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# Why refer to OT?

- Bowel control, as well as personal hygiene are important activities of daily living (American Occupational Therapy Association, 2008).
- Problems in these areas may limit independence and individual social participation.
- The acquisition of voluntary continence of the bowel, as well as independence in hygiene are considered an important milestone of childhood.

# Data Driven Decision Making

Identifying Strengths and Participation Challenges

Identify Theory

Conducting the Comprehensive Assessment

Generating Hypotheses

**Developing and Scaling Goals** 

Identifying Outcome Measures

Setting the Stage for Intervention

Conducting the Intervention

Measuring Outcomes and Monitoring Progress

SENSORY INTEGRATION ASSESSMENT INTERPRETATION TOOL 📤 -SIPT ★ EASI - SPM/SP 🚇 - OTHER TESTS 📮					
Problems in Vestibular Bilateral Integration					
	Problems in Somatoprasis		Problems in Visuopraxis	Problems in Sensory Reactivity	
Sensory Perception				Sensory Reactivity	
Vestibular Processing PRN/VN	Proprioception    XIN       Prop JP       Prop: F       position    awareness; use of force	Tactile Perception  MFP  GRA  LTS  TP:S  TP:O  TP:D  TP:D  ability to find or manipulate objects w/o vision	Visual Perception  SV A  FG A  VP: 5   other visual perception tests (e.g. DTVP, TVPS   visual perception abilities (e.g. puzzles, hidden figure games)	Sensory Over-Reactivity  Signs of over-or beightened responses: SPM Bal & Moy't. GI / PC	Sensory Under Reactivity  Signs of under responses:SPM Bal & Mov'tSPM Bal & Mov'tSPM TouchTP testsSR-TactileSPM HearingSPM Hearing
Praxis & Motor Related Function  Postural/Ocular  SWB	Postural Mechanisms SWB ABAI ABAI ABAI ABAI ABAI ABAI ABAI AB	Somatesensory-based Praxis  PPY A  OP A  SPr A  BMC A  Pr.P M  Pr. S A  Language-based Praxis  PYC A  PYFO M  Meation-based Praxis  Pr. I M  SPM Planning & Ideas  ability to learn new  ability to learn new	Visuopraxis  MAc DC DC CPr VP: D VP: C VP: C Other visual motor tests (e.g. VMI) D Ability to draw, write, build, fold, etc.	SPM Hearing SR-Auditory SR-Auditory SR-Offactory SPM Vision other observations or caregiver report on over reactions to sensory input (e.g. temperature, pain or other sensation)	SPM Taste/Smell SR-Olfactory SR-Olfactory SPM Vision  other observations or caregiver report on under reactions to sensory input (e.g. temperature, pain or other sensation)

# From clinical practice to research and back

Clinical cases 2005

Systematic data collection THPQ

Pilot study n=36 2016 Refined data collection THPQ-R

Study #2 n=276 2019 Clinical cases
Further analysis
2021

### Recent meta-analysis on prevalence of FDD

37 studies; 35 constipation, 15 FNRFI

**Constipation**: 0,5% to 32,2%; **9,5%** (CI 95%: 7,5 a 12,1).

FNRFI: 0.0% to 1.8%; **0.4%** (CI 95% 0.2-0.7).

Koppen, I. J., Vriesman, M. H., Saps, M., Rajindrajith, S., Shi, X., van Etten-Jamaludin, F. S., ... & Tabbers, M. M. (2018). Prevalence of functional defecation disorders in children: a systematic review and meta-analysis. The Journal of Pediatrics, Volume 198, July 2018, Pages 121-130.e6

https://doi.org/10.1016/j.jpeds.2018.02.029

# What do we know about constipation and retentive fecal incontinence in children?

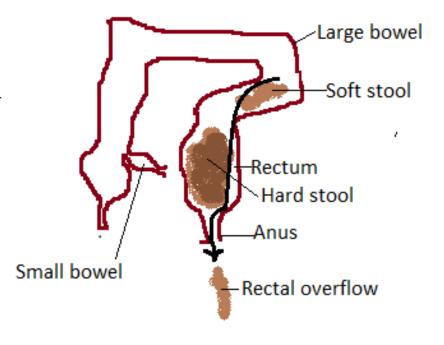


 Pathophysiology is recognized to be multifactorial and remains incompletely understood.

(Mugie, Di Lorenzo, & Benninga, 2011)

# **Retentive Fecal Incontinence**

- Soiling associated with constipation.
- Involuntary.
- Soft stool from the bowel slips around a hard mass of stool in rectum.
- One of the most common gastrointestinal complaints in toddlers.



