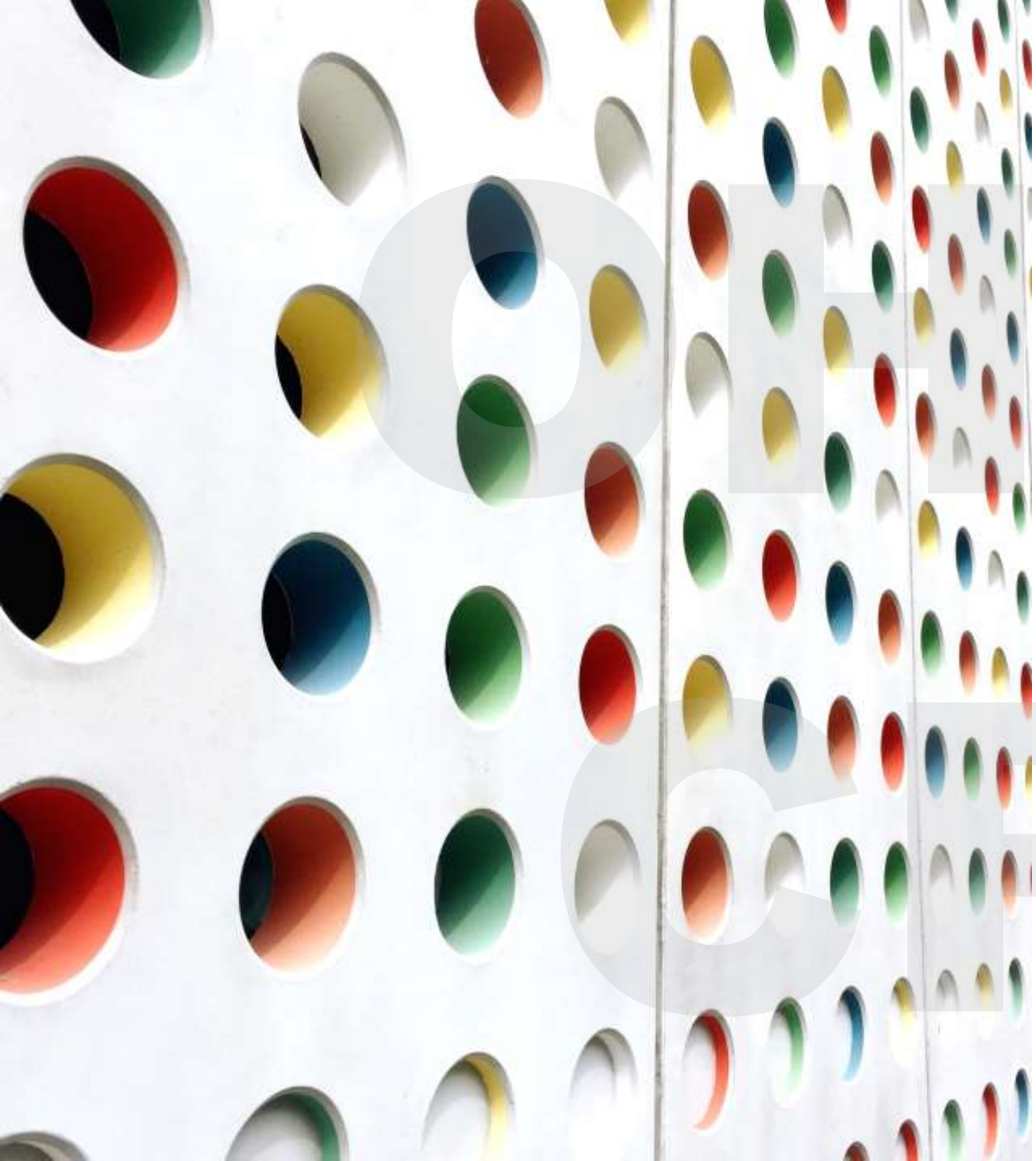

Abdominal Pain, Workup, and How to Approach Patients When it's Negative

RUTH DUFFIELD FNP

OHSU/DOERNBECHERS

PEDIATRIC GASTROENTEROLOGY

Disclosures

NONE

Objectives

Evaluate testing

Define functional abdominal pain or Disorders of the Gut Brain Interaction (DGBI)

Differentiate functional from organic abdominal pain

Explore the ROME Criteria

Identify family dynamics and history

Case study.....

