

Integrative Medicine Approach to Common Pediatric Conditions

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PHOENIX CHILDRENS CARE NETWORK 9.13.2023

Objectives

1

Define Integrative
Medicine

2

Recognize which patients
would benefit from an
Integrative Medicine
approach

3

Utilize Integrative
Medicine strategies in
the management of
common pediatric
conditions in a short visit

4

Educate patients and
families about safe and
efficacious options to
augment conventional
medical care

Disclosures

None



The formal definition agreed upon is:

It is an Evidence based integration of both complementary and conventional treatments

What do I mean by Complementary Treatments?

- Dietary changes
- Supplements, Herbs, Botanicals
- Manual therapies: massage, chiropractor, other
- Mind Body: meditation, guided imagery, yoga, tai chi
- Energy: Reiki, Acupuncture, Spiritual,
- Traditional medicines: Ayurvedic, Traditional Chinese, every culture has its own
- Other: music therapy, art therapy, pet therapy

Whole Patient:

- All the factors that influence and are impacted by health
- Sleep, Nutrition, Exercise, Stress, Environment, Spirituality

While IM is utilized across the full spectrum of health, there is a focus on prevention and healing

Personalized and tailored approach to each individual's needs. This is not a one-size-fits all approach

Fosters Patient-Provider relationship which in itself is a powerful tool in the care of a patient

Integrative Medicine as a Subspecialty



New Developments 2022:

Pediatric Integrative Medicine certification through Academy of Pediatric Integrative Medicine

CMS National Uniform Claim Committee Taxonomy Code for Integrative Medicine 4/2022

IM stats in the U.S.

1 in 9

US Children (12%)
use complementary
treatments

>50%

Children with
chronic illness,
as high as 80%

9%

Infants in the US
receive botanical
supplements / teas

2017 National Health Interview Study (NHIS)
Zhang Y, 2011
Birdee, 2010

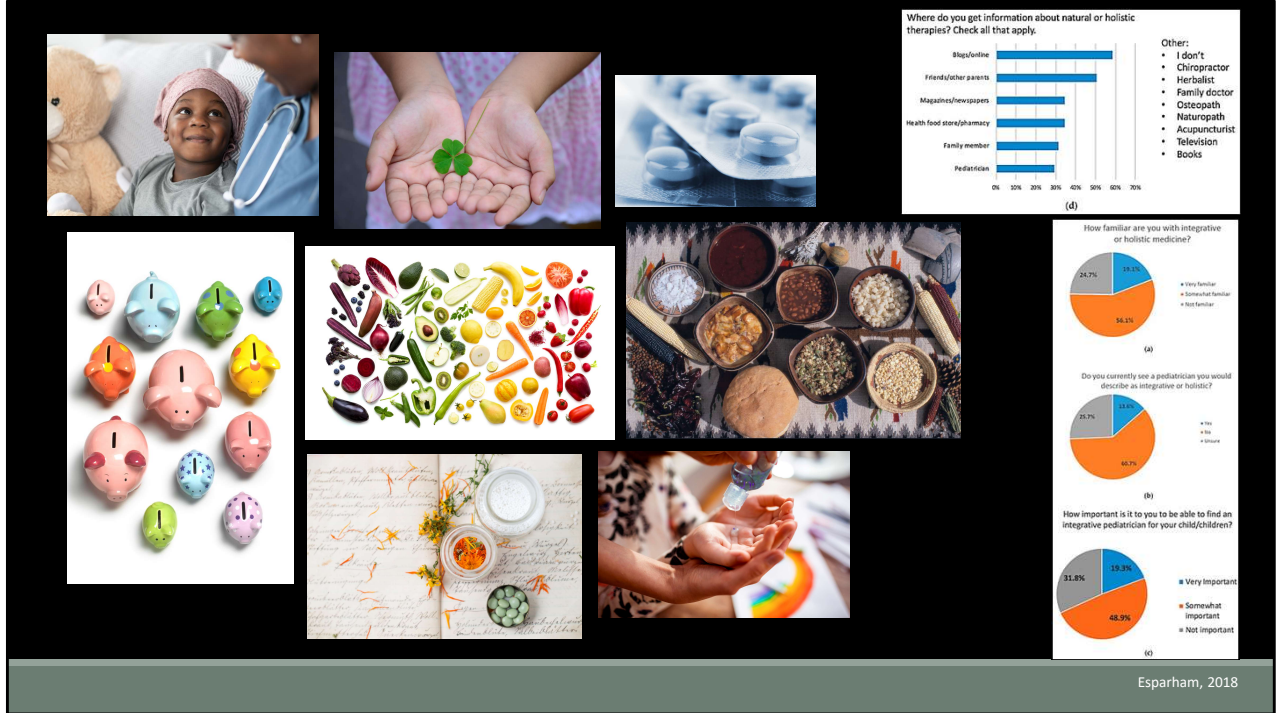
1 in 9: depending on your practice volume, that could be as many as 2-3 patients per day on average