(Cohn, 2011)

### Medical treatment convencional



- 1) Education
- 2) desimpacation of faeces\*
- 3) Re-accumulation prevention\*
- 4) non-punitive attitude and basic behavior modification strategies
- Based on abundant evidence
   (North American Society for Pediatric Gastroenterology, Hepatology and Nutrition, 2006;2014)

# Conventional medical intervention doesn't always solve the problem

Long-term studies: 25% to 50% un respond Many continue to struggle in adulthood

(Bongers, Van Wijk, Reitsma, Benninga 2010; Khan et al., 2007; Van Ginkel et al., 2003; Michaud, et al., 2009; Mousa et al., 2020; Pijper et al., 2010; Procter & Loader, 2003; Staiano, Andreotti, Greco, Basile, & Auricchio, 1994; Van Mill, Koppen & Benninga, 2019).

https://doi.org/10.1007/s11894-019-0690-9



### Evidence-Based Recommendations ESPGHAN and NASPGHAN Tabbers et al, 2014

JPGN • Volume 58, Number 2, February 2014

IPGN • Volume 58, Number 2, February 2014

Evaluation and Treatment of Functional Constipation in Children

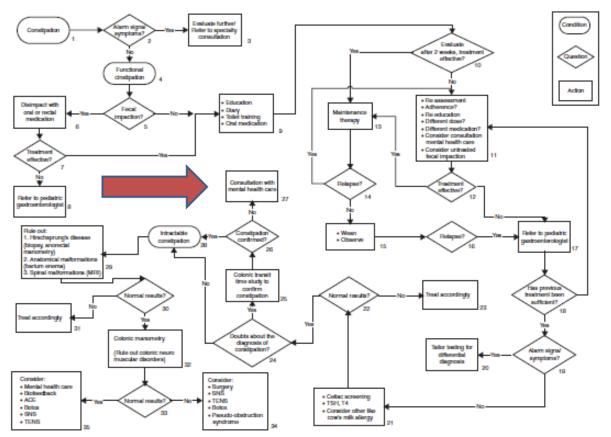


FIGURE 2. Algorithm for the evaluation and treatment of infants ≥6 months of age. ACE = antegrade continence enema; MRI = magnetic resonance imaging; SNS = sacral nerve stimulation; TENS = transcutaneous electric nerve stimulation; TSH = thyroid-stimulating hormone.

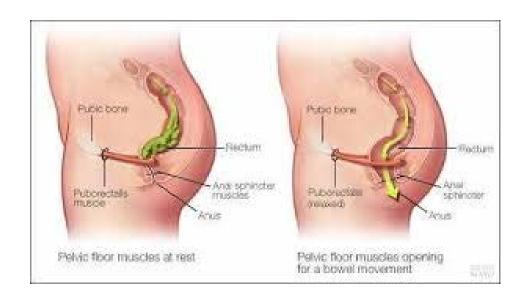
### **Diet modification**



- Many researchers
   describe treatments
   aimed at increasing fiber
   intake in children.
- It is often part of conventional medical treatment

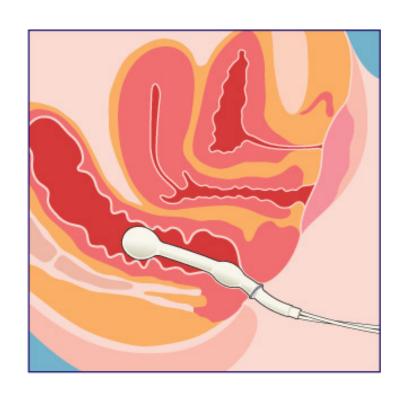
(Karagiozoglou-Lampoudi, 2012; Kuhl, Felt, & Patton, 2009; Sullivan, Alder, Shrestha, Turton, & Lambert, 2012)

# physiotherapy



https://urologyaustin.com/physicaltherapy/constipation-and-pelvic-floorphysical-therapy/ Pelvic floor muscles play a role in intestinal function. The puborectal muscle wraps around the rectum and should be able to relax enough to allow stool to pass, but also maintain enough tension to support the rectum during defecation.

# feedback



- To teach you how to control sphincter muscles.
- (Brazelli, Griffiths, Cody & Tappin, 2011; Chiaroni & Whitehead, 2008)

### massage



- Limited evidence in the scientific literature.
- It abounds among practitioners of traditional Indian, Chinese, Arabic, Egyptian and Greek medicine practitioners.
- (Culbert & Banez, 2007; Silva, Cignolini, Warren, Budden, & Skowron-Gooch, 2007).

