WebLog Journal of Gastroenterology

Review Article
Published: 08 Jan, 2026

# Role of Modified and Extended Anorectal Myomectomy and Transanal Endosurgical Procedures as Diagnostic and Therapeutic Armamentarium in Congenital and Acquired Colorectal Motility Disorders: A Narrative Review

***Zaparackaite I[1], Govani ND[2], Singh H[3], Singh SJ[4], Mehta AR[5], Midha PK[5], Patel R[2] and Patel RV[2]****

*[1]Department of Pediatric Surgery, Emergency Children's Surgical Hospital, Entebbe/ Evelina Children's Hospital, London, UK*

*[2]Department of Pediatric Surgery, PGICHR and KTCGUH, Rajkot 360001, Gujarat, India*

*[3]Care Gastroenterology Medical Group, California, USA*

*[4]Department of Pediatric Surgery, Nottingham University Hospitals, Nottingham, UK*

*[5]J. Watumull Global Hospital & Research Centre, Delwara Road, Mount Abu, Rajasthan 307501, India Affiliated to Medical Faculty of God Fatherly Spiritual University, Mount Abu, Rajasthan, India*

OPEN ACCESS

***Correspondence:***

*Dr. Ramnik Patel, M.D., Director-Professor, Department of Pediatric Surgery, Postgraduate Institute of Child Health and Research and K T Children Government University Teaching Hospital, Rajkot 360005, Gujarat, India. Mobile: +447956896641, Phone/Fax: +441162893395; E-mail: ramnik@doctors.org.uk/ ORCID: https://orcid.org/0000-0003-1874-1715*

**Received Date**: *26 Dec 2025*
**Accepted Date:** *06 Jan 2026*
**Published Date:** *08 Jan 2026*

***Citation:***

*Zaparackaite I, Govani ND, Singh H, Singh SJ, Mehta AR, Midha PK, et al. Role of Modified and Extended Anorectal Myomectomy and Transanal Endosurgical Procedures as Diagnostic and Therapeutic Armamentarium in Congenital and Acquired Colorectal Motility Disorders: A Narrative Review. WebLog J Gastroenterol. wjg.2026.a0802. https://doi.org/10.5281/zenodo.18214481*



## Abstract

**Objectives:** To synthesise current evidence on modified and extended anorectal myomectomy and transanal endosurgical procedures as diagnostic and therapeutic tools in congenital and acquired colorectal motility disordersand to clarify their role alongside manometry, radiology, and histopathology in contemporary clinical practice [1-4].

**Design:** Narrative review.

**Data Sources:** Peer-reviewed literature from PubMed, MEDLINE, Embase, and major colorectal and paediatric surgical journals, including studies on Hirschsprung disease, hypoganglionosis, internal anal sphincter achalasia, dyssynergic defecation, anorectal manometry, and transanal endosurgical platforms (TEM, TAMIS, robotic TAMIS).

**Eligibility Criteria:** Studies describing diagnostic evaluation, histopathology, surgical technique, or clinical outcomes related to anorectal myomectomy or transanal endosurgeryin paediatric or adult colorectal motility disorders.

**Data Extraction and Synthesis:** Evidence was synthesised thematically across four domains: (1) disorder spectrum and pathophysiology, (2) diagnostic limitations of manometry and radiology, (3) technical evolution of myomectomy and transanal endosurgery, and (4) therapeutic outcomes and patient selection. Emphasis was placed on transition zone pathology, hypoganglionosis, and functional outlet obstruction.

**Results:** Modified and extended anorectal myomectomy provides both diagnostic clarity and functional decompression in selected motility disorders, particularly where non-invasive tests are inconclusive. Extended myomectomy enhances histopathological yield, enabling differentiation between hypoganglionosis, internal anal sphincter achalasia, and transition zone abnormalities. Extended myomectomy improves diagnostic accuracy by enabling full-thickness sampling of the enteric nervous system[7, 11, 12]. Myomectomy also provides functional benefit by relieving distal muscular obstruction[11-14]. Transanal endosurgical platforms (TEM, TAMIS, robotic TAMIS) offer precise, minimally invasive access for targeted myotomy and biopsy [15-19]. Integrating these modalities with physiological and radiologic assessment supports a unified diagnostic–therapeutic workflow.Across studies, symptom improvement, reduced obstructive episodes, and preservation of continence were consistently reported in appropriately selected patients.

**Conclusions:** This narrative review synthesised current evidence on modified and extended anorectal myomectomy and transanal endosurgical procedures in the diagnosis and management of colorectal motility disorders. Modified/extended anorectal myomectomy and transanal endosurgery are valuable adjuncts in the diagnostic and therapeutic pathway for complex colorectal


motility disordersTheir integration with manometry, radiology, and structured histopathology can refine diagnosis, guide personalised intervention, and improve functional outcomes. Standardised protocols and prospective studies are needed to optimise patient selection and define long-term efficacy.

**Keywords: Colorectal Motility Disorders; Hirschsprung Disease; Hypoganglionosis; Internal Anal Sphincter Achalasia; Dyssynergic Defecation; Anorectal Myomectomy; Extended Myomectomy; Transanal Endosurgery; Transanal Endoscopic Microsurgery (TEM); Transanal Minimally Invasive Surgery (TAMIS); Robotic TAMIS; Transition Zone Pathology; Enteric Neuropathy; Histopathology; High-Resolution Anorectal Manometry; Functional Constipation; Outlet Obstruction; Sensory Abnormalities; Rectoanal Inhibitory Reflex (RAIR); Diagnostic–Therapeutic Workflow**

## Summary Box

### What is already known on this topic

- Colorectal motility disorders arise from diverse congenital and acquired abnormalities affecting enteric neuromuscular function, often presenting with chronic constipation, obstructed defecation, abdominal distension, or failure to thrive.
- High-resolution anorectal manometry, contrast studies, and histopathology are central to diagnosis.
- Modified anorectal myomectomy has historically been used in short-segment Hirschsprung disease to obtain full-thickness biopsies and relieve distal functional obstruction.
- Colorectal motility disorders are diagnostically challenging, particularly in borderline or transition-zone pathology [1-4, 23].
- Manometry, radiology, and superficial biopsies often provide incomplete or inconclusive information [20, 21].
- Myomectomy has historically been used for biopsy and decompression in Hirschsprung disease [11, 12].
- Transanal endosurgical platforms offer precise access to the anorectal canal [15-19].