50-80% of patients with chronic illness, which is a large portion of our patient population

9% of infants, in the US, receive botanical supplements or teas in their first year of life, including in the newborn period

~ ½ Adult patients report that they do not disclose use of complementary treatments to their physicians: weren't asked, fear of a negative reaction / "getting in trouble"

Many of these patients are concurrently taking prescription or OTC medications



There are a wide variety of reasons parents will seek IM treatment

- Support child's natural healing
- Perceived safety compared to conventional treatments which may not actually be true
- Explore all available treatment options
- New approaches to chronic conditions
- Cultural preferences
- Cost effective treatment options & access to care
- Promotion of health and wellness throughout life cycle

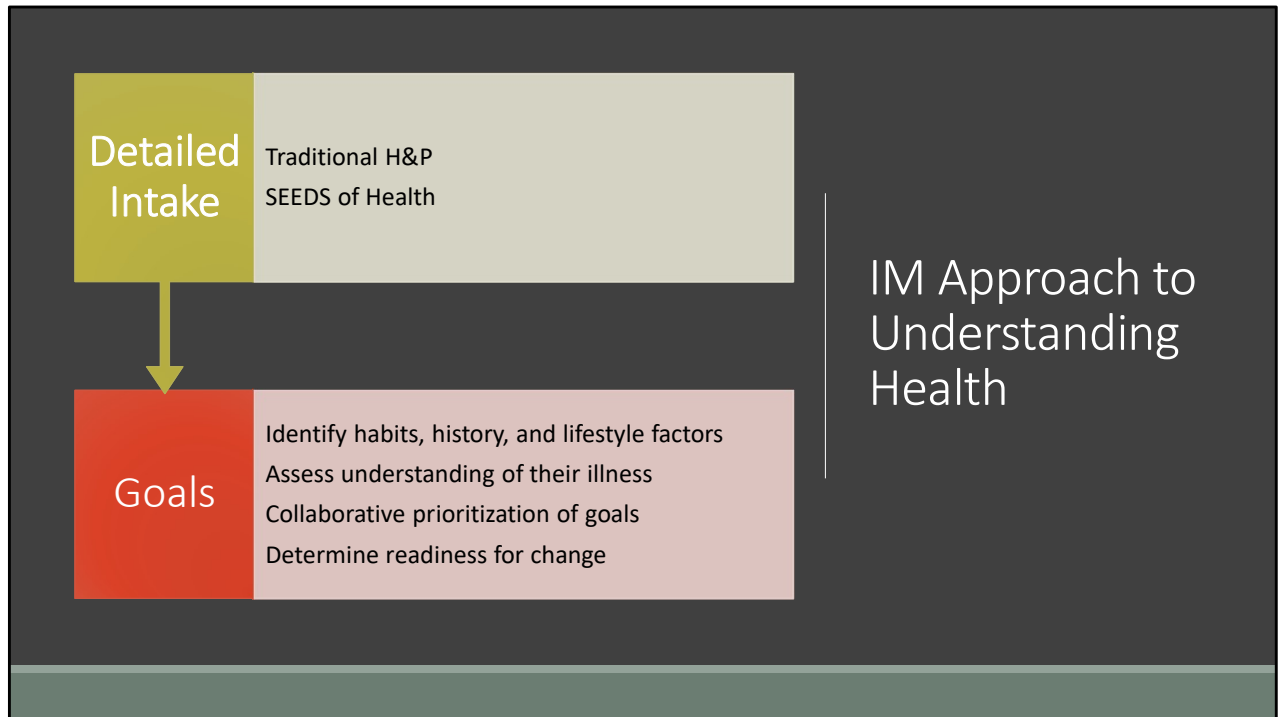
Regardless of the reason, The reality is, our patients are going to seek out these treatments with or without us.