# Neuromodulation-based treatments



- Pharmacological treatments
- Psychocognitive interventions
- Electrical stimulation of neural circuits.
- (Bonaz & Sabate, 2009; Lackner et al., 2006;
  Mayer, Tillisch, & Bradesi, 2006; Chase,
  Robertson, Southwell, Hutson, & Gibb, 2005;
  Gaman & Kuo, 2008; Ismail et al., 2009;
  Leong et al., 2011; Iacona, Ramage,
  Malakounides, 2019)

# Psychological therapy: Cognitive and behavioral interventions



The child does not want to participate in toileting routines

- 1) Phobic reactions to defecation
- 2) Parent education on behavioral procedures
- 3) Play therapy
- (Dijk, Benninga, Grootenhuis, Onland-van Nieuwenhuizen, & Last, 2007)

 Probiotics, prebiotics, symbiotics, antibiotics and fecal microbiota transplantation.

Ohkusa et al., (2019) Doi.org/10.3389/fmed.2019.00019 Thursby & Juge, (2017) DOI: 10.1042/BCJ20160510

# Study and management of intestinal flora



# Data Driven Decision Making

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Measuring Outcomes and Monitoring Progress

Beaudry, I. B., Schaaf, R. C., & Ramos, E. P. (2013). Brief Report— Occupational therapy based on Ayres Sensory Integration in the treatment of retentive fecal incontinence in a 3year-old boy. American Journal of Occupational Therapy, 67, 601– 606.

#### Dr. Eduardo Ramos-Polo:

- Pediatric gastroenterologist
- Concerned with participation in defecation and toilet routines
- Limited success of behaviorism approaches
- Urged me to evaluate his patients
- Sensory hyperreactivity

(Beaudry-Bellefeuille & Ramos-Polo, 2011; Beaudry-Bellefeuille, Schaaf & Ramos-Polo 2013)

Referral from gastroenterology to OT (2005)



# Implications for occupational therapy

• Occupational therapists with post professional training in ASI® should be considered as part of the interdisciplinary teams who treat children with FDD and stool withholding behavior in order to correctly diagnose and treat underlying sensory difficulties that can be at the root of the behaviors of children FDD.

#### **REVIEW ARTICLE**

# Defecation-Specific Behavior in Children with Functional Defecation Issues: A Systematic Review

Isabelle Beaudry-Bellefeuille, MSc; Debbie Booth, M App Sci; Shelly J Lane, PhD, OTR/L, FAOTA, PhD

Perm J 2017;21:17-047

E-pub: 09/29/2017 https://doi.org/10.7812/TPP/17-047

#### **ABSTRACT**

Context: Atypical defecation habits are common and distressing for children and families and can have a major impact on quality of life. Often, no underlying factor can be identified, and the defecation disorder is considered functional. Current interventions are not successful for up to 50% of children. We suggest this high failure rate may be caused by lack of consistency in descriptors of behavioral indicators for functional defecation problems. Most investigations and descriptors focus on general behavior. There are fewer reports concerning defecation-specific behaviors.

Objective: To develop a thorough inventory of defecationspecific behaviors, providing a more informed foundation for assessment and intervention.

Design: A systematic review of six common databases was performed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses recommendations. Reference lists of retained articles were screened for additional studies. behaviors. However, both general and defecation-specific behavioral concerns are thought to play an important role in the development and in the persistence of constipation.<sup>3</sup> A deeper understanding of the behaviors reflective of actual toileting and defecation problems could provide greater insight into the unique manifestations of functional defecation disorders and thus a better foundation for treatment. Because approximately 25% to 50% of children do not fully recover from functional defecation disorders despite medical management and therapeutic strategies,<sup>3,4</sup> reconsidering our understanding of these disorders is imperative.

When referring to gastrointestinal disorders, the term functional is used to describe conditions that cannot be linked to a single discrete underlying biological etiology and are the result of the interaction between psychosocial factors and altered gut physiology via the brain-gut axis.<sup>5</sup> The Rome Foundation diagnostic criteria are considered a gold standard for identification of functional gastrointestinal disorders.<sup>4,5</sup> In the case of child-





# Sensory Integration Concerns in Children With Functional Defecation Disorders:

A Scoping Review

Isabelle Beaudry-Bellefeuille, Shelly J. Lane, Alison E. Lane

**OBJECTIVE.** We examined the literature to identify reports of sensory integration concerns in children with functional defecation issues and to explore whether difficulty processing sensation may be related to their challenging bowel management behaviors.