Brittney is an 11 year old female who comes to the office for the second time this month for periumbilical abdominal pain. They were in the ER two weeks ago with normal labs and both an US and also CT scan were done. Both Brittney and her Mom report that the pain occurs daily, and has been present for over several months. She is not losing weight. There is no set pattern identified, and they have been unable to associate foods with her pain. Anxiety can increase her symptoms. She has no allergies. There are no known 'red flags' suggesting an organic source for her pain. There is no known family history of GI disease including IBD. However, her Mother shares that there is IBS and also anxiety with depression on both maternal and paternal sides. Brittney reports getting along in school and with friends but she is missing days of school. The PE is unremarkable. A friend advised Mom to ask for a 'scope'.

Work up

Suggested testing for evaluation from our web site

PEDIATRIC GASTROENTEROLOGY

Work-up Summary

We received your request to have your patient evaluated in our pediatric GI clinic. In order to make your patient's GI visit more diagnostically useful, please consider ordering the following tests based on your patient's symptoms and fax the results to our office at **503-418-1377**. Please consider giving the parent(s) a copy of the results to bring with them to the New Patient Consultation.

Failure to thrive

- CBC with differential
- Complete metabolic panel
- Total IgA
- IgA for Tissue Transglutaminase (TTG)
- Thyroid stimulating hormone (TSH)
- ESR and C-Reactive Protein
- Fecal Calprotectin (if diarrhea)
- Urine pregnancy screen if past menarche

Persistent vomiting/reflux

- Upper GI (X-ray with barium) to the Ligament of Treitz to evaluate for malrotation

Abdominal pain

- CBC with differential
- Complete metabolic panel
- ESR and C-Reactive Protein
- Lipase
- Total IgA
- IgA for Tissue Transglutaminase (TTG)
- Fecal Calprotectin (if diarrhea)
- Urine pregnancy screen if past menarche

Nausea

- CBC with differential
- ESR
- Lipase
- Complete metabolic panel
- Urine pregnancy screen if past menarche

Persistent diarrhea (> three weeks)

- CBC with differential
- Complete metabolic panel
- ESR and C-Reactive Protein
- Total IgA
- IgA for Tissue Transglutaminase (TTG)
- Stool culture
- Fecal calprotectin
- Fecal elastase and qualitative fat stain including Yersinia, Shigella, Salmonella, Campylobacter, E. coli O157:H7
- Stool for ova and parasites including Giardia antigen and Cryptosporidium
- Stool alpha-1 antitrypsin

Blood in stool – Baby

- Stool culture and calprotectin
- CBC with differential
- C. difficile if infant > six months of age

Blood in stool – Kids

- CBC with differential
- ESR and C-Reactive Protein
- Complete metabolic panel
- Fecal calprotectin and WBC
- Stool culture including Yersinia, Shigella, Salmonella, Campylobacter, E. coli O157:H7
- Stool for C. difficile toxins A and B

OHSU DOERNBECHER CHILDREN'S Hospital

Therapeutic Relationship ....

Engage the child in the visit; eye contact, affirmative nods, relevant medical information

A nondirective, nonjudgmental, patient centered interview: child's feelings, thoughts and experience

Immediate reason for visit: asking, 'What led you to see me at this time?': concern for serious illness, family stressors, developing psychiatric comorbidity (anxiety, depression),impairment of daily function (school and peer relationships), and the hidden agendas

Careful PE and cost efficient investigation

Determine understanding of illness and also symptoms.

Respond realistically, 'How do you think I can be helpful?' and set limits

Involve child and family in treatment : 'Let me suggest some treatments for you to consider'

Di Lorenzo, C., Nurko, S., Drossman, D.A., Chang, L., Chey, W., Kellow, J., Tack, J., Whitehead, W., et. Al. (Eds.). (2016). Rome IV Pediatric Functional Gastrointestinal Disorders: Disorders of Gut-Brain Interaction. The ROME Foundation.

Red Flags, or alarm symptoms.....