- Without us means they will turn to less reliable sources of information. This includes online sources such as blogs and social media, family and friends, other practitioners who we may or may not agree with and who may not have the medical knowledge that we have, putting our patients at risk of making unsafe or ill-informed decisions and potential for adverse effects.
- When surveyed, the majority of patients feel it is important for their pediatrician to be knowledgeable in an integrative approach.



PROVIDER REASONS: Strengths of IM Approach

- Expand available treatment options
- Increasing prevalence of chronic & lifestyle illnesses in pediatric populations
- Increase in stress related disorders in children



- In our practice, we do the initial intake together to streamline the process for the family
- We allot 90 minutes for the initial intake to dig deep into the lifestyle factors and understand the patient
 - Follow ups are with 1 or both of us and 45 to 60 minutes depending on their needs



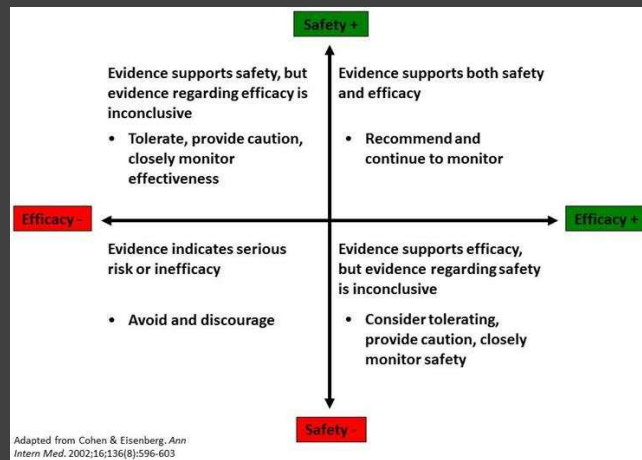
Integrative Medicine Treatment

It takes a village to raise a child and in our professions, to care for a child. Integrative medicine exemplifies this by working to support both pt families and their providers, whether it be PCPs or subspecialists. Since we have longer visits, we are well positioned to help our referring providers offload some of the burden of the intensive teaching that typical visits don't allow for.

It also involves incorporating others into the care as indicated. You don't have to be the expert in everything. Some common referrals we place are for acupuncture, OMT, PT, feeding therapy, referrals to specialists, community resources, etc.

Additional benefit to providers. A large part of provider wellbeing is having meaningful interactions and relationships with our patients and feeling a sense of purpose, so an integrative approach can augment that.

Safety & Efficacy



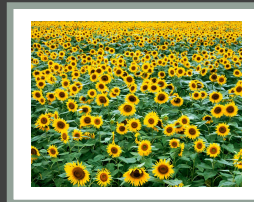
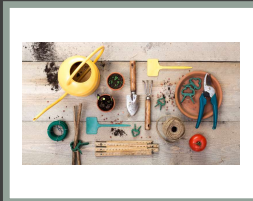
Esparham, 2018

It is important to note that both conventional and complementary therapies should be recommended based on these safety and efficacy guidelines.

