



# **The Use of Botulinum Toxin as an Adjuvant in Managing Children with Chronic Constipation and Obstructed Defecation**

*A Thesis*

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سببنا أنك لا تعلم لنا  
إلا ما علمتنا أنك أنت  
العليم العظيم

صدق الله العظيم

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# Dedication

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# *List of Abbreviations*

Abb.	Full term
Ach.....	Acetylcholine
ARA .....	Anorectal angel
ARJ .....	Anorectal junction
ARM .....	Anorectal Manometry
BMP .....	Best Management Practices
BTX A .....	Botulinum neurotoxin type A
BTX.....	Botulinum neurotoxin
CFC.....	Chronic functuonal constipation
CLC .....	Chloride channel
CTT.....	Colonic transit time (CTT)
DRE .....	Digital rectal exam
ESPGHAN .....	The European Society for pediatric Gastroenterology Hepatology and Nutrition
FC .....	Functional constipation
GI.....	Gastrointestinal
IAS.....	Internal anal sphincter
LES.....	Lower esophageal sphincter
NASPGHAN .....	North American Society for Pediatric Gastroenterology, Hepatology and Nutrition
NICE.....	National Institute for health and Clinical Excellence
NMJ .....	Neuromuscular junction
ODS .....	Obstructed defecation syndrome
PACCT .....	The Paris Consensus on Childhood Constipation Terminology
PCL .....	Pubococcygeal line
PEG .....	Polyethylene glycol

## *List of Abbreviations Cont...*

Abb.	Full term
RAIR.....	Rectoanal inhibitory reflex (RAIR)
SBL.....	Senna laxative
SNAP-25.....	Synaptosomal-associated protein of 25 kd
SNM.....	Sacral neuromodulation

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## INTRODUCTION

**F**unctional constipation (FC) is a common pediatric healthcare problem worldwide, with reported prevalences ranging between 0.7 and 29.6 % and a mean female-to-male ratio of 2.1:1. FC is characterized by infrequent bowel movements, hard and/or large stools, painful defecation, and fecal incontinence, and is often accompanied by abdominal pain. These symptoms can have a significant impact on a child's well-being and health-related quality of life (*Koppen et al., 2015*).

Functional constipation is one of the commonest digestive complaints in children, which has become quite a proportion in public health problem. Like many other functional disorders, its etiology, pathophysiology and prognosis are ill-understood. This made its management a current work in progress field to reach a better satisfying outcome for the children and their families (*Rajindrajith and Devanarayana, 2011*).

As regards the clinical diagnosis of FC; the evaluation primarily consists of a thorough medical history and a complete physical examination. Additional investigations are not necessary in most cases. The physician should seek to understand the patient's perception of their current bowel habit, compared to the past and should include stool frequency, form and the ease of passage of stool. The use of the Bristol Stool

Chart may aid the patient in their description of the stool form (*Thayalasekeran et al., 2013*).

However, family physicians must be alert for red flags that may indicate the presence of an uncommon but serious organic cause of constipation, such as Hirschsprung's disease (congenital aganglionic megacolon), pseudo-obstruction, spinal cord abnormality, hypothyroidism, diabetes insipidus, cystic fibrosis, gluten enteropathy, or congenital anorectal malformation (*Biggs and Dery, 2006*).

Treatment of functional constipation involves disimpaction using oral or rectal medication. Polyethylene glycol is effective and well tolerated, but a number of alternatives are available. After disimpaction, a maintenance program may be required for months to years because relapse of functional constipation is common. Maintenance medications include mineral oil, lactulose, milk of magnesia, polyethylene glycol powder, and sorbitol (*Koppen et al., 2015*).

Despite treatment, only 50 to 70 percent of children with functional constipation demonstrate long-term improvement, hence the search for novel methods of treatment (*Biggs and Dery, 2006*).

## **AIM OF THE STUDY**

**T**his study aimed to evaluate the effectiveness of adding anal Botox injection to those already followed management plan for pediatric age group suffering from chronic functional constipation.

## Chapter 1

# DEFINITION AND PATHOPHYSIOLOGY OF CHRONIC FUNCTIONAL CONSTIPATION IN PEDIATRICS

### Chronic functional constipation prevalence:

**F**unctional constipation (FC) is a common disorder in children worldwide. Available data show that its prevalence is higher in the South Asian region and in South America, than in any other part of the world (*Rajindrajith et al., 2016*). While constipation occurs in all continents, currently there is a lack of prevalence data in children from Africa and Oceania (*Levy et al., 2017*).

The prevalence varies according to age groups. The peak incidence of constipation occurs between 2 and 4 years of age, when the potty training starts. A recent systematic review found that the median prevalence of constipation in children was 12%. The incidence of constipation reported in infants varies between 0.05% and 39.3% but based on expert consensus the prevalence is estimated at 15%. At this age, feeding is a major contributing factor (*Levy et al., 2017*).

Gender specific prevalence of constipation also varies between studies. Some studies have reported no difference in prevalence of constipation between girls and boys, while others

found significantly higher prevalence in girls (*Rajindrajith and Devanarayana, 2011; Levy et al., 2017*).

### **Defecation physiology:**

In order to understand the physiology of defecation, deep knowledge of the anatomy of the rectum and anal canal is very important. The rectum is the last part of the large intestine, located in the lower pelvis. Rectal function is crucial for retention of stool (continence) and for evacuation (defecation). The rectum in adult measures about 15–17 cm in length, descending along the sacrococcygeal concavity and passing through the pelvic floor to the anal canal. The major part is called the rectal ampulla, which is a wide segment, with a perimeter that can extend to more than 15 cm. The lowest and narrowest part is the anal canal. The anorectal junction is formatted by the constant traction of the puborectal sling. The levator ani muscle, formed by the iliococcygeus, the pubococcygeal, and the puborectal muscles, serves as the pelvic floor. The relaxation of levator ani, and mainly the puborectalis muscle, the perineum and contraction of the lower abdomen, and the relaxation of the anal sphincter, all work in tandem in order to provide a normal defecation. Distention of rectal wall stimulates contractions of colon and rectal wall, mediated by the parasympathetic defecation reflex. Thus, phasic rectal contractions start and tone increases, formatting a conduit shape of rectum rather than a reservoir (**Figure 1**) (*Palit et al., 2012*).