Surgical Management of Fecal Incontinence In Children

ESSAY

Submitted for Partial Fulfilment of the Master Degree in (General Surgery)

By

AHMED HASSAN MOHAMED ZAETOON

M.B.,B.Ch. (Zagazig University)

Supervisors

Prof. Dr.

IBRAHIM EL-SAYED BASSIOUNY

Professor of Pediatric Surgery
Faculty of Medicine
Ain Shams University

Dr.

ALAA AHMED FAYEZ HAMZA

Lecturer of Pediatric Surgery
Faculty of Medicine
Ain Shams University

Dr.

TAREK AHMED HASSAN

Lecturer of Pediatric Surgery
Faculty of Medicine
Ain Shams University

Department of Surgery
Faculty of Medicine
Ain Shams University

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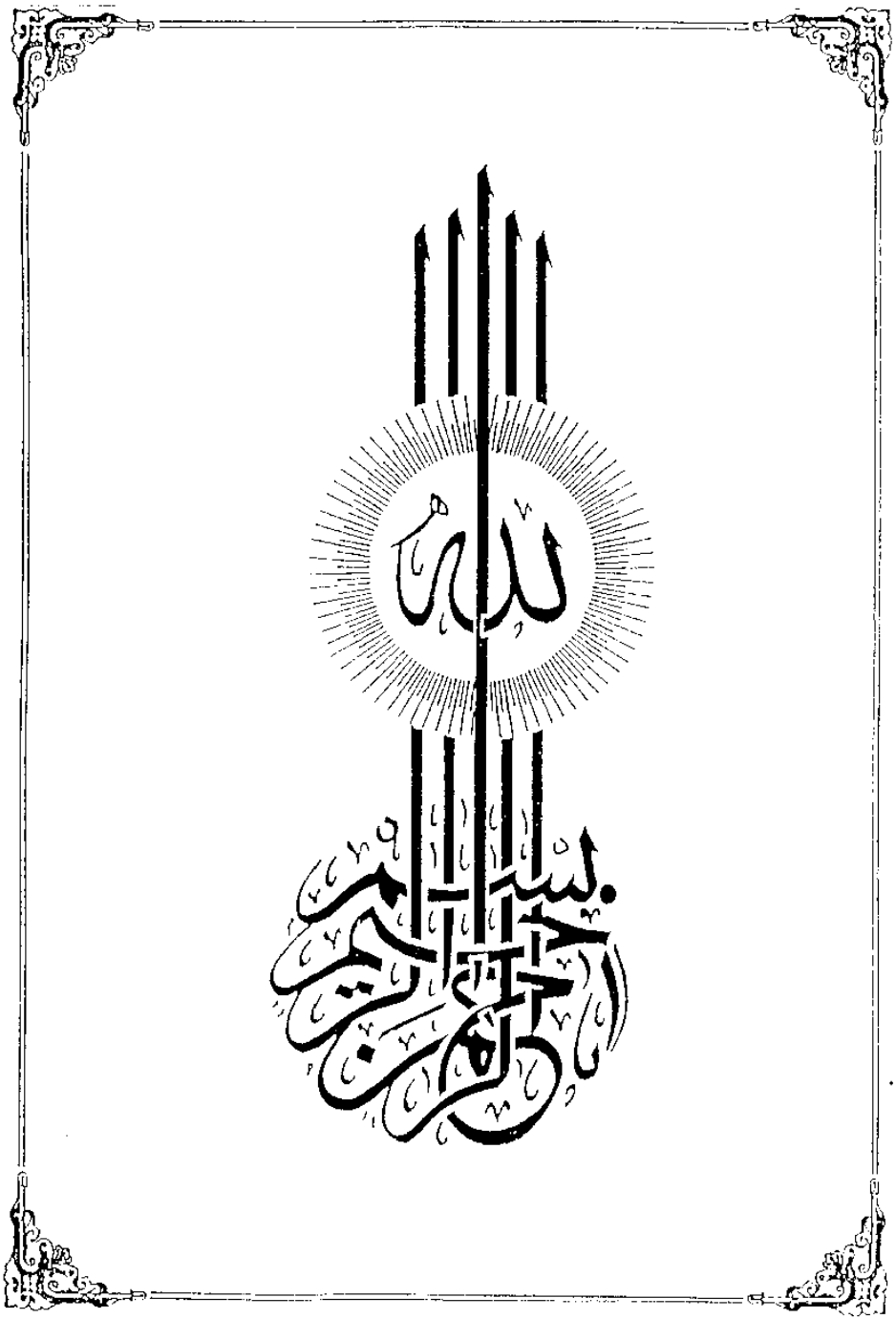