- Ideally, a treatment is in this top right corner: both safe and efficacious.
- If it is in the top left corner: safe but efficacy is not proven, perhaps it is tolerated with monitoring for effect. We always warn family members to be mindful of the financial burden of these treatments as well.
- In the bottom right corner: If it is efficacious but less safe, after consideration and discussion, you may decide to recommend against or to proceed with caution and close monitoring.
- This bottom left corner is the red zone: Avoid and discourage use of any treatments that are proven not to be safe and not to be efficacious.

More high quality pediatric outcome studies are needed, however, the evidence is growing. More evidence exists for integrative treatment for adults than children, so we focus more on lifestyle approaches in our practice. One of our goals as we go through this talk today is to help sort through some of the evidence, or lack there of.

SEEDS of Health



Sleep

Exercise

Eat

Drink

Stress

We want to discuss with you some common pediatric conditions that we work with, and how you can incorporate integrative practices into your patient care. Each of these could be an entire talk of their own, so the focus today is for you to leave this talk with some pearls, or seeds, that you can easily begin using right away with your patients.

We focus heavily on SEEDS of Health with our patients. We use this acronym as a guideline for taking patient history and providing recommendations

Sleep

Exercise / Environment

Eat

Drink

Stress / Self / Spirituality

Often these impact each other so even if the problem seemingly lies in one category, we still investigate all the areas. For example, disrupted sleep patterns can impact timing of meals and ability to meet nutritional goals, impacting energy / physical activity / sleep / mood, etc.

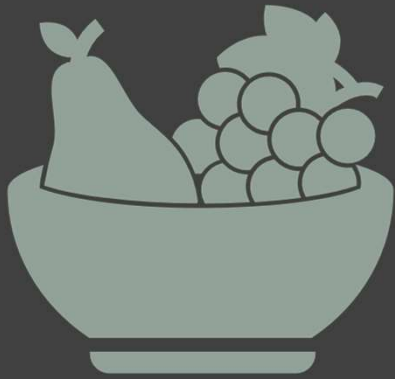
Since nutrition is such a huge part of pediatrics at all stages, Gabby will first discuss some general nutrition principles that you can apply to the majority of your patients, and would be beneficial for the whole family. After that, I will do a run down of common pediatric diagnoses and recommendations.

IM Scenario

15 year old obese female with chronic headaches and occasional constipation seeking alternative options to help manage symptoms.

What type of dietary recommendations would you provide?

- a) Very low fat diet (<25 gm fat)
- b) Keto diet
- c) Anti-inflammatory diet and optimal hydration
- d) High fiber diet



Integrative Nutrition

Realistic and sustainable approach to diet that is customizable to patient/family needs and focused on optimizing intake

- Anti-inflammatory Diet
- Micronutrients
- Dietary Supplements
- Optimal Hydration
- Mindful Eating