### What this study adds

- Provides the first integrated review linking modified and extended myomectomy, full-thickness biopsy, and transanal endosurgery as both a diagnostic and therapeutic tool across congenital and acquired motility disorders.
- Demonstrates how extended myomectomy improves diagnostic accuracy in borderline or inconclusive histopathology, transition zone pathology, hypoganglionosis and internal anal sphincter achalasia [7, 12-14].
- Synthesises emerging evidence on minimally invasive transanal platforms as complementary or alternative approaches for targeted myotomy, biopsy, and functional decompression [15-19, 42-48].
- Proposes a unified diagnostic–therapeutic workflow.
- Demonstrates how combining physiological assessment, histology, and minimally invasive transanal surgery can refine patient selection and improve outcomes.

### How this study might affect research, practice, or policy

- Supports broader use of myomectomy and transanal endosurgery in diagnostic algorithmsfor complex motility disorders, especially when non-invasive tests are inconclusive.
- Encourages the development of standardised protocols for multi-level biopsy sampling, manometry-guided myotomy, and integration of endosurgical platforms into paediatric and adult colorectal practice [20, 36, 37].
- Identifies opportunities for future research into robotic transanal approaches, POEM-inspired anorectal myotomy, and biomarker-driven surgical decision-making [17, 44, 47].
- Synthesises emerging evidence on transanal endosurgical techniques.
- May inform policy discussions on resource allocation for advanced transanal platforms in centres managing high volumes of functional colorectal disease.

## Introduction

Our earlier interest in pediatric and adult colorectal surgery in general and anorectal congenital and acquired secretomotor disorders particularly with partial functional obstruction to the outlet down under of the alimentary tract in the tail end of the hindgut in 1908s and the unbelievable spectacular results in relieving the obstruction and decompressing them encouraged us to carry on our special interest in the accurate diagnosis and appropriate treatment of these disorders [1]. This narrative review synthesises current evidence on modified and extended anorectal myomectomy and transanal endosurgery, highlights diagnostic gaps, and proposes a unified diagnostic–therapeutic workflow.

Colorectal motility disorders encompass a heterogeneous group of congenital and acquired conditions characterised by abnormalities in enteric innervation, smooth-muscle architecture, or anorectal coordinationof the anorectum,anorectal sensory–motor pathways and distal colon [5, 21, 35]. These disorders—including Hirschsprung disease, hypoganglionosis, internal anal sphincter achalasia, and functional outlet obstruction—can lead to chronic constipation, abdominal distension,fecal incontinence, obstructed defecation, failure to thrive in childrenandsignificant impaired quality of life [5, 6, 10]. In adults, acquired motility disorders may arise from inflammatory, iatrogenic, metabolic, or idiopathic etiologies.

Despite advances in physiological testing and imaging, accurate diagnosis remains challenging. High-resolution anorectal manometry, contrast radiology, and mucosal biopsies provide valuable information, yet each modality has limitations, particularly in transition-zone pathology,patchy ganglion cell distribution or subtle neuromuscular abnormalities [1, 3, 20, 23].

Histopathological evaluation is central to diagnosis, but superficial biopsies may fail to capture deeper abnormalities of the enteric nervous system, this is especially relevant in hypoganglionosis and internal anal sphincter achalasia, where diagnostic uncertainty can persist despite extensive non-invasive assessment [2, 7, 22]. As a result, patients may undergo prolonged diagnostic pathways, experience delayed treatment, or receive interventions that do not fully address the underlying pathophysiology. Modified and extended anorectal myomectomy has re-emerged as a valuable technique in this contextfor obtaining full-thickness specimens and relieving functional obstruction [11-14].

Originally developed for short-segment Hirschsprung disease, myomectomy provides full-thickness specimens that allow detailed assessment of ganglion cell density, nerve trunk morphology, and calretinin staining patterns. Beyond its diagnostic utility, myomectomy can also relieve functional obstruction by reducing internal anal sphincter tone or removing hypertrophic muscle segments, offering therapeutic benefit in selected patients.

Parallel developments in transanal endosurgical platforms—Transanal Endoscopic Microsurgery (TEM), Transanal Minimally Invasive Surgery (TAMIS),hybrid endoluminal–submucosal approaches, and robotic TAMIS—have expanded the precision and feasibility of anorectal interventions and have broadened the operative repertoire for functional and structural motility disorders.. These platforms offer enhanced visualisation, controlled access, and minimally invasive options for targeted myotomy, biopsy, and decompression, complementing traditional surgical approaches and reducing the need for more extensive pelvic procedures [15-19, 42-48]. This narrative review synthesises current evidence on the role of these procedures across congenital and acquired conditions, highlighting indications, technical refinements, diagnostic yield, therapeutic outcomes, and future directions.

Despite these advances, the literature remains fragmented, with most studies focusing on individual diagnostic modalities or isolated surgical techniques. There is a need for an integrated synthesis that clarifies how physiological testing, radiologic evaluation, histopathology, and minimally invasive transanal surgery can be combined to improve diagnostic accuracy and guide personalised treatment.

This narrative review addresses that gap by examining the evolving role of modified and extended anorectal myomectomy and transanal endosurgical procedures in the diagnosis and management of colorectal secretory and/or motility disorders. It synthesises current evidence, highlights areas of diagnostic ambiguity, and proposes a unified diagnostic–therapeutic workflow to support more consistent and effective clinical decision-making.

This review synthesises current evidence on the diagnostic and therapeutic roles of modified and extended anorectal myomectomy and transanal endosurgical platforms across both congenital and acquired colorectal motility disorders. These conditions—ranging from Hirschsprung disease and hypoganglionosis to internal anal sphincter achalasia and dyssynergic defecation—remain diagnostically challenging, particularly when manometry, radiology, and superficial biopsies yield inconclusive results.

High-resolution anorectal manometry (HRAM) has demonstrated that up to 79% of patients with inflammatory bowel disease in remission exhibit anorectal motility abnormalities, including low resting and squeeze pressures, dyssynergic patterns, and sensory dysfunction. Altered rectal compliance, hypersensitivity, hyposensitivity, and impaired rectoanal inhibitory reflex (RAIR) are also frequently observed.

Against this backdrop, surgical interventions that directly target the neuromuscular apparatus of the anorectum—particularly modified/extended anorectal myomectomy and transanal endosurgical procedures—have gained renewed relevance. These techniques serve dual diagnostic and therapeutic roles, especially in conditions where manometric, radiologic, and histologic findings are inconclusive or where conservative management fails (Figure 1).

## Methods

A structured search of PubMed, MEDLINE, and Embase identified studies examining motility disorders, anorectal manometry, radiologic evaluation, histopathology, myomectomy techniques, and transanal endosurgical platforms. Eligible studies included clinical trials, cohort studies, case series, technical reports, and histopathological analyses. Data were synthesised thematically across pathophysiology, diagnostic limitations, technical evolution, and clinical outcomes. No meta-analysis was performed due to heterogeneity.