INTRODUCTION
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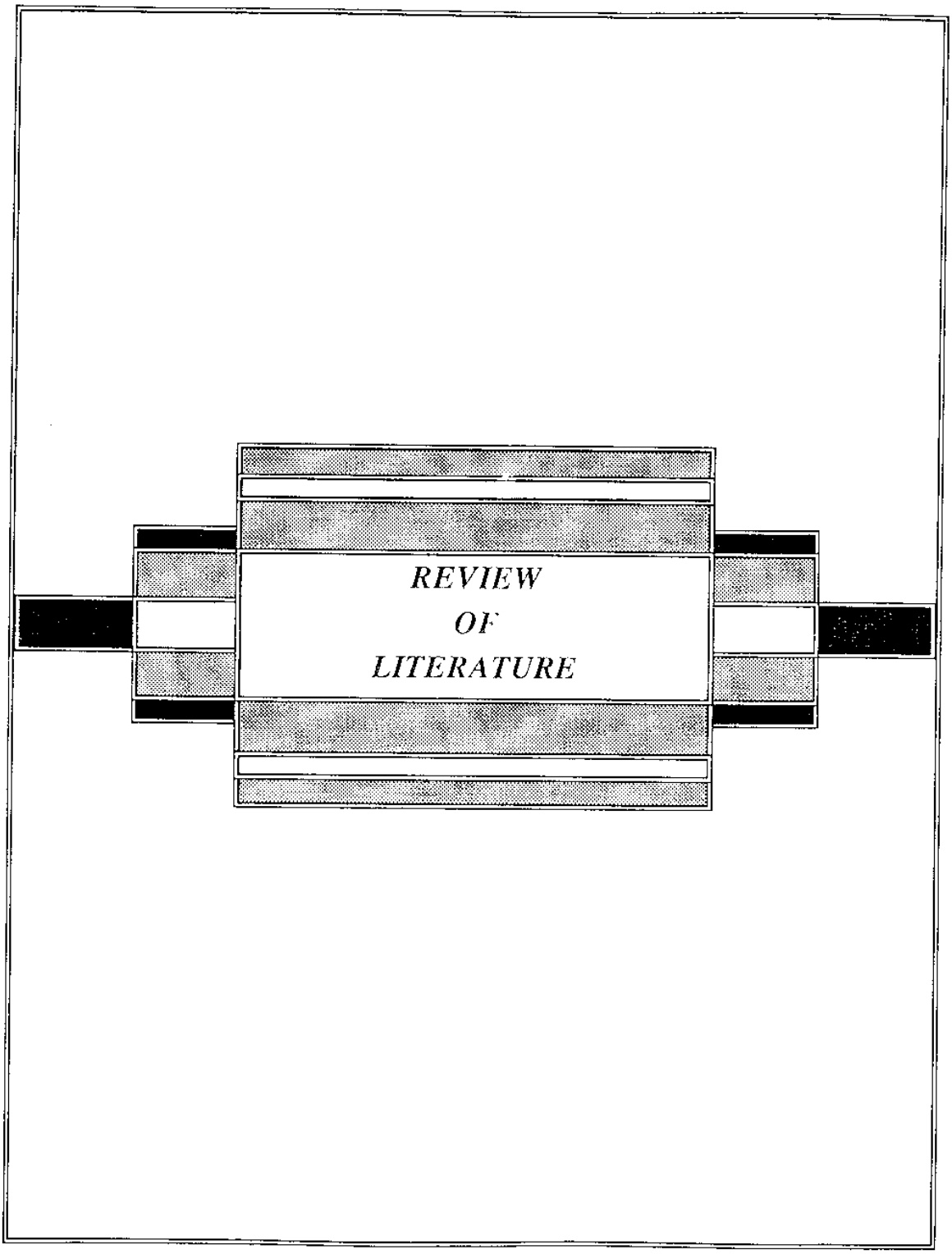