**METHOD.** A scoping review was used to address the research question. We sourced articles from six databases in three languages, searched reference lists of all included articles, and identified additional articles through discussion with experts in the field.

**RESULTS.** Twelve articles were included in the final synthesis, identifying 15 challenging behaviors potentially related to sensory integration concerns.

**CONCLUSION.** We summarize research documenting sensory integration concerns in children with functional defecation issues, providing researchers and clinicians with an overview of the current state of understanding.

### The toileting habit profile questionnaire: Examining construct validity using the Rasch model

Isabelle Beaudry-Bellefeuille<sup>1,2</sup>, Anita Bundy<sup>3</sup>, Alison Lane<sup>4</sup>, Eduardo Ramos Polo<sup>5</sup> and Shelly J Lane<sup>6</sup>

British Journal of Occupational Therapy 1–13

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#### Abstract

Introduction: Preliminary reports support the hypothesis that sensory issues may be related to atypical defecation habits in children. Clinical practice in this area is limited by the lack of validated measures. The toileting habit profile questionnaire was designed to address this gap.

Methods: This study included two phases of validity testing. In phase 1, we used Rasch analysis of existing data to assess item structural validity, directed content analysis of recent literature to determine the extent to which items capture clinical concerns, and expert review to validate the toileting habit profile questionnaire. Based on phase 1 outcomes, we made adjustments to toileting habit profile questionnaire items. In phase 2, we examined the item structural validity of the revised toileting habit profile questionnaire.

Results: Phase 1 resulted in a 17-item questionnaire: 15 items designed to identify habits linked to sensory over-reactivity and two designed to identify sensory under-reactivity and/or poor perception items. The analysis carried out in phase 2 supported the use of the sensory over-reactivity items. Remaining items can be used as clinical observations.

Conclusion: Caregiver report of behaviour using the revised toileting habit profile questionnaire appears to adequately capture challenging defecation behaviours related to sensory over-reactivity. Identifying challenging behaviours related to sensory underreactivity and/or perception issues using exclusively the revised toileting habit profile questionnaire is not recommended.



### The Toileting Habit Profile Questionnaire-Revised: Examining Discriminative and Concurrent Validity

Isabelle Beaudry-Bellefeuille (pa,b, Alison Lanec, Simon Chiud, Christopher Oldmeadowe, Eduardo Ramos Polof, and Shelly J Laneg

<sup>a</sup>Occupational Therapy, University of Newcastle, Callaghan (NSW), Australia; <sup>b</sup>Clinica de Terapia Ocupacional Pediatrica Beaudry-Bellefeuille, Private Practice, Oviedo, Spain; <sup>c</sup>School of Health Sciences, University of Newcastle, Australia; <sup>d</sup>Hunter Medical Research Institute, New Lambton Heights (NSW), Australia; <sup>e</sup>Clinical Research Design and Statistical Services, Hunter Medical Research Institute, New Lambton Heights (NSW), Australia; <sup>f</sup>Paediatric Gastroenterologist, Private Practice, Oviedo, Spain; <sup>g</sup>Occupational Therapy, School of Health Sciences, University of Newcastle, Australia.

#### ABSTRACT

Sensory over-reactivity may be related to atypical defecation habits in children with constipation. The Toileting Habit Profile Questionnaire-Revised (THPQ-R) is designed to identify defecation-related sensory issues. This study examined the discriminative and concurrent validity of the THPQ-R. Differentiating between children with and without constipation was used to establish discriminative validity. The relationship between scores on the THPQ-R and on the defecation scale of the Virginia Encopresis-Constipation Apperception Test (VECAT-S) was examined to establish concurrent validity. The difference in THPQ-R scores was statistically significant. There was a strong positive correlation between the over-reactivity section of the THPQ-R and VECAT-S scores. Results support using the THPQ-R to identify atypical defecation behaviors.