Pain that wakes a child from sleep

Localization in the RUQ or RLQ abdomen

Rectal blood loss

Diarrhea and or vomiting

Fever by history

Family history of IBS or Celiac disease

Weight loss

Family history first degree peptic ulcer disease

Abnormal labs: CBC-elevated WBC, elevated PLT, low Hgb-CMP with low Albumin

Concern by Provider

Gijsbers, C.F.M., Benninga, M.A., Schwiezer, J.J., Kneepkens, C.M.F., Vergouwe, Y., Buller, H.A. (2014). Validation of the Rome III Criteria and Alarm Symptoms for Recurrent Abdominal Pain in Children. Journal of Pediatric Gastroenterology and Nutrition, 58, 779-785.

What is Functional Abdominal Pain?

Pediatric Functional abdominal pain disorders (FAPDs) are characterized by recurrent or persistent abdominal pain. No organic cause is identified.

Considered one of the most common chronic pain disorders in childhood

The prevalence is approximately 13% and for many children the abdominal problems will persist into adult hood

Pediatric FAPDs are associated with lower quality of life, increased health care costs and impaired social interactions

Lalouni, M, Ljotsson, B., Bonnert, M., Ssegonja, R., Benninga, M., Bjureberg, J., Hogstrom, J., Sahlin, H., Simren, M., Feldman, I., Hedman-Lagerlof, E, Serlachius, E., Olen, O. (2019). Clinical and Cost Effectiveness of Online Cognitive Behavioral Therapy in Children with Functional Abdominal Pain. Clinical Gastroenterology and Hepatology, 17, 2236-2244.

Independent, not-for-profit, international organization

To assist in diagnosing and treating by developing a symptom-based diagnostic criteria for GI disorders

Rome I (1994) -> Rome II (2000) -> Rome III (2006)