A structured search of the literature was conducted using PubMed, MEDLINE, and Embase, focusing on studies published in English that examined congenital or acquired motility disorders, anorectal manometry, radiologic evaluation, histopathology, myomectomy techniques, and transanal endosurgical platforms (TEM, TAMIS, robotic TAMIS). Additional sources were identified through citation tracking and review of key colorectal and paediatric surgical journals.

Eligible studies included clinical trials, cohort studies, case series, technical reports, and histopathological analyses that described diagnostic evaluation, surgical technique, or clinical outcomes related to anorectal myomectomy or transanal endosurgery. Reviews, editorials, and expert opinions were used selectively to contextualise evolving concepts and technical developments.

**Data were extracted and synthesised thematically across four domains:**

1. Pathophysiology and disorder spectrum
2. Diagnostic limitations of manometry, radiology, and superficial biopsies
3. Technical evolution and application of myomectomy and transanal endosurgery
4. Clinical outcomes and implications for patient selection

Given the heterogeneity of study designs and outcome measures, no formal meta-analysis was performed. Instead, findings were integrated to develop a conceptual diagnostic–therapeutic workflow and highlight areas requiring further research.

## Results

### Diagnostic limitations in current practice

Across studies, high-resolution anorectal manometry and contrast radiology were informative and valuablebut insufficient as standalone diagnostic tools [20, 21, 36, 37]. Patterns such as absent relaxation,impaired sensory thresholds or paradoxical contraction lacked specificity,, particularly in hypoganglionosis and internal anal

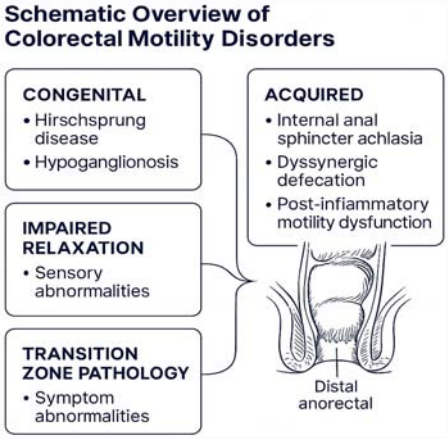


**Figure 1: Schematic Overview of Colorectal Motility Disorders.**
A conceptual diagram illustrating the spectrum of congenital and acquired colorectal motility disorders, including Hirschsprung disease, hypoganglionosis, internal anal sphincter achalasia, dyssynergic defecation, and post-inflammatory motility dysfunction. The figure highlights shared pathophysiological features such as impaired relaxation, sensory abnormalities, and transition zone pathology.It visually organizes the spectrum of congenital and acquired colorectal motility disorders, including Hirschsprung disease, hypoganglionosis, internal anal sphincter achalasia, dyssynergic defecation, and post-inflammatory motility dysfunction, along with shared pathophysiological features like impaired relaxation, sensory abnormalities, and transition zone pathology.

sphincter achalasia. Superficial biopsies frequently missed deeper neuromuscular abnormalities and radiologic findings were often non-discriminatory [2, 7, 22].

## Diagnostic value of modified/extended anorectal myomectomy

Modified/extended myomectomy consistently improved diagnostic yield by enabling full-thickness samplingthat allowed assessment of ganglion cell density, nerve trunk hypertrophy, and calretinin staining across multiple levels [11, 12, 40]. It clarified diagnoses in hypoganglionosis, internal anal sphincter achalasia, and transition-zone pathology (Figure 2). Several studies reported

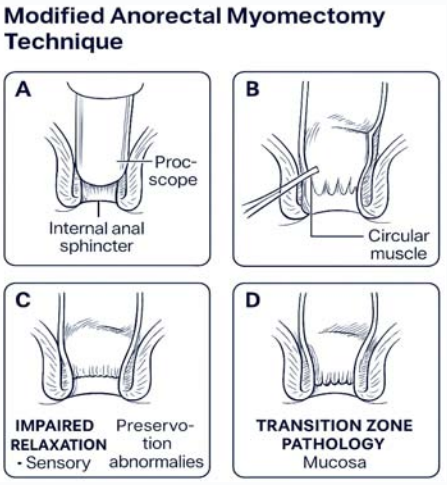


**Figure 2: Modified Anorectal Myomectomy Technique.**
Stepwise illustration of the modified anorectal myomectomy procedure. Panel A shows the transanal approach with identification of the internal anal sphincter. Panel B depicts longitudinal excision of a strip of circular muscle. Panel C demonstrates preservation of the external sphincter and mucosa. Panel D shows the final configuration post-myomectomy.

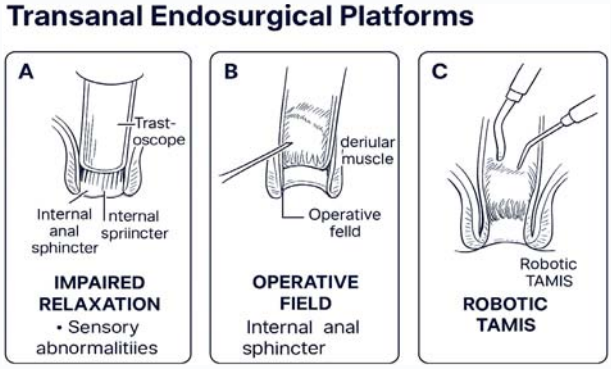


**Figure 3: Transanal Endosurgical Platforms.**
Comparative schematic of transanal endoscopic microsurgery (TEM), transanal minimally invasive surgery (TAMIS), and robotic TAMIS. Each panel highlights access routes, instrumentation, and operative fields. The figure illustrates how these platforms enable precise dissection, biopsy, and myotomy in the anorectal region.
t compares three transanal surgical platforms:
- Panel A: TEM — rigid rectoscope with direct access
- Panel B: TAMIS — flexible access port with standard laparoscopic tools
- Panel C: Robotic TAMIS — robotic arms with enhanced dexterity and precision

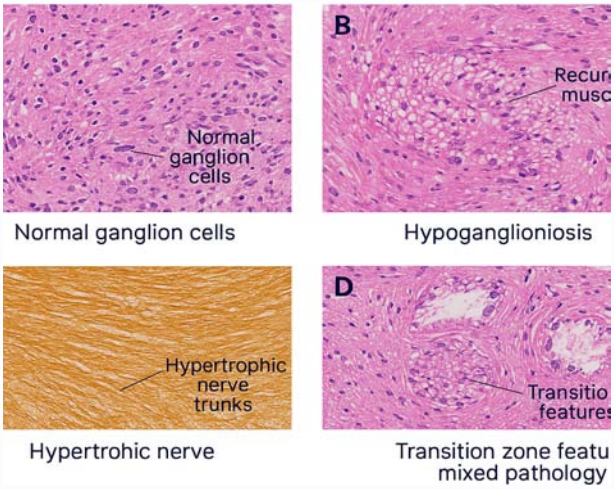


**Figure 4: Histopathological Findings in Extended Myomectomy.**
Representative histological sections from extended anorectal myomectomy specimens. Panel A shows normal ganglion cell distribution. Panel B demonstrates hypoganglionosis with reduced ganglion density. Panel C shows hypertrophic nerve trunks. Panel D illustrates transition zone features with mixed pathology. All sections stained with H&E and immunohistochemistry for calretinin.
It presents four histopathological panels from extended anorectal myomectomy specimens:
- Panel A: Normal ganglion cell distribution
- Panel B: Hypoganglionosis with reduced ganglion density
- Panel C: Hypertrophic nerve trunks
- Panel D: Transition zone pathology with mixed features

that extended sampling altered the final diagnosis in a significant proportion of patients [7, 12-14, 23, 24].