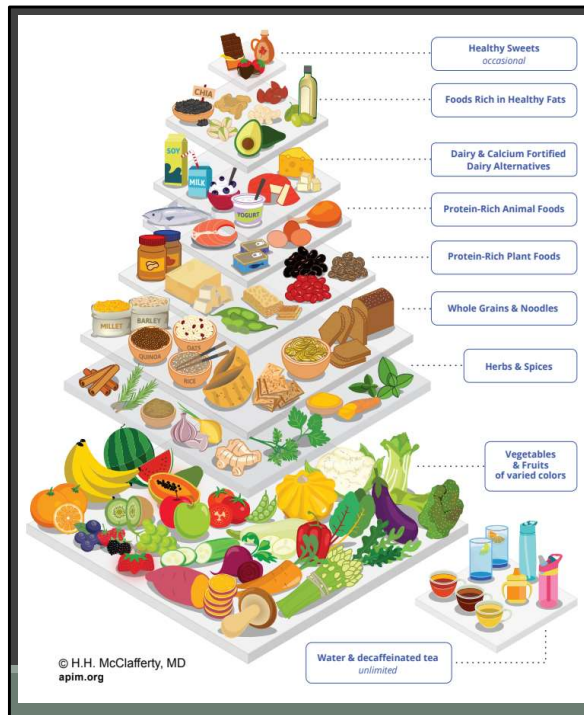
1 Stanzus, 2019
2 Ogden, 2013

The opposite of mindful eating, sometimes referred to as mindless or distracted eating, is associated with anxiety, overeating, and weight gain. [1] Examples of mindless eating are eating while driving, while working, or viewing a television or other screen (phone, tablet). [2]

Anti-Inflammatory Diet

- ❑ Not a restrictive or “fad” diet used for weight loss
- ❑ Focus on what can we add/ better options to include in diet rather than remove or restrict
- ❑ Rich in micronutrients (vitamins and minerals), fiber, essential fatty acids
- ❑ Aim for variety and include as much fresh foods as able to
- ❑ Include healthy carbohydrates, fat, and protein with each meal





Anti-Inflammatory Diet: a closer look

- Fruits and Vegetables
- Herbs and spices
- Whole grains + Pasta
- Plant Based Protein
- Animal Based Protein
- Dairy & Dairy Alternatives
- Healthy Fats
- Water & Decaffeinated Teas (green tea, herbal tea)



Micronutrients & Supplements

Focus on dietary intake as primary source with supplemental intake if unable to meet nutrient needs through diet alone

- Magnesium
- Omega 3 Fatty Acids
- Fiber
- Vitamin D
- Probiotics



Micronutrients & Supplements

Magnesium

- Muscle cramping, headaches, restless leg syndrome
- **Sources of Magnesium:** Nuts/ seeds such as pumpkin seeds, almonds, cashews, Brazil nuts, dark chocolate



Micronutrients & Supplements

Omega 3 Fatty Acids

- Reduce triglyceride levels, decrease inflammation, support cardiovascular health
- DHA/EPA - fatty fish or seafood such as salmon or mackerel
- ALA – plant based foods such as flax seed or chia seed



Micronutrients & Supplements

Fiber

- Decrease cholesterol, increase satiety of meals, maintain bowel health with regular bowel movements, control blood sugar
- **Fiber Rich Foods:** whole grains, beans, lentils, legumes, fruits, vegetables, nuts and seeds



Micronutrients & Supplements

Vitamin D

- Mental health benefits, promotes immune health, muscle/bone strength and development
- **Vitamin D Sources:** dairy products (milk, cheese, yogurt), salmon, trout, sardines, mushrooms, fortified soy/almond milk



Micronutrients & Supplements

Probiotics

- Reduce incidence and duration of antibiotic associated diarrhea, manage digestive discomfort or constipation, promote healthy microbiome, prevention and treatment of allergies, reduce risk and duration of common respiratory and GI infections
- **Sources of Probiotics:** fermented foods, yogurt, kefir, kimchi, kombucha, miso, tempeh



Dietary Supplements are among the most commonly utilized complementary treatment in both adults and pediatrics.

What is considered a dietary supplement?

Vitamins, mineral, botanical, amino acid, other dietary substances

How do you guide your patients on which supplements are safe?

- Dietary supplements are not required to undergo the same pre-market approval process as pharmaceuticals
- We recommend a healthy diet rather than supplements. When dietary needs are inadequate, we will check labs and make recommendations. We discuss them openly, including when we do not recommend them due to risks of drug interactions, lack of evidence, etc.
- When shopping for supplements, look for these logos, check the consumerlab website.
 - NSF: conducts on-site audits and product testing to verify quality and compliance. Dietary supplement companies voluntarily for this evaluation
 - USP: conducts on-site audits and product testing to verify quality and compliance. Dietary supplement companies voluntarily for this evaluation
 - ConsumerLab: checks for heavy metals as an indicator of contamination, also lists FDA recalls and warnings

Optimal Hydration



Prevents constipation,
headaches, muscle
cramping



Contributes to increased
energy levels and
performance



Provide ideas for increasing
fluid intake



Mindful Eating

"Mindful eating focuses on your eating experiences, body-related sensations, thoughts and feelings about food, with heightened awareness and without judgment."