Rome IV (2016) - **Functional Gastrointestinal Disorders (FGIDs)**

Rome V Criteria to be completed 2026

- Renamed **Disorders of Gut-Brain Interaction (DGBIs)**

ROME FOUNDATION

Rome V will be representing 27 countries

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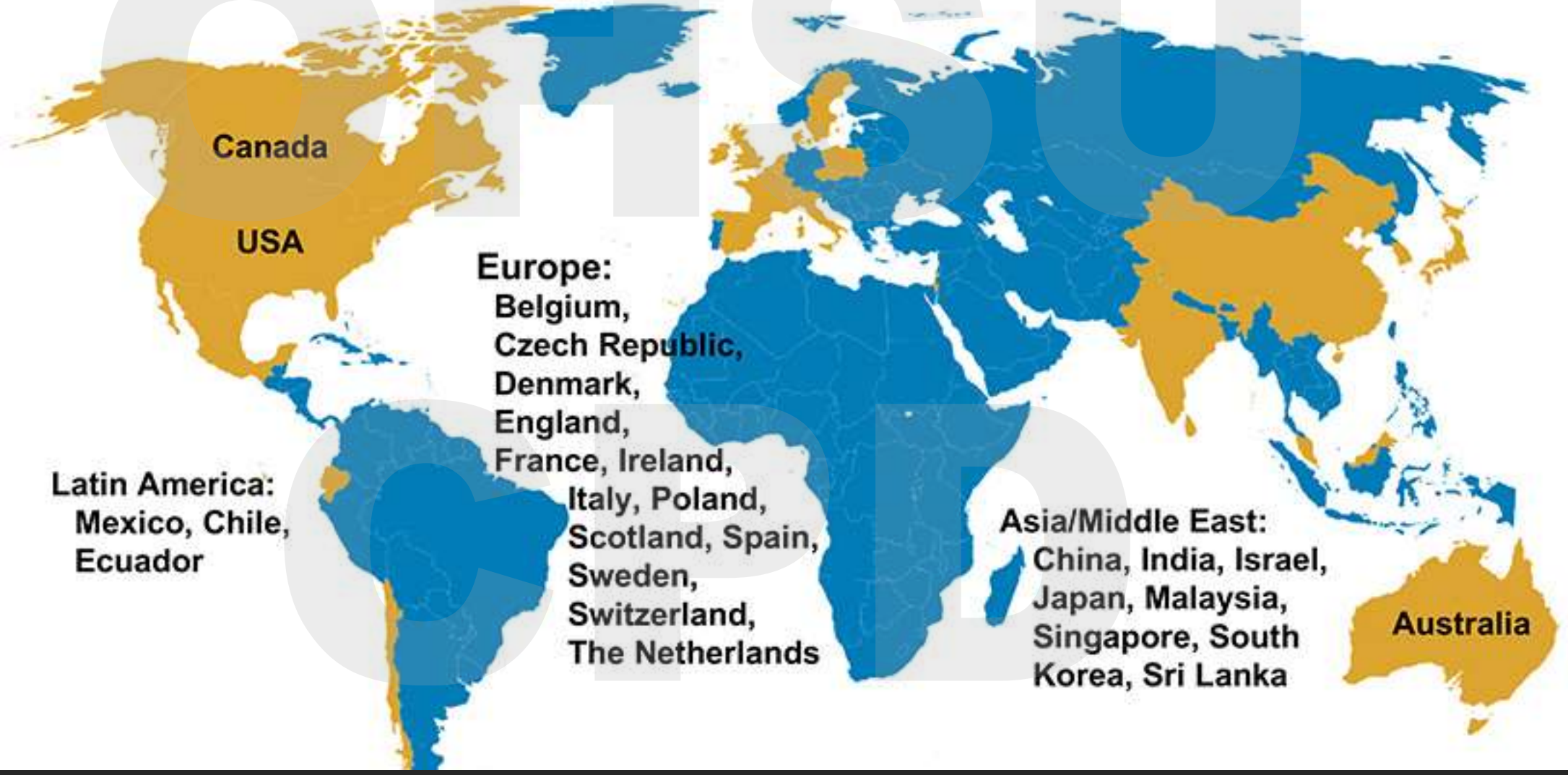
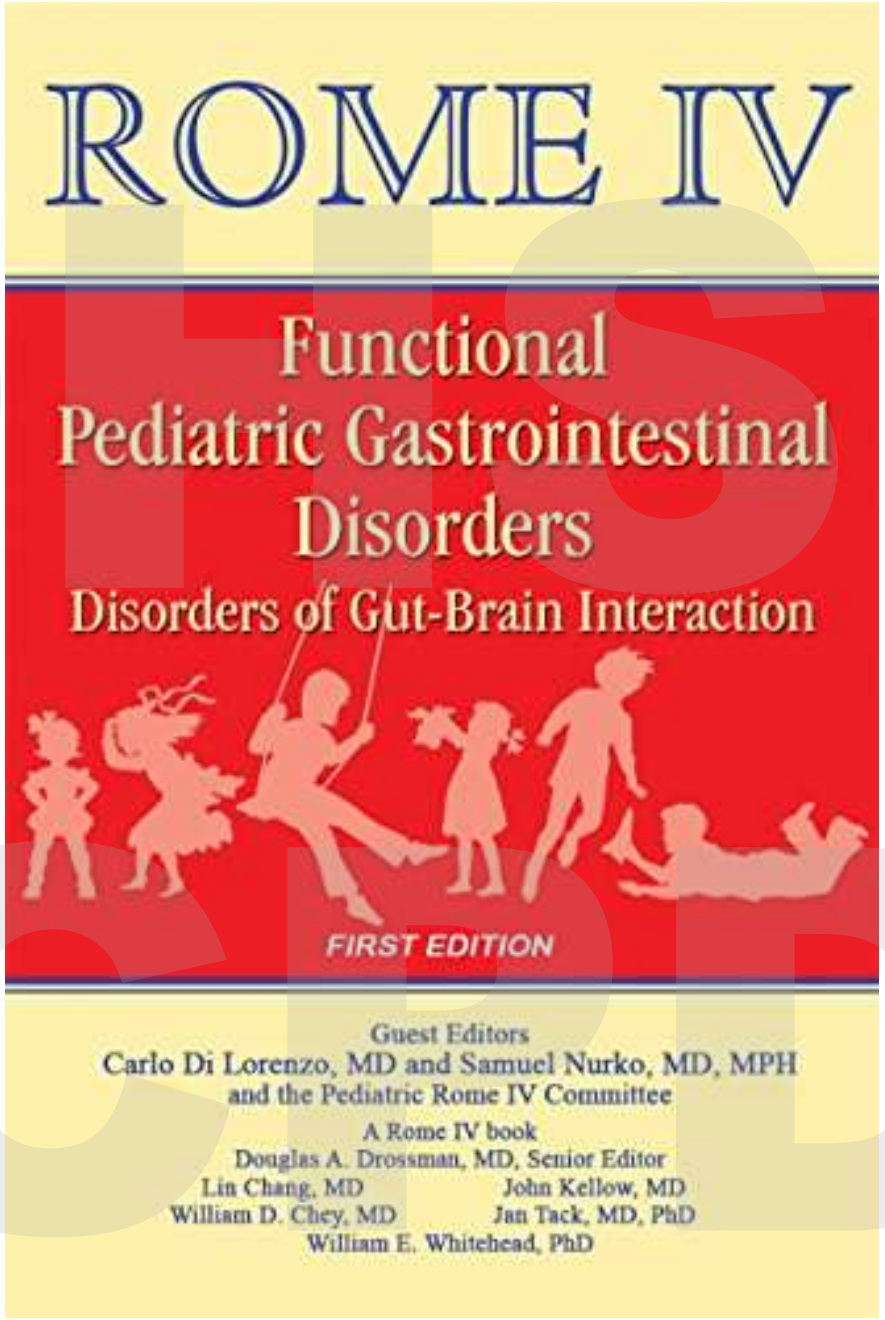