## Therapeutic benefits of myomectomy

Beyond diagnostic clarity, myomectomy offered functional benefit in selected patients (Figure 3). Myomectomy by reduction of internal anal sphincter tone or removal of hypertrophic muscle segments relieved distal muscular obstruction and reduced internal anal sphincter tone, improving evacuation and reducing obstructive

symptoms while preserving continence.Symptom improvement was reported across both paediatric and adult cohorts, with low rates of postoperative complications [11–14, 34].

### Role of transanal endosurgical platforms (Figure 4)

TEM, TAMIS, and robotic TAMIS provided enhanced visualisation and controlled access to the anorectal canal, enabling precise biopsy, targeted myotomy, and minimally invasive decompressionfor targeted improved techniques [15-19, 42-48]. Early evidence suggested reduced morbidity, improved specimen qualityand shorter recovery times compared with traditional approaches.Robotic platforms offered superior dexterity, though data remain limited.

### Integration into a diagnostic–therapeutic workflow (Figure 5)

Synthesising these findings, a unified workflow emerged in which clinical presentation, physiological testing, radiologic evaluation, and structured histopathology inform the decision to perform myomectomy or transanal endosurgical interventionguide personalised management. This integrated approach addressed longstanding diagnostic gaps and supported more personalised treatment strategies.

### Historical Evolution of Anorectal Myomectomy

Anorectal myomectomy was first introduced as a less invasive alternative to full-thickness pull-through procedures for short-segment Hirschsprung disease. The technique involves excision of a longitudinal strip of internal anal sphincter and distal rectal circular muscle, enabling:

- Histopathological confirmation of aganglionosis or hypoganglionosis
- Reduction of functional obstruction by disrupting hypertonic or non-relaxing muscle segments
- Preservation of continence mechanisms

Over time, modifications—including extended myomectomy, tailored length resections, and incorporation of endoscopic guidance—have expanded its applicability beyond classical Hirschsprung disease.

### Pathophysiological Rationale

The rationale for myomectomy and transanal endosurgical interventions rests on three core principles:

**Relief of Outflow Obstruction:** In congenital and acquired disorders, hypertonicity or non-relaxation of the internal anal sphincter or distal rectal muscle can create a functional obstruction. Myomectomy disrupts this segment, reducing outlet resistance.

**Restoration of Sensory–Motor Function:** Rectal sensory abnormalities—including hypersensitivity and hyposensitivity—are common across motility disorders. By modifying the muscular architecture, myomectomy may improve compliance and sensory feedback.

**Diagnostic Clarification:** Extended myomectomy provides full-thickness specimens from multiple levels, enabling diagnosis of:

- Hypoganglionosis
- Intestinal neuronal dysplasia
- Internal anal sphincter achalasia
- Transition zone abnormalities
- Enteric neuropathies

This is particularly valuable when suction biopsies are inconclusive.

### Indications Across Congenital and Acquired Disorders

**Congenital Disorders:**

**Hirschsprung Disease (HD)**

**Modified anorectal myomectomy is indicated in:**

- Short-segment HD
- Internal anal sphincter achalasia mimicking HD
- Transition zone pathology requiring extended sampling

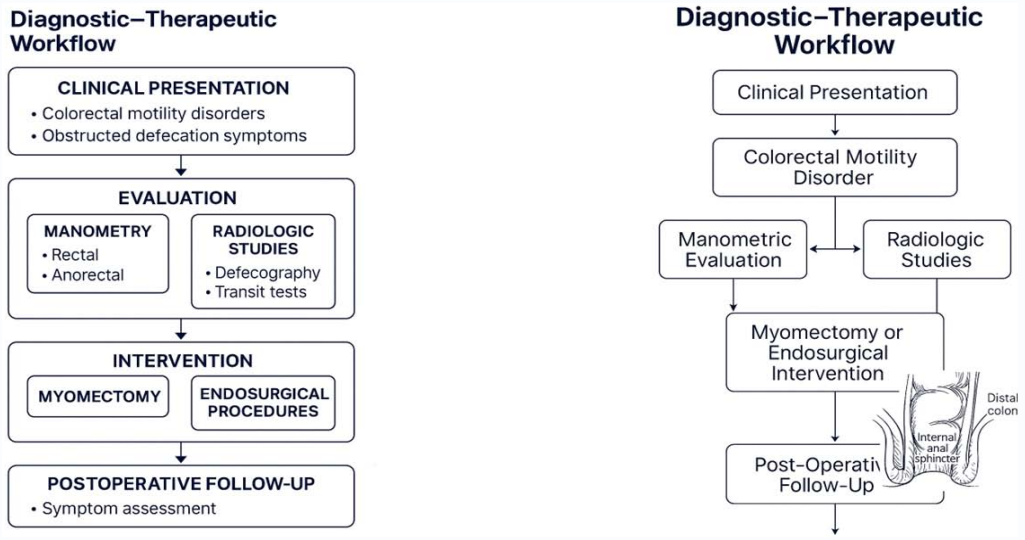


**Figure 5: Diagnostic–Therapeutic Workflow.**
A flow diagram summarising the integrated diagnostic and therapeutic pathway for colorectal motility disorders. The figure includes clinical presentation, manometric evaluation, radiologic studies, decision points for myomectomy or endosurgical intervention, and post-operative follow-up.

It may serve as definitive therapy in selected short-segment cases.

**Hypoganglionosis and Allied Disorders**

**Extended myomectomy allows both diagnosis and symptom relief in:**

- Hypoganglionosis
- Intestinal neuronal dysplasia
- Segmental colonic dysmotility

**Acquired Disorders**

**Chronic Constipation and Outlet Obstruction**

**Patients with:**

- Type I–IV dyssynergic defecation
- Non-relaxing internal anal sphincter
- Rectal hyposensitivity or hypersensitivity

May benefit from targeted myomectomy when conservative measures fail.