- Small bites / chew thoroughly
- Eat slow and savor food
- Engage in body's senses
- Listening to signs of feeling full or satisfied
- Avoid skipping meals or going long periods without eating

[HTTPS://WWW.HSPH.HARVARD.EDU/NUTRITIONSOURCE/MINDFUL-EATING/](https://www.hsph.harvard.edu/nutritionsource/mindful-eating/)

There is a link to a short video describing mindful eating if you are interested

Benefits of Mindful Eating



Improved dietary patterns



Better nutrient absorption



Weight management (specific to emotional and binge eating) [1]



Increase awareness of hunger and satiety cues [2]

1 Warren, 2017
2 Miller, 2014

Common Referral Diagnoses

Allergy / Asthma

Obesity / Metabolic syndrome

GI: IBS, IBD, constipation, functional abdominal pain

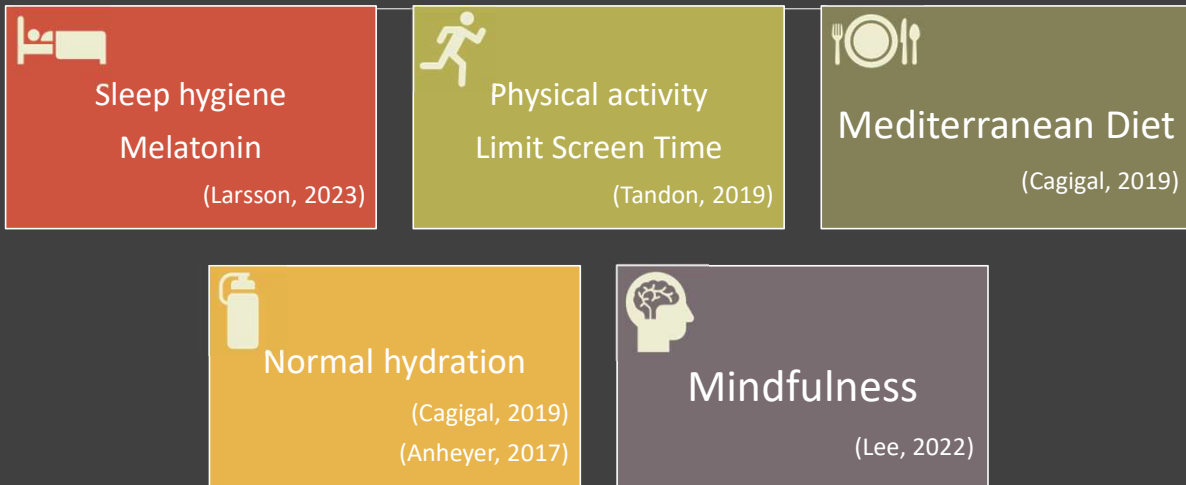
Migraines

ADHD

Common Themes:

- Inflammatory process
- Nutritional component
- Lifestyle component
- Complex / chronic illness

ADHD



Sleep (Larsson, 2023)

Sleep disorders common in patients with autism and ADHD

Melatonin can improve sleep latency, efficiency, and total sleep time but not QOL or ADHD symptoms

Sleep hygiene and behavioral interventions may improve total sleep time, decrease sleep disturbances, decreased ADHD symptoms, and improve QOL

Exercise (Tandon, 2019)

Kids, esp teens and obese, with ADHD are less likely to adhere to recommended phys activity, sleep, and limits on screen time. Were likely to have 50% less sports participation that patients with asthma

Eat

Lower adherence to Mediterranean diet and increased intake of sugar, fast food, sodas, skipping breakfast associated with increased prevalence of ADHD diagnosis (Rios-Hernandez, 2017)