ROME IV
Functional
Pediatric Gastrointestinal
Disorders
Disorders of Gut-Brain Interaction
FIRST EDITION
Guest Editors
Carlo Di Lorenzo, MD and Samuel Nurko, MD, MPH
and the Pediatric Rome IV Committee
A Rome IV book
Douglas A. Drossman, MD, Senior Editor
Lin Chang, MD
John Kellow, MD
William D. Chey, MD
Jan Tack, MD, PhD
William E. Whitehead, PhD

Pediatric Functional Gastrointestinal Disorders…Complex

The Rome IV (2016), is a stand alone book for pediatrics. The reason given, is that for the pediatric population (infants to adolescents), complaints are often misdiagnosed and over investigated. Plus, for many adults, their FGID started in childhood.

There are currently 17 pediatric FGIDs, identified as Disorders of the Gut-Brain Interaction (DGBI).They are classified by GI symptoms and related to any combination including motility disturbance, visceral hypersensitivity, altered mucosal and immune function, altered gut microbiota and altered CNS processing. Extremely helpful, are algorithms to help guide choices in treatment.

Framework used is a biopsychosocial model to describe a bidirectional interaction of biological and psychosocial factors that result in gut brain dysfunction. So, for Rome IV, The child meets criteria, or does not..

Functional Gastrointestinal Disorders (FGID)

- Symptom-based criteria
- After appropriate evaluation, the symptoms cannot be fully explained by another medical condition
- Rome IV removed "rule out organic disease"
- Leave up to the clinician to determine appropriate testing
- AVOID running unnecessary testing
- Diagnosed CLINICALLY and NOT by exclusion

https://theromefoundation.org/rome-iv/rome-iv-criteria/

Functional Gastrointestinal Disorders (FGID)

- Presentation or symptoms are very variable
- Categories classified by GI Region and Pediatrics

- Under Childhood Functional Disorders
  - Functional Nausea and Vomiting Disorders
  - Functional Defecation Disorders (ie. Constipation)
  - Functional Abdominal Pain Disorders (FAPDs)

https://theromefoundation.org/rome-iv/rome-iv-criteria/

Functional Abdominal Pain Disorders

- Functional Dyspepsia
  - Postprandial distress syndrome
  - Epigastric pain syndrome
- Irritable Bowel Syndrome (IBS)
- Abdominal Migraines
- Functional Abdominal Pain – Not Otherwise Specified

https://theromefoundation.org/rome-iv/rome-iv-criteria/

Irritable Bowel Syndrome (IBS)