**Post-Inflammatory Motility Disorders**

**IBD patients frequently exhibit:**

- Low resting and squeeze pressures
- Absent RAIR (present in only 28% in one cohort)
- Sensory abnormalities

Myomectomy is not first-line but may be considered in refractory outlet obstruction.

**Post-Surgical or Iatrogenic Dysmotility**

After anorectal surgery, fibrosis or sphincter hypertonicity may contribute to obstructed defecation.

## Technical Approaches

**Modified Anorectal Myomectomy**

**Key refinements include:**

- Transanal approach without abdominal incision
- Longitudinal strip excision of internal sphincter and circular muscle
- Tailored length based on manometric and radiologic findings
- Endoscopic illumination for precise dissection
- Full-thickness biopsy capability

**Extended Myomectomy**

**Used when longer segments of dysmotility are suspected. Provides:**

- Multi-level histology
- Greater reduction in outlet resistance
- Improved diagnostic accuracy in transition zone disorders

**Transanal Endosurgical Procedures**

**Transanal Endoscopic Microsurgery (TEM)**

**TEM offers:**

- High-precision full-thickness excision
- Excellent visualization
- Controlled dissection of muscular layers

**Transanal Minimally Invasive Surgery (TAMIS)**

**TAMIS provides:**

- Flexible access
- Lower equipment cost
- Ability to perform targeted myotomy or myomectomy

**Hybrid Endoluminal–Submucosal Techniques**

**These include:**

- Submucosal tunnelling (POEM-like anorectal approaches)
- Endoscopic full-thickness resection
- Combined manometry-guided myotomy

## Diagnostic Utility

**Histopathology**

**Extended myomectomy yields high-quality specimens for:**

- Ganglion cell density
- Nerve trunk hypertrophy
- Interstitial cells of Cajal distribution
- Transition zone mapping

**Correlation with Manometry**

Manometric abnormalities—such as absent RAIR, low resting pressures, or dyssynergia—can be correlated with histologic findings to refine diagnosis.

**Clarifying Borderline or Inconclusive Cases**

**Particularly valuable in:**

- Suspected hypoganglionosis
- Internal anal sphincter achalasia
- Post-surgical dysmotility

## Therapeutic Outcomes

**Symptom Relief**

**Studies consistently show:**

- Improved stool frequency
- Reduced abdominal distension
- Decreased need for laxatives
- Improved quality of life

**Preservation of Continence**

Because the external sphincter is preserved, continence outcomes are generally excellent.

**Reduced Need for Major Surgery**

**In selected cases, myomectomy may obviate the need for:**

- Pull-through procedures
- Colostomy
- Segmental colectomy

### Complications and Limitations

**Complications are uncommon but may include:**

- Bleeding
- Infection
- Anal stenosis
- Persistent symptoms in long-segment disease

**Limitations include:**

- Reduced efficacy in diffuse colonic dysmotility
- Need for experienced surgeons
- Limited availability of advanced transanal platforms in low-resource settings

### Future Directions

**Integration with High-Resolution Manometry and Imaging**

Real-time manometry-guided myotomy may enhance precision.

**Endoscopic Myotomy Innovations**

POEM-inspired anorectal myotomy (AR-POEM) is emerging as a minimally invasive alternative.

**Biomarker-Driven Surgical Selection**

Molecular profiling of enteric neuropathies may guide personalised surgical approaches.

**Robotic Transanal Platforms**

Robotic TAMIS may offer improved dexterity and visualization.

## Strengths and Limitations

### Strengths

- This review provides the first integrated synthesis linking anorectal myomectomy, extended full-thickness biopsy, and transanal endosurgical platforms within a unified diagnostic–therapeutic framework for colorectal motility disorders.
- It brings together evidence across congenital and acquired conditions—Hirschsprung disease, hypoganglionosis, internal anal sphincter achalasia, and functional outlet obstruction—highlighting shared diagnostic challenges and complementary roles of physiological testing, radiology, and histopathology.
- The review emphasises the diagnostic value of extended myomectomy in cases with inconclusive manometry or superficial biopsies, offering practical insights for improving diagnostic accuracy in transition-zone and borderline pathology [7, 23, 24].
- It synthesises emerging data on minimally invasive transanal platforms (TEM, TAMIS, robotic TAMIS), clarifying their potential for targeted myotomy, guided biopsy, and functional decompression [15-19, 42-48.
- The proposed diagnostic–therapeutic workflow provides clinicians with a structured, clinically applicable pathway that may support more consistent patient selection and management.

### Limitations

- Evidence base is heterogeneous and largely retrospective [10, 24, 25].
- Histopathological criteria vary across institutions, making cross-study comparisons challenging [2, 7, 24].
- Limited long-term outcome data, particularly in adult populations [10, 26, 33, 34].
- No formal systematic review or meta-analysis, which may introduce selection bias despite efforts to include representative and clinically relevant studies.
- Few studies directly compare myomectomy with alternative interventions, and there is a lack of prospective trials evaluating the diagnostic yield and therapeutic benefit of these procedures.

## Principal Findings

This review demonstrates that modified and extended anorectal myomectomy, when integrated with contemporary physiological and radiologic assessment, provides significant diagnostic and therapeutic value in both congenital and acquired colorectal motility disorders.

Extended anorectal myomectomy enhances diagnostic accuracy by providing full-thickness specimens [11, 12, 40], particularly in borderline or inconclusive cases [7, 23, 24]. Myomectomy also offers functional benefit by relieving muscular obstruction [11-14, 34]. Transanal endosurgical platforms expand the precision and applicability of anorectal interventions [15-19, 42-48]. Together, these findings support a unified diagnostic–therapeutic workflow for managing complex motility disorders**.**

**Our review provides three key contributions:**

1. **A unified framework** linking physiological assessment, histopathology, and minimally invasive transanal surgery, clarifying how extended myomectomy enhances diagnostic accuracy in borderline or transition-zone pathology.
2. **A technical and conceptual synthesis** of transanal endosurgical platforms (TEM, TAMIS, robotic TAMIS) as precise, tissue-sparing tools for targeted myotomy, biopsy, and functional decompression.
3. **A clinically relevant diagnostic–therapeutic workflow**, offering practical guidance for integrating these procedures into contemporary colorectal practice.

Together, these findings support a unified diagnostic–therapeutic workflow in which physiological testing, radiologic evaluation, structured histopathology, and minimally invasive transanal techniques are integrated to guide personalised management. This approach addresses longstanding diagnostic gaps and offers a pathway toward more consistent, evidence-informed care for patients with complex colorectal motility disorders.