REVIEW OF LITERATURE

PHYSIOLOGY OF DEFECATION

Most of the time the rectum is empty of feces. This results partly from the fact that a weak functional sphincter exists approximately 20 cm. From the anus at the junction between the sigmoid and the rectum. However, when a mass movement forces feces into the rectum the process of defecation is normally initiated, including reflex contraction of the rectum and relaxation of the anal sphincters.

Continual dribble of fecal matter through the anus is prevented by:

(1) Tonic constriction of the internal anal sphincter which is a continuation

of circular smooth muscle of the rectum.

(2) external anal sphincer that is striated voluntary muscle that surrounds

and lies slightly distal to the internal sphincter and controlled by somatic nervous system **(Donald et al.,1987).**

Ordinary defecation results from the defecation reflex, which can be described as follows: when the feces enter the rectum, distensition of the rectal wall initiates afferent signals that spread through the myenteric plexus to initiate peristaltic waves in the descending colon, sigmiod and rectum, forcing feces toward the anus.

As the peristaltic wave approaches the anus, the internal anal sphincter is inhibited by the usuall phenomenon of "receptive relaxation" and if external anal sphincter is relaxed, defecation will occur. This overall effect is called the defecation reflex (**Weisbrodt, 1991**).

However, defcation reflex itself is extremely weak, and to be effective in causing defecation it must be fortified by anothe reflex that involves the sacral segments of the spinal cord as illustrated in figure number 2. When the afferent fibres in the rectum are stimulated, signals are transimtted into the spinal cord and hence, reflexly, back to the descending colon, sigmoid, rectum, and the anus by way of parasympathetic nerve fibers in the nervi erigentes. These parasympathetic signals greatly intensify the peristaltic waves and

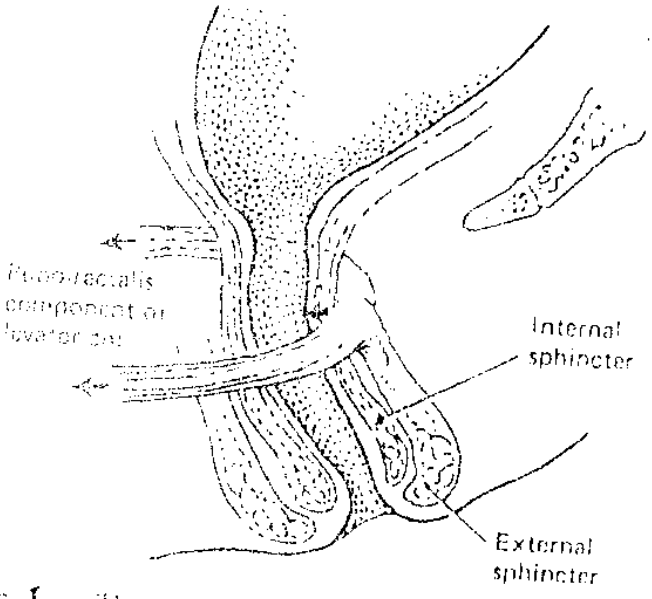


Fig. 1. — The components of the anal sphincter mechanism.

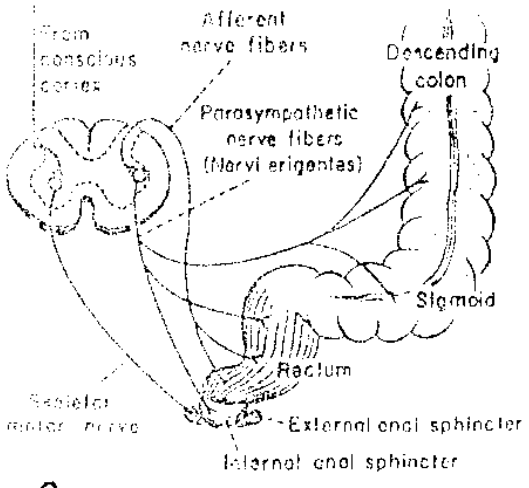


Figure 2. — The afferent and efferent pathways of the parasympathetic mechanisms for enhancing the defecation reflex.

convert the defecation reflex from an in effectual weak movement into apowerful process of defecation that is some times effective in emptying the large bowel all the way from the splenic flexure to the anus.