- Recurrent abdominal pain on average at least 1 day/week in the last 3 months, associated with two or more of the following:
  - Related to defecation
  - A change in frequency of stool
  - A change in form/appearance of stool
- Subtypes
  - IBS-C: Predominantly constipation
  - IBS-D: Predominately diarrhea
  - IBS-M (mixed) or IBS-U (unclassified)

https://theromefoundation.org/rome-iv/rome-iv-criteria/

ROME IV Diagnostic Criteria for IBS and FAP-NOS

IBS: Must include all of the following: Abdominal pain at least 4 days per month associated with 1 or more of the following related to defecation, change in frequency of stool, change in appearance/form of stool. For children with constipation the pain does not resolve with resolution of constipation. After appropriate evaluation the symptoms cannot be fully explained by another medical condition. Criteria fulfilled for at least 2 months before diagnosis.

FAP-NOS: Must be fulfilled at least 4 times per month and include all of the following: Episodic or continuous abdominal pain that does not occur solely during physiologic events (eg eating, menses), insufficiency criterial for IBS, functional dyspepsia, or abdominal migraine, and after appropriate evaluation, abdominal pain cannot be fully explained by another medical condition

Referrals

About 38% of 8-15 year old children report weekly abdominal pain and consultations for this account for 2-4% of all pediatric office visits.

In Pediatrics, there has been an identified higher frequency of abdominal pain visits in children, and consultations for functional gastrointestinal disorders (FGID) in the winter than in summer months

This large retrospective study of 172.4 million patients compared adults and children and referral for abdominal pain.

The study did find a seasonal variation in referrals for chronic or recurrent abdominal pain in children, with the lowest rates found during summer months. No seasonal variation was found with adults.

Saps, M., Hudgens, S., Mody, R., Lasch, K., Harikrishnan, V., Baum, C. (2013). Seasonal Patterns of abdominal Pain Consultations Among Adults and Children. Journal of Pediatric Gastroenterology and Nutrition, 56, 290-296.

Well why is this?

The reason(s) for this seasonal variation is not fully understood.

Placing findings into a biopsychosocial model is the most accepted framework for helping with understanding FGIDs

Possible causes, or a combination, include stress/anxiety, sleep, melatonin and serotonin metabolism, infections, vitamin D deficiency, allergies, and school/academic factors. Will also add with holding of stool and constipation with refusal to use school bathroom.

Saps, M., Hudgens, S., Mody, R., Lasch, K., Harikrishnan, V., Baum, C. (2013). Seasonal Patterns of abdominal Pain Consultations Among Adults and Children. Journal of Pediatric Gastroenterology and Nutrition, 56, 290-296

Gut inflammation and calprotectin....

Fecal calprotectin, stool testing, is used to identify possible gut inflammation, particularly possible inflammatory bowel disease,(i.e. UC and CD).

Calprotectin is a neutrophil protein and is a marker of inflammation. However it not specific and cannot take the place of clinical judgement.

Fecal calprotectin can be considered a tool to differentiate FAPDs from an organic disease, but it's value is mostly in identifying possible IBD, and tracking rise or fall in therapy.

Joishy, M., Davies, I., Ahmed, M., Wassel, J., Davies, K., Sayers, A., Jenkins, H. (2009). Fecal Calprotectin and Lactoferrin as Noninvasive Markers of Pediatric Inflammatory Bowel Disease. Journal of Pediatric Gastroenterology and Nutrition, 48, 48-54.

Ribes Koninckx, C., Donat, E., Benninga, M.A., Broekaert, I.J., Gottrand, F., Kolho, K., Lionetti, P., Miele, E., Orel, R., Papadopoulou, Pienar, C., Schappi, M.G., Wilschanski, M., Thapar, N. (2021). The Use of Fecal Calprotectin Testing in Paediatric Disorders: A Position Paper of the European Society for Paediatric Gastroenterology and Nutrition Gastroenterology Committee. Journal of Pediatric Gastroenterology and Nutrition, 72, 617-640.

Stool for calprotectin

Stool testing for Inflammatory Bowel Disease (IBD)

- Fecal calprotectin or lactoferrin
- ESR or CRP
- In a meta-analysis, patients with IBS symptoms, a CRP I ≤ 0.5, or calprotect5in level ≤40 ug/g, there was a ≤1% probability of IBD

- Menees, S.B., Powell, C., Kurlander, J., Goel, A., Chey, W.D. (2015). A meta-analysis of the utility of C-reactive protein, erythrocyte sedimentation rate, fecal calprotectin, and fecal lactoferrin to exclude inflammatory bowel disease in adults with IBS. American Journal of Gastroenterology, 110(3), 445-454.