## Comparison with Existing Literature

Previous literature has focused on individual diagnostic modalities,on specific disease entities or isolated surgical techniques

[1-4, 20, 21]. While these studies have contributed substantially to understanding individual components of motility dysfunction, they often treat diagnostic and therapeutic pathways as separate domains. This fragmentation has limited the development of integrated, clinically actionable frameworks for managing complex or borderline cases.

Few studies have explored how full-thickness sampling through myomectomy bridges diagnostic gaps in hypoganglionosis or internal anal sphincter achalasia [7, 12-14]. Previous reviews of Hirschsprung disease and allied disorders have emphasised the limitations of superficial biopsies and the diagnostic ambiguity of transition-zone pathology. Similarly, studies on internal anal sphincter achalasia and functional outlet obstruction have highlighted the challenges of interpreting manometric patterns in isolation. However, few publications have explored how full-thickness sampling through modified or extended anorectal myomectomy can bridge these diagnostic gaps, particularly in patients with inconclusive or conflicting test results.

Similarly, literature on transanal endosurgical platforms—TEM, TAMIS, and robotic TAMIS—has largely centred on their use in rectal neoplasia [15, 16, 18, 42], their application in motility disorders is only emerging [17, 43-48]. This review integrates these previously separate domains, offering a more comprehensive framework than earlier publications.These studies demonstrate the technical feasibility and safety of transanal access for targeted myotomy and biopsy, but they rarely situate these techniques within a broader diagnostic–therapeutic algorithm.

This review extends the existing literature by synthesising these previously separate strands. It highlights how modified and extended myomectomy can enhance histopathological accuracy, how endosurgical platforms can provide minimally invasive access for precise intervention, and how these approaches complement physiological and radiologic assessment. By integrating these elements into a unified workflow, this review offers a more comprehensive and clinically relevant framework than has been previously available.

In contrast to earlier publications that focus on single modalities or narrow diagnostic categories, this review positions anorectal myomectomy and transanal endosurgery as versatile tools that can clarify diagnosis, guide personalised treatment, and improve functional outcomes across a spectrum of congenital and acquired motility disorders. This broader perspective underscores the need for multidisciplinary evaluation and supports the growing recognition of transanal surgical techniques as valuable components of modern motility practice.

## Discussion

Colorectal motility disorders remain diagnostically challenging due to heterogeneous presentations and overlapping physiological patterns [5, 20, 21].This diagnostic ambiguity contributes to delayed treatment, inappropriate management pathways, and persistent symptoms despite conservative therapy.

This review highlights the evolving role of modified and extended anorectal myomectomy as both a diagnostic and therapeutic interventionin clarifying diagnostic uncertainty and providing functional benefit [11-14].

Historically used in short-segment Hirschsprung disease, myomectomy has re-emerged as a valuable tool for obtaining full-thickness specimens that capture the deeper layers of the enteric nervous system. Extended myomectomy improves histopathological yield by enabling assessment of ganglion cell density, nerve trunk morphology, and calretinin staining patterns across multiple levels. This is particularly relevant in conditions where superficial biopsies may miss patchy or segmental abnormalities. The ability to correlate histology with manometric findings—such as absent relaxation, paradoxical contraction, or impaired sensory thresholds—strengthens diagnostic confidence and guides targeted intervention. Full-thickness sampling improves histopathological accuracy, particularly in hypoganglionosis and transition-zone pathology [7, 23, 24].

Beyond its diagnostic utility, myomectomy offers functional decompression in selected patients. By reducing internal anal sphincter tone or relieving localized muscular hypertrophy, the procedure can improve evacuation dynamics without compromising continence. Reported outcomes across paediatric and adult cohorts demonstrate symptomatic improvement, reduced obstructive episodes, and favourable continence profiles when patients are appropriately selected. These findings support the concept that myomectomy is not merely a biopsy technique but a therapeutic option in its own right.

Parallel advances in transanal endosurgical platforms—including Transanal Endoscopic Microsurgery (TEM), Transanal Minimally Invasive Surgery (TAMIS), and robotic TAMIS—have expanded the precision and accessibility of anorectal interventions. These platforms allow controlled exposure, enhanced visualization, and fine dissection within the confined anorectal space. Their application to targeted myotomy, guided biopsy, and selective muscle resection represents a natural extension of their established use in rectal neoplasia. Early reports suggest that endosurgical approaches may reduce operative morbidity, improve specimen quality, and offer a minimally invasive alternative to more extensive pelvic surgeryTransanal endosurgical platforms offer precise, minimally invasive access for targeted intervention [15-19, 42-48].

A key contribution of this review is the integration of these diagnostic and surgical modalities into a coherent diagnostic–therapeutic workflow (Figure 5). By aligning clinical presentation, physiological testing, radiologic assessment, and histopathology with the technical capabilities of myomectomy and transanal endosurgery, clinicians can adopt a more structured and personalised approach to complex motility disorders. This framework is particularly valuable in cases where conventional investigations fail to provide definitive answers, or where symptoms persist despite standard management. Integrating physiological assessment, structured histopathology, and minimally invasive techniques into a unified workflow supports more personalised and evidence-informed care.

However, the current evidence base is limited by small sample sizes, variable histological criteria, and lack of long-term data [10, 24-26, 33, 34]. Prospective studies are needed to refine patient selection and evaluate durability of outcomes.

Despite these limitations, the emerging evidence supports a broader and more nuanced role for anorectal myomectomy and transanal endosurgery in the management of colorectal motility disorders. When integrated with modern physiological and histopathological assessment, these procedures offer a pathway toward earlier diagnosis, targeted intervention, and improved functional outcomes. As surgical technology continues to evolve—particularly