Evidence lacking to support omega 3 or vitamin supplementation, or elimination diets. Kids with ADHD less likely to have a healthy diet (Cagigal, 2019)

Drink

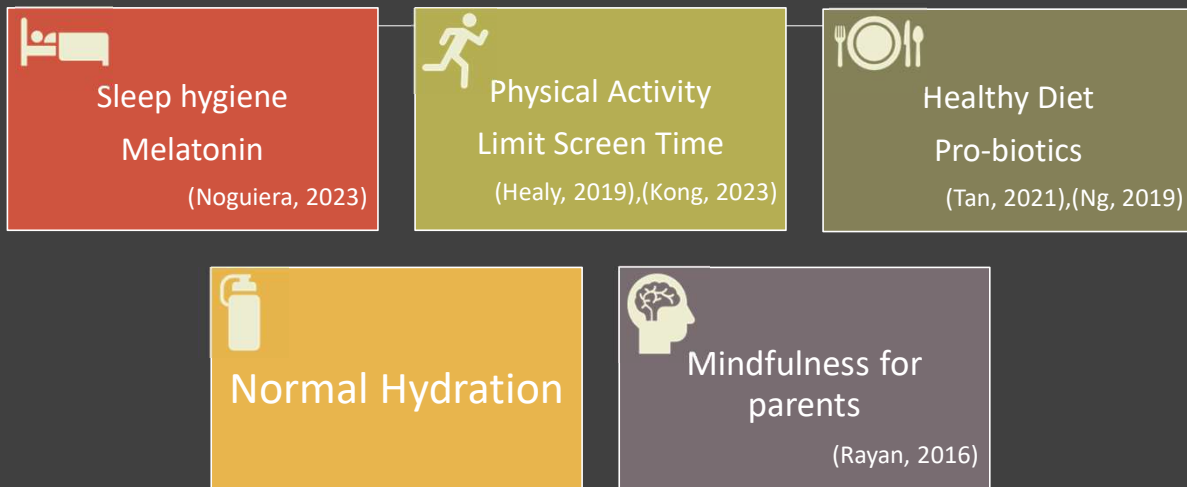
Lack of adequate evidence on herbal treatments for ADHD (Anheyer, 2017)

Recommend normal hydration with water, avoid sodas and sugary drinks

Stress

Systematic review and meta-analysis of 12 RCTs showed mindfulness based interventions can have a moderate to large improvement in ADHD symptoms (Lee, 2022)

Autism



Sleep

Sleep disorders common in patients with autism and ADHD
Melatonin can have positive impact on sleep quality in ASD. Systematic review and meta-analysis (Noguiera, 2023)

Exercise

Children with ASD less likely to adhere to recommendations for physical activity, screen time, and sleep, especially in teens and more severe ASD (Healy, 2019)
Meeting these recs associated with improved behavior symptoms, learning, activities of daily living capabilities, QOL, and less bullying (Kong, 2023)

Eat

Mixed evidence on gluten-free / casein-free diet
Systematic reviews looking at prebiotics, probiotics, fecal transplant did not find adequate evidence to recommend use although may have some benefit on GI symptoms (Tan, 2021)(Ng, 2019)