Adolescent Pain Catastrophizing….Protective Parental Responses to Pain

Chronic pain on functioning varies across our pediatric patients and familial factors do play an interdependent role in pediatric functional outcomes.

Parents of children reporting chronic pain also report higher levels of psychological distress.

Parents shape their child's pain responsive through positive and negative reinforcement.

Protective parenting responses are a pattern of reinforcement that results in the child's increased symptom report, and subsequent adverse outcomes.

A form of this is pain catastrophizing where one magnifies, ruminates or feels helpless about pain which results in heightened assistance and empathetic responses from parents.

Welkom, J.S., Hwang, W., Guite, J.W., et al. (2013). Adolescent Pain Catastrophizing Mediates the Relationship Between Protective Parental Responses to Pain and Disability Over Time. Journal of Pediatric Psychology, 38 (5), 541-550.

Parental Factors in Functional Abdominal Pain

Mothers of children with IBS or FAP-NOS report more physical complaints, specifically autonomic and GI symptoms compared to healthy controls.

Fathers of children with IBS/FAP-NOS report lower scores on ignoring unwanted behaviors compared to Fathers of healthy controls. These Fathers also demonstrated higher rates of depression, and lower rates of agreeableness personality factor compared to the Mother.

The study suggests a genetic component, but parental behavior is suggested to be a more important factor, transmitting illness behavior to their children and reinforcing the childs' own concerns.

Zeevenhooven, J., Rutten, J.M.T.N., van Dijk, M., Peeters, B., Benninga., M. (2019). Parental Factors in Pediatric Functional Abdominal Pain Disorders: A Cross-sectional Cohort Study. Journal of Pediatric Gastroenterology and Nutrition, 68, e20-e26.

The Family

Family systems theories are based on the assumption that families are 'integrated complex units' and that the individual and functioning, to be understood, requires evaluation of the family.

As providers we know what an open healthy family looks like, and we are very much aware of families with unhealth family functioning behaviors. We see this when evaluating a child due to the stress and emotional arousal on the gut.

Treatment expectations of the parent are often frustrated, there is no 'medication' for 10 days to 'fix' the problem and research has documented no difference in family functioning for disease-specific responses. This is why family based treatment programs are effective in improving family functioning and the childs' response, that is reduction in pain and symptom severity and functional disability in FGID.

Garr, K., Stough, C.O., Origlio, J. (2021). Family Functioning in Pediatric Functional Gastrointestinal Disorders: A Systematic Review. Journal of Pediatric Psychology, 46(5), 485-500. .

Functional Abdominal Pain and the Reciprocal Association Between Parent and Child

It is known that child and parent factors in pediatric chronic pain are reciprocally related.

However what the direction of influence is between child and parent is not fully known.