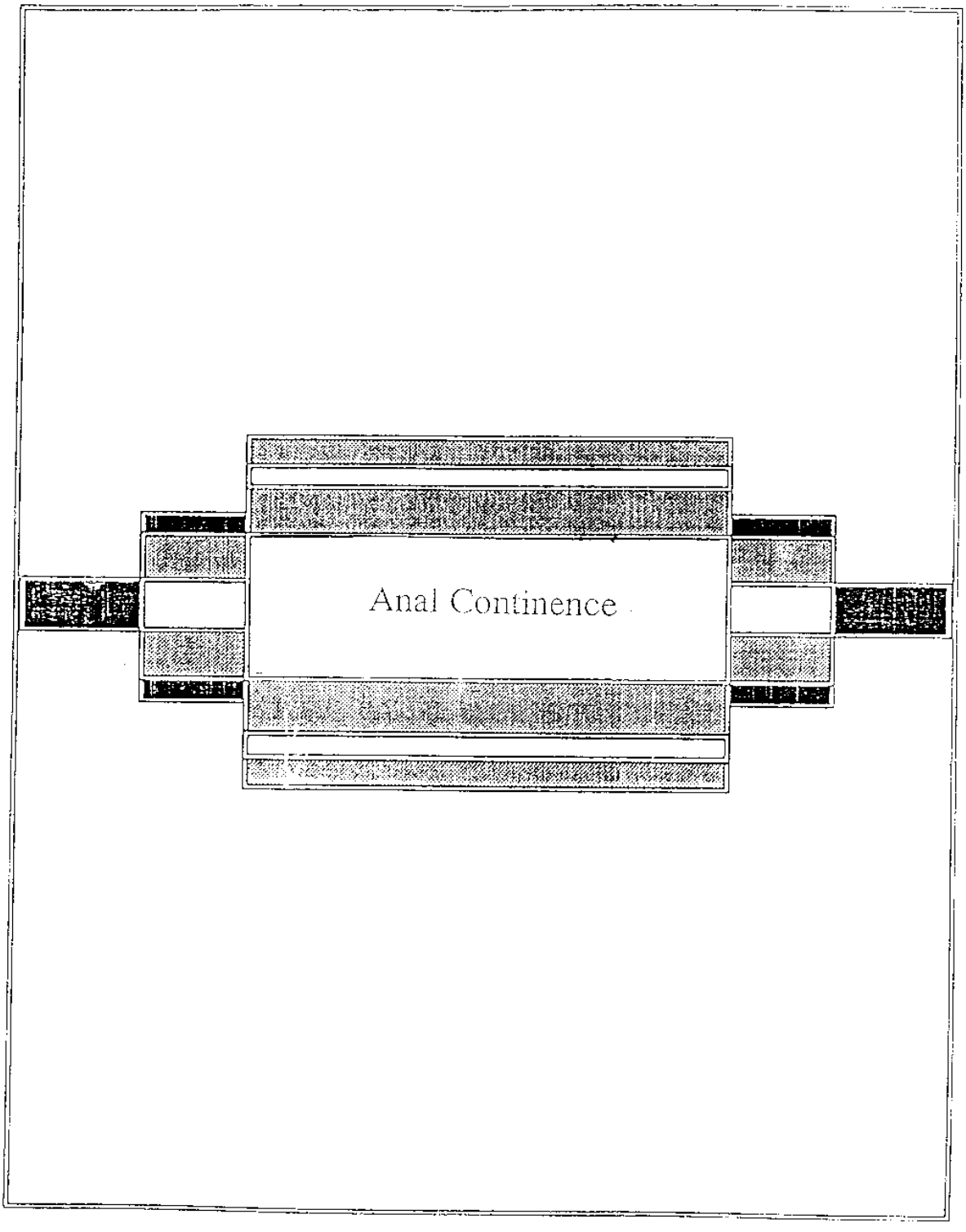
Also, the afferent signals entering the spinal cord initiate other effects, such as taking a deep breath, closure of the glottis, and contraction of the abdominal muscles to force downward on the fecal contents of the colon while at the same time causing the pelvic floor to pull outward and upward on the anus to evaginate the feces down ward **(Davenport, 1966).**

