surrounds the anal canal and is surrounded in its lower part with the EAS. The acquired factor is gaining (by toilet training) high sympathetic tone at the IAS keeping it contracted all the time until there is a desire and/or a need to evacuate under suitable social circumstances. This is a nerve-muscle action, nor-epinephrine (a neuro-transmitter of alpha-sympathetic nerves) acts on receptors on the plain muscle fibers of the IAS keeping it contracted all the time and thus the anal canal closed. FI can be due to neurological or muscular failure. The neurological failure can be transient (sympathetic failure), e.g. severe fear or getting drunk; or permanent (damage of CNS), e.g. stroke, MS. More commonly, the cause of FI is lacerations in the collagen chassis of the IAS which is the result of CBT. The IAS is intimately related to the posterior vaginal wall which is subjected to significant (sometimes rapid) stretching during vaginal delivery, with subsequent invisible lacerations in the collagen chassis of both the posterior vaginal wall and the IAS. CBT causes lacerations in the collagen chassis of the posterior vaginal wall leads to posterior vaginal wall prolapse. The same trauma causes lacerations of the intimately lying collagen chassis of the IAS leading to FI. The lacerated collagen chassis of both the posterior vaginal wall and the IAS further lose more strength and become weaker with decrease of estrogen level after menopause, as the vitality of the pelvic tissues are hormone dependent.

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