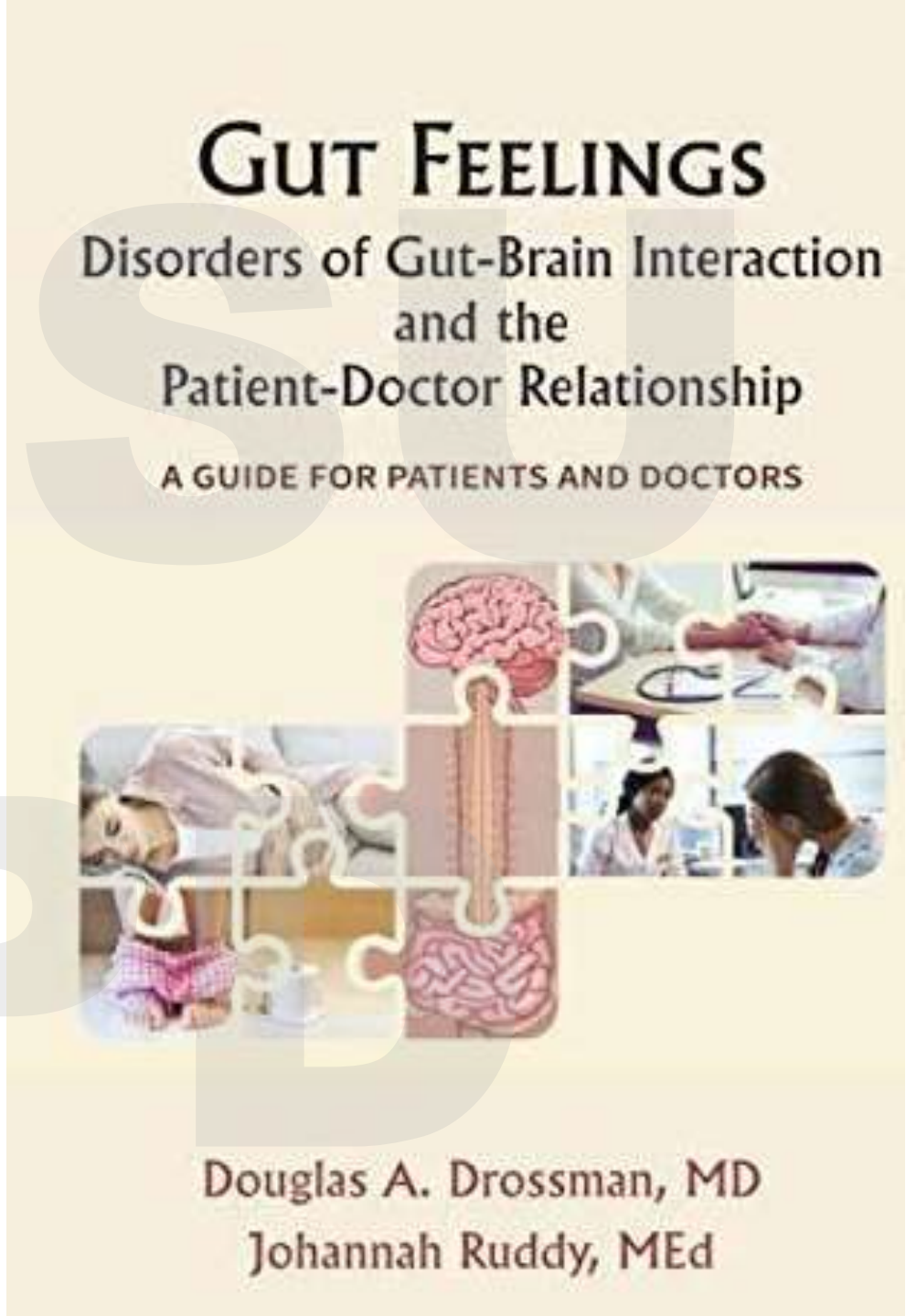
This study looked at 109 families with children reporting FAP including pain, impairment, parental outcomes and distress and personal time burden.

Addressing parental personal time burden in FAP treatment might possibly support the improvement on the childs' level and also parents.

Calvano, C., Warschburger, P. (2022). Treatment for Pediatric Functional Abdominal Pain: An Initial Examination of Reciprocal Associations Between Pain, Functional Impairment and Parental Distress. Journal of Pediatric Psychology, 47(4), 483-496.

The GI workup is negative.... Both Good and Bad News

This book is for both the patient as well as the Physician, or Health Care Provider



A Million-dollar Work-up for Abdominal Pain: Is It Worth It?

The challenge with pain predominate functional gastrointestinal disorders is that a diagnosis is made clinically, on symptom based criteria, and there are no biomarkers to send for testing.

The AAP Subcommittee on Chronic AP recommends that children with functional AP, without alarm symptoms to suggest an organic disorder, be evaluated within the primary care setting. Both the AAP and NASPGHAN on chronic abdominal pain state that most children are unlikely to require diagnostic testing.

Conducting extensive work-up does not reassure the parents but in fact may lead them to believe there is a life threatening condition.

Investigations in children with FGID are commonly sought, and the costs are substantial and their yield minimal.

Dhroove, G., Chogle, A., Saps, M. (2010). A Million-dollar Work-up for Abdominal Pain: Is It Worth It? Journal of Pediatric Gastroenterology and Nutrition, 51, 579-583.

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