However, despite the defecation reflex, other effects are necessary before actual defecation occurs. First, relaxation of the internal sphincter and forward movement of feces toward the anus, normally initiates an instantaneous contraction of the external sphincter which still temporarily prevents defecation, second, except in babies and mentally inept persons, the conscious mind then takes over voluntary control of the external sphincter and either inhibits it to allow defecation to occur or further contracts it if the moment is

not socially acceptable for defecation to occur. When the contraction is maintained, the defecation reflex dies out after a few minutes and usually will not return until an additional amount of feces enters the rectum, which may not occur until several hours thereafter **(Bortoff, 1972).**

When it becomes convenient for the person to defecate, defecation reflexes can sometimes be initiated by taking deep breath to move the diaphram downward and then contracting the abdominal muscles to increase the pressure in the abdomen, thus forcing fecal contents into the rectum to elicit new reflexes. Unfortunately, reflexes ini . ted in this way are never as effective as those that arise naturally, for which reason people who inhibit their natural reflexes too often become severely constipated.

In the newborn bady or in some persons with transected spinal cords, the defecation reflex causing automatic emptying of the lower bowel without the normal control exercised through contraction of the external anal sphincter **(Truelove, 1966).**



ANAL CONTINENCE

It is difficult to formulate a generally acceptable definition of normal anal continence, however **Gaston 1948** defines anal continence as the ability to retain feces until its delivery is convenient. Anal incontinence is defined as a variable loss of the ability to control the release of bowel contents, whether that is flatus, loose or solid fecal matter. The components of continence are sensory, motor and reflex parts.

The continence components

1- Sensory components

The rectal sensation is most important to give awareness of the arrival of material in the rectum. The sensation of rectal fullness is most probably dependent on receptors within the levator ani muscles rather than the rectum (**Parks, 1977**). Anal canal sensation may contribute in the discrimination of the nature of the material (**Duthei and Cairns, 1960**).

2- Motor components

Numerous investigators have studied the physiology of the anus and rectum with wide spectrum of techniques. All proved that there is a high-pressure zone in the anal canal. The average peak pressure, 2cm from the anal verge, is 25-120mmHg in the normal individual at rest. The importance of the high pressure zone in maintaining anal continence and the role of internal and external sphincters in it's production is doubtful.

The pressure zone is not altered when the external sphincter is paralysed except when a small bolus is puled through the anal canal. so that the resting pressure would seem to be largely due to the internal sphincter (**Duthie and Watts, 1965**).

Although it has been demonstrated that activity is present in the external anal sphincter and pelvic floor muscles. These muscles can only be contracted voluntarily for 40 to 60 seconds. After that despite continued effort by the subject, both electrical activity of the muscle and pressure within the anal canal return to basal levels (**Porter, 1962**).

3- Reflexes

Adistending force of up to 25 mm Hg pressure in the rectum leads to a dectrease in the pressure zone in the anal canal, there is also a transient increase in the activity of the external anal sphincter. The decrease in the anal canal pressure would be sufficient to allow the rectal contents to reach a level in the anal canal enough to make them contact the sensory zone, therefore aiding in the recognition of the nature of the contents. Further rectal distension shows inhibition of the external anal sphincter (**Duthei, 1975**).

Theories of anal continence

1- The pressure zone area

This is the most accepted theory. The high pressure zone area, with an average pressure 25-120 mm Hg, in the anal canal, provides an effective barrier against pressure in the rectum with an average pressur 5-20 mm Hg.

At rest a higher pressure is found in the anal canal than in the rectum. under certain circumstances as on straining the reverse occurs and inspite of that incontinence does not occur. This suggests