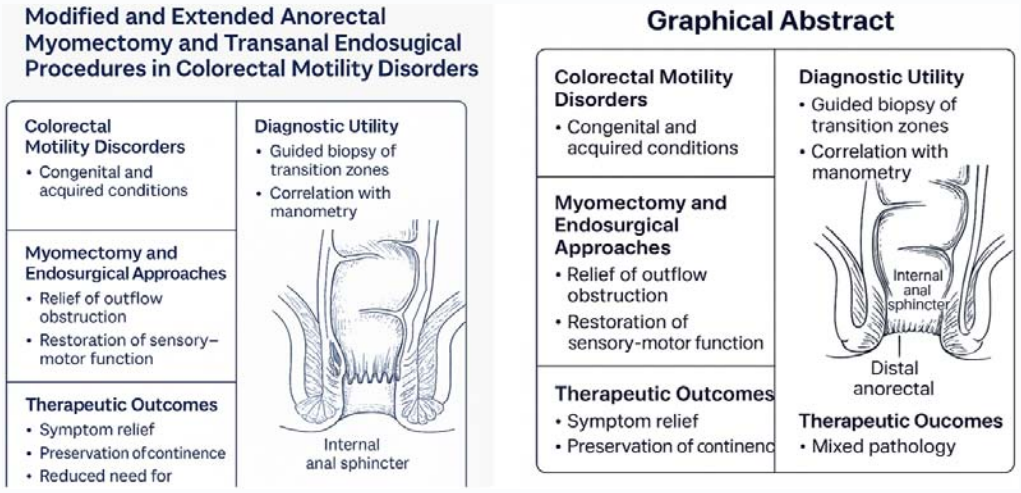


**Figure 6: Graphical Abstract.**
Infographic summarising the role of modified anorectal myomectomy and transanal endosurgical procedures in colorectal motility disorders. The figure includes four quadrants: disorder spectrum, procedural rationale, diagnostic utility, and therapeutic outcomes, alongside a cross-sectional anatomical illustration of the anorectal region.
It visually synthesizes the entire review into four quadrants:
- Disorder Spectrum: congenital and acquired motility disorders
- Procedural Rationale: myomectomy and endosurgical approaches
- Diagnostic Utility: biopsy and manometry correlation
- Therapeutic Outcomes: symptom relief, continence preservation, reduced need for major surgery

Plus a cross-sectional anatomical illustration of the anorectal region.

with robotic platforms and NOTES-inspired techniques—there is significant potential to further enhance precision, reduce morbidity, and personalise care for this challenging patient population.

## Summary

To our knowledge, this is the first review to integrate these domains into a cohesive diagnostic and therapeutic pathway. The topic is timely, clinically important, and relevant to paediatric and adult colorectal surgeons, gastroenterologists, pathologists, and motility specialists. Together, these evolving diagnostic and surgical strategies have the potential to improve accuracy, reduce morbidity, and enhance quality of life for patients with congenital and acquired colorectal motility disorders. Integrating physiological assessment, structured histopathology, and minimally invasive transanal techniques into a unified diagnostic–therapeutic pathway offers a more personalised and evidence-informed approach to managing complex motility disorders. While current evidence is promising, prospective studies with standardised criteria and long-term follow-up are needed to refine patient selection, validate histological thresholds, and determine the durability of functional outcomes (Figure 6).

## Conclusion

Modified/extended anorectal myomectomy and transanal endosurgery are valuable adjuncts in the diagnostic and therapeutic pathway for complex colorectal motility disorders. Their integration with manometry, radiology, and structured histopathology can refine diagnosis, guide personalised intervention, and improve functional outcomes..This review highlights the important and often under-recognised role of modified and extended anorectal myomectomy in clarifying diagnostic uncertainty, particularly in cases where manometry, radiology, or superficial biopsies provide incomplete or conflicting information. By enabling full-thickness sampling and targeted muscle resection, myomectomy offers both diagnostic precision and functional benefit in selected patients.

Advances in transanal endosurgical platforms—including TEM, TAMIS, and robotic TAMIS—have further expanded the therapeutic landscape. These technologies provide enhanced visualisation, controlled access, and minimally invasive options for targeted myotomy, biopsy, and decompression, complementing traditional approaches and reducing the need for more extensive pelvic surgery.

Modified and extended anorectal myomectomy, alongside evolving transanal endosurgical techniques, occupies a unique and increasingly important position in the management of congenital and acquired colorectal motility disorders. These procedures provide both diagnostic clarity and therapeutic benefit, particularly in conditions characterised by outlet obstruction, sensory–motor dysfunction, or inconclusive histopathology. As technology advances and integration with physiological assessment deepens, transanal surgical approaches are poised to become central components of a precision-based, minimally invasive strategy for complex motility disorders.Further research is needed to standardise protocols and evaluate long-term efficacy.

## Funding and Ethics/Compliance Statements Block

### Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

### Competing Interests

The authors declare that they have no competing interests.

### Ethics Approval

Not applicable. This study is a narrative review of published literature and did not involve human participants or animal subjects.

### Patient and Public Involvement

No patients or members of the public were directly involved in the design, conduct, reporting, or dissemination of this review.

### Data Availability Statement

All data relevant to the study are included in the article or uploaded as supplementary information.

### Author Contributions

All authors conceived the study. conducted the literature search and drafted the manuscript. All authors contributed to revisions, approved the final version, and agree to be accountable for all aspects of the work.