#### ARTICLE HISTORY

Received 10 December 2018 Accepted 2 March 2019

#### KEYWORDS

Constipation; child; occupational therapy; sensory integration





#### Examining Hyper-Reactivity to Defecation Related Sensations in Children with Functional Defecation Disorders

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<sup>1</sup>Occupational Therapy, University of Newcastle, Callaghan, Australia <sup>2</sup>MM. Pediatric Gastroenterologist. Private Practice. Oviedo. Spain

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Isabelle Beaudry-Bellefeuille, Occupational Therapy, University of Newcastle, Callaghan, Australia. Tel: +34 985 295184; Email: ibbergo@gmail.com Received: 08-10-2019 Revised: 17-12-2019

Accepted: 17-12-2019

#### Abstract

Background: Adequate sensory perception and reactivity to sensory stimuli associated with defecation is key to successful stool toileting. Preliminary reports suggests that some of the difficulties that many children with FDD experience with toileting could be related to sensory hyper-reactivity. Objective: This study investigated the relationship between sensory hyper-reactivity and functional defecation disorders (FDD).

Methods: Parents of three to six-year-old children with and without FDD completed two questionnaires; the Toileting Habit Profile Questionnaire-Revised (THPQ-R; tool that measures sensory hyper-reactivity to defectation related sensations) and the Short Sensory Profile (SSP). On both questionnaires, low scores indicate more concerns. Between group comparisons and the relationship between scores on the THPQ-R and on the sensory hyper-reactivity items of the SSP were examined.

Results: The sensory hyper-reactivity mean score of the SSP was lower for children with FDD. The difference was statistically significant (P=0.0005). There was a positive correlation between THPQ-R and SSP hyper-reactivity scores (r274=0.485, P=0.0005). Further, higher levels of sensory hyperreactivity (low SSP score) were associated with a higher frequency of the challenging defecation behaviors described in the THPQ-R (low THPO-R score).

Conclusion: Health practitioners do not usually consider sensory hyper-reactivity as a possible factor contributing to the difficulties of the child with FDD. Our results indicate that routine screening for sensory hyper-reactivity may be an important practice element when working with children with FDD. In addition, the present study adds support to the validity of the THPQ-R in identifying behaviors potentially linked to sensory hyper-reactivity.

Beaudry-Bellefeuille, I., Lane, A., Ramos-Polo, E., Lane, S. (2019). Examining hyper-reactivity to defecation related sensations in children with functional defecation disorders. Annals of Colorectal Research, 7(4), 1-7.

### Intervention model

**Current Situation** 

Normal intestinal transit

Identify underlying factors

Progressive steps which will lead us to our final goal

Feel the urge, hold for a moment, go and sit on the toilet

(Baby, diaper, toilet/potty training, pain, fissures, etc.)	(Context, how, where, when, defecation diary)	(Constipation, slow transit, bloating, test results, treatments, etc.)	Functional Defecation Disorder Clinical	
Sensory Discrimination-	Sensory Hyperreactivity	Feeding	Reasoning	
Perception issues/ Hypo-	(SPM, SP, THPQ-R items 1-	(Selective/picky feeder,	Tool	
reactivity (SIPT, EASI, SPM, SP, Manometry, THPQ-R items 16-17, poor visceral perception**)	15, visceral hyperreactivity*)	fibre, special diet, allergies, etc.)	SPM: Sensory Processing Measure (Parham & Ecker, 2007); SP: Sensory Profile (Dunn, 1999); THPQ: Toileting Habit Profile Questionnaire (Beaudry- Bellefeuille, Lane, & Ramos, 2016; Beaudry-Bellefeuille, Bundy, A Lane, Ramos-Polo, SJ Lane, 2019); SIPT: Sensory	
Pelvic floor/muscle control	Challenging toileting	Trauma, attachment and	Integration and Praxis Tests	
(Urinary or faecal incontinence)	behaviours / Attitude (Fearful, motivated, refuses, does not care, THPQ-R, VECAT)	other emotional issues (Abuse, negligence, violent enemas, birth of sibling, divorce, change of school, bullying, etc.)	(Ayres, 1989); EASI: Evaluation in Ayres Sensory Integration (Mailloux, Smith-Roley, Parham, 2017); VECAT: Virginia Encopresis-Constipation Apperception Test (Cox et al., 2003). * Awad & Camacho (2009); Faure & Wieckowska (2007); **Foo et al., 2016	

Digestive issues

**Current situation** 

History of defecation

# TREATMENT PLAN Plan de Tratamiento



Toileting/ Intestinal transit Hacer caca/tránsito intestinal	Strategies/recommendations Estrategias/recomendaciones	

# Establish a relationship of trust

- Do you want to poop?
- Have you pooped?
- How is the day-to-day with the child, how does the child act, how do the parents act...
- The conduct of one and all impacts upon the acceptance of defecation...