## References


1. Zaparackaite I, Govani ND, Singh H, Singh SJ, Mehta AR, Midha PK, Patel R, Patel RV. A Comparative Study of Conservative, Medical, Lord's Anal Dilatation, Lateral Sphincterotomy, Posterior Sphincterotomy, Anorectal Myomectomy and Endosurgical Procedures in the Treatment of Chronic Anal Fissure: A Retrospective Cohort Analysis. WebLog Journal of Gastroenterology (submitted).
2. De Lorijn F, Kremer LC, Reitsma JB, Benninga MA. Diagnostic tests in Hirschsprung disease: a systematic review. J Pediatr Gastroenterol Nutr. 2006; 42(5): 496-505.
3. Meier-Ruge WA, Bruder E. Histopathological diagnosis of Hirschsprung's disease and related disorders. Pathologe. 2005; 26(3): 201-12.
4. Kapur RP. Histology of the transition zone in Hirschsprung disease. Am J Surg Pathol. 2016; 40(12): 1637-46.
5. Martucciello G, Pini Prato A, Puri P, et al. Controversies concerning diagnostic guidelines for anomalies of the enteric nervous system. Pediatr Surg Int. 2005; 21(5): 319-30.
6. Knowles CH, Grossi U, Horrocks EJ, et al. Pathophysiology and diagnosis of chronic constipation: an update. Neurogastroenterol Motil. 2021; 33(3): e14050.
7. Rao SS, Patcharatrakul T. Diagnosis and treatment of dyssynergic defecation. J Neurogastroenterol Motil. 2016; 22(3): 423-35.
8. Meier-Ruge WA, Ammann K, Bruder E, et al. Updated terminology of hypoganglionosis and related disorders. Pediatr Dev Pathol. 2004; 7(3): 267-74.
9. Kenny SE, Tam PK, Garcia-Barcelo M. Hirschsprung's disease. Semin Pediatr Surg. 2010; 19(3): 194-200.
10. Langer JC. Hirschsprung disease. Curr Opin Pediatr. 2013; 25(3): 368-74.
11. Rintala RJ, Pakarinen MP. Long-term outcomes of Hirschsprung disease. Semin Pediatr Surg. 2012; 21(4): 336-43.
12. Meier-Ruge WA, Brönnimann PB, Gambazzi F, Schmid P. Extended myectomy in anorectal motility disorders. Eur J Pediatr Surg. 1994; 4(6): 341-5.
13. Meier-Ruge WA, Bruder E, Holschneider AM. Extended myectomy for internal anal sphincter achalasia. J Pediatr Surg. 2004; 39(1): 79-83.
14. Langer JC, Rollins MD, Levitt MA. Evaluation and management of internal anal sphincter achalasia. J Pediatr Surg. 2020; 55(4): 635-41.
15. De Caluwé D, Puri P. Internal anal sphincter achalasia: a systematic review. Pediatr Surg Int. 2010; 26(11): 1107-12.
16. Atallah S, Albert M, Larach S. Transanal minimally invasive surgery: a giant leap forward. Surg Endosc. 2010; 24(9): 2200-5.
17. Buess G, Kipfmüller K, Hack D, et al. Transanal endoscopic microsurgery: results of 75 cases. Dis Colon Rectum. 1988; 31(10): 792-7.
18. Atallah S, Martin-Perez B, Keller D, et al. Robotic transanal minimally invasive surgery (R-TAMIS). Tech Coloproctol. 2014; 18(10): 1083-7.
19. Marks JH, Frenkel JL, Greenleaf CE, et al. Transanal endoscopic microsurgery for rectal lesions: experience with 425 cases. Surg Endosc. 2014; 28(1): 140-7.
20. Lacy AM, Tasende MM, Delgado S, et al. Transanal total mesorectal excision for rectal cancer: outcomes and controversies. Lancet Oncol. 2015; 16(1): e37-46.
21. Knowles CH, Scott SM, Lunniss PJ. High-resolution anorectal manometry: interpretation and clinical utility. Neurogastroenterol Motil. 2014; 26(8): 1083-98.
22. Bharucha AE, Wald A, Enck P, Rao SS. Functional anorectal disorders. Gastroenterology. 2006; 130(5): 1510-8.
23. Meier-Ruge WA, Bruder E. Calretinin immunohistochemistry in the diagnosis of Hirschsprung disease. Pediatr Dev Pathol. 2006; 9(3): 196-202.
24. Pini Prato A, Gentilino V, Giunta C, et al. Transition zone pull-through in Hirschsprung disease: a systematic review. Pediatr Surg Int. 2011; 27(11): 1105-10.
25. Friedmacher F, Puri P. Classification and diagnostic criteria of hypoganglionosis: a systematic review. Pediatr Surg Int. 2013; 29(9): 887-94.
26. Ralls MW, Coran AG, Teitelbaum DH. Reoperative surgery for Hirschsprung disease. Semin Pediatr Surg. 2012; 21(4): 354-63.
27. Teitelbaum DH, Coran AG. Long-term results and quality of life after surgery for Hirschsprung disease. Semin Pediatr Surg. 2017; 26(5): 336-45.
28. Gosain A, Frykman PK, Cowles RA, et al. Guidelines for the diagnosis and management of Hirschsprung disease. Pediatr Surg Int. 2017; 33(5): 517-21.
29. Heuckeroth RO. Hirschsprung disease — integrating basic science and clinical medicine to improve outcomes. Nat Rev Gastroenterol Hepatol. 2018; 15(3): 152-67.
30. Tomuschat C, Puri P. Hypoganglionosis: A review. Pediatr Surg Int. 2015; 31(4): 327-33.
31. Friedmacher F, Puri P. Rectoanal inhibitory reflex in Hirschsprung disease: a systematic review. Pediatr Surg Int. 2013; 29(9): 889-97.
32. De la Torre L, Ortega A. Transanal endorectal pull-through for Hirschsprung disease. J Pediatr Surg. 1998; 33(8): 1283-6.
33. Levitt MA, Peña A. Outcomes from the Peña pull-through for Hirschsprung disease. Semin Pediatr Surg. 2012; 21(4): 336-43.
34. Kyrklund K, Pakarinen MP, Rintala RJ. Long-term bowel function after surgery for Hirschsprung disease. J Pediatr Surg. 2010; 45(8): 1600-7.
35. Jarvi K, Laitakari EM, Koivusalo A, et al. Long-term outcomes of internal anal sphincter achalasia. J Pediatr Surg. 2013; 48(10): 2141-6.
36. van den Berg MM, Hogan M, Di Lorenzo C, et al. Colonic motility disorders in children. Neurogastroenterol Motil. 2006; 18(8): 613-22.
37. Camilleri M, Bharucha AE, di Lorenzo C, et al. American Neurogastroenterology and Motility Society consensus on anorectal testing. Neurogastroenterol Motil. 2017; 29(1): e12910.
38. Scott SM, Carrington EV. The London Classification: improving diagnostic performance in anorectal disorders. Clin Gastroenterol Hepatol. 2020; 18(4): 770-8.
39. Rao SS. Dyssynergic defecation and biofeedback therapy. Gastroenterol Clin North Am. 2008; 37(3): 569-86.
40. Felt-Bersma RJ. Rectal sensation and compliance in constipation. Neurogastroenterol Motil. 2013; 25(1): 4-6.
41. Meier-Ruge WA, Bruder E, Holschneider AM. Full-thickness biopsy in motility disorders. Eur J Pediatr Surg. 2003; 13(6): 386-92.

42. Holschneider AM, Puri P. Hirschsprung's Disease and Allied Disorders. 3rd ed. Springer; 2008.

43. Devesa JM, Vicente E, Enriquez JM, et al. TEM for benign rectal disease: long-term outcomes. Surg Endosc. 2009; 23(4): 802-8.

44. Albert MR, Atallah SB, deBeche-Adams T, et al. Transanal minimally invasive surgery (TAMIS) for rectal lesions. Dis Colon Rectum. 2013; 56(3): 396-402.

45. Keller DS, Haas EM. Robotic TAMIS: technique and outcomes. Tech Coloproctol. 2014; 18(10): 1089-94.

46. Sylla P, Rattner DW, Delgado S, Lacy AM. NOTES and transanal platforms: evolution of minimally invasive colorectal surgery. Clin Colon Rectal Surg. 2015; 28(3): 140-50.

47. Emile SH, Elfeki H, Shalaby M, Sakr A. Transanal minimally invasive surgery: a systematic review. Surg Endosc. 2018; 32(1): 1-17.

48. Lacy AM, Bollo J, Alonso V, et al. Robotic transanal surgery: current status. Tech Coloproctol. 2019; 23(3): 197-205.

49. van der Steeg HJ, Sloots CE, van der Steeg AF, et al. Long-term outcomes after transanal endosurgery. Colorectal Dis. 2017; 19(3): O75-82.

50. De Backer A, Vandenplas Y, Van Winckel M, et al. Clinical significance of transition zone pathology. J Pediatr Surg. 2000; 35(10): 1446-9.

51. Puri P, Shinkai M. Pathogenesis of Hirschsprung disease and related disorders. Semin Pediatr Surg. 2004; 13(1): 18-24.