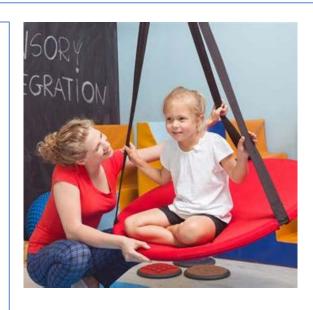
# Problematic Behavior

### • Understand in order to be able to intervene:

- Impact of the caregiver's conduct regarding the GI function of the child (eg, punishments for involuntary incontinence, excessive expectations)
- Impact of the child's conduct in the face of demands of the caregiver (eg, stubbornness, rejection of the WC)
- Impact of the gastrointestinal processes on the child's conduct (eg, pain when defecating)
- Impact of the child's conduct upon the gastrointestinal processes (eg, voluntary withholding of stools).

# Sensory Problems

- Intervention from the approach of Ayres sensory integration (ASI®)
- Sensory strategies for the home





# Rejection of the WC

#### Desensitization:

Progressive nearing towards the rejected stimulus, while also assuring a calm state of alert

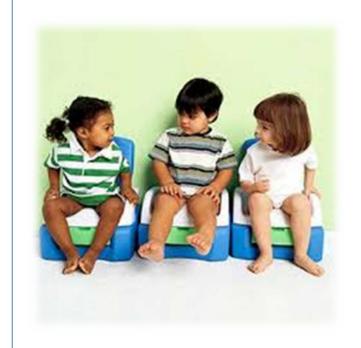


Moving the child towards the bathroom.

- Symbolic play in the bathroom.
- Changes in posture in the bathroom while playing symbolically.
- Poop in the different previous positions.
- Remove some clothing (trousers, underwear)
- Poop while squatting on the floor.
- Poop in the potty with training.
- Poop in the potty without training.
- Etc.

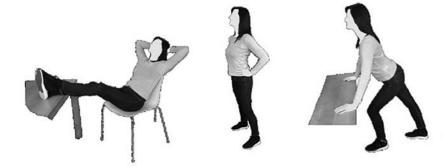
# Become conscious of the need to poop

- Establish a gradual timetable.
- Once it is stable, offer a time frame to see whether the child asks to go; take it to the WC if it doesn't ask to go within a reasonable period of time.
- Some children can need an external reminder for a long time (or forever) and will be continent whenever somebody reminds them to go to the WC.



# What about interoception?

**Powerful Postures** 



Neutral Postures







Adopting open and conscious postures and moving the body in space seems beneficial for improving interoceptive accuracy as well as for reducing anxiety.

Weineck F, Schultchen D, Hauke G, Messner M, Pollatos O (2020) Using bodily postures to reduce anxiety and improve interoception: A comparison between powerful and neutral poses. PLoS ONE 15(12): e0242578. https://doi.org/10.1371/journal.pone.0242578

Beaudry-Bellefeuille I, Lane SJ, Lane A. Sensory integration concerns in children with functional defecation disorders: A scoping review. Am J Occup Ther:73(3)

Beaudry-Bellefeuille I, Lane SJ. Examining sensory over-responsiveness in preschool children with retentive fecal incontinence. Am J Occup Ther. 2017;71(5): 7105220020p1-7105220020p8.

Beaudry Bellefeuille I, Ramos Polo E. Tratamiento combinado de la retención voluntaria de heces mediante fármacos y terapia ocupacional [Combined treatment of volontary stool retention with medication and occupational therapy]. Bol Pediatr 2011;51:169-176.

Beaudry IB, Schaaf RC, Ramos EP. Brief Report—Occupational therapy based on Ayres Sensory Integration in the treatment of retentive fecal incontinence in a 3-year-old boy. Am J Occup Ther 2013;67(5), 601–606.

Beaudry-Bellefeuille I, Bundy A, Lane A, et al. The Toileting Habit Profile Questionnaire; Examining Construct Validity using the Rasch Model. Br J Occup Ther. 2018: doi: 10.1177/0308022618813266

Beaudry-Bellefeuille I, Lane SJ, Chiu S, et al. The Toileting Habit Profile Questionnaire-Revised; examining discriminative and concurrent validity. Journal of Occupational Therapy, Schools, & Early Intervention 2019; doi: 10.1080/19411243.2019.1590756

Beaudry-Bellefeuille I, Lane SJ, Ramos-Polo E. The Toileting Habit Profile Questionnaire: Screening for sensory-based toileting difficulties in young children with constipation and retentive fecal incontinence. Journal of Occupational Therapy, Schools, & Early Intervention 2016;9(2): 163-175.

# Thank you