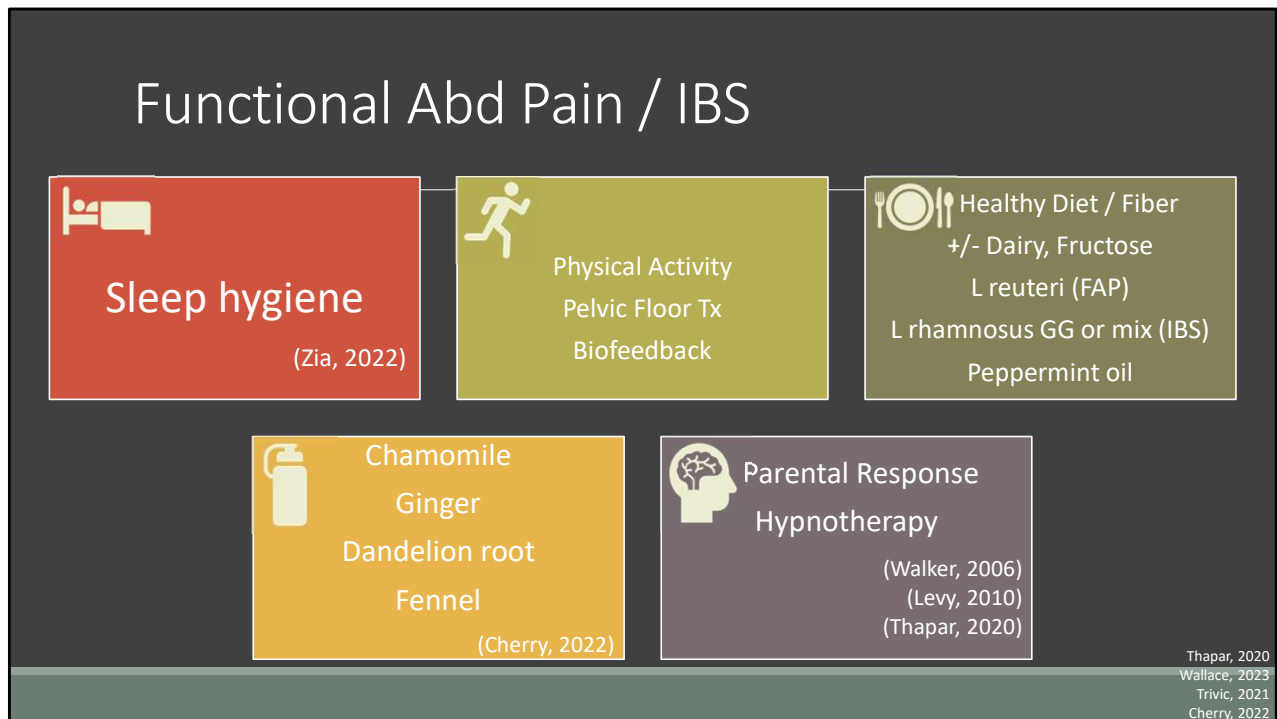
Drink

Normal hydration. Some mention in literature of polydipsia occurring at higher rate in children with autism.

Stress

Mindfulness based interventions can be an effective and acceptable tool to improve QOL and positive stress reappraisal in parents of children with autism (Rayan, 2016)

Functional Abd Pain / IBS



Sleep: systematic review of 348 studies identified poor sleep as one of the key factors in developing IBS / FGID in both adults and children (Zia, 2022)

Exercise:

- small pilot study in children 8-18 w FAP or IBS showed improvement in pain frequency and in 8-11 yrs pain intensity, decreased pain frequency at 3 month esp 8-11 yrs
- Pelvic floor therapy / biofeedback

Eat

- 93% report at least 1 food or group impacting symptoms (Thapar, 2020)
- 70% feel improvement with diet
 - Increase fruits, vegetables
 - Daily fiber goal in grams = 5 + age in years (low fiber intake in childhood assoc w development of FAPD Thapar 2020)
 - Limit processed foods
 - Consider limit dairy / fructose
 - Limit caffeine, fatty foods
- Microbiome: pre and probiotics
 - **FAP:**
Review of 18 RCT: may be some benefit of pre- and pro-biotics but low certainty, no adverse effects (Wallace, 2023)
8 RCT: L rhamnosus GG and L reuteri studied. Modest improvement in pain with L reuteri, further studies needed (Trivic, 2021)
 - **IBS:** (Thapar 2020)

Lactobacillus rhamnosis GG improvement in pain in 2 studies, no significant difference in one study
Mixture of 8 strains improves symptoms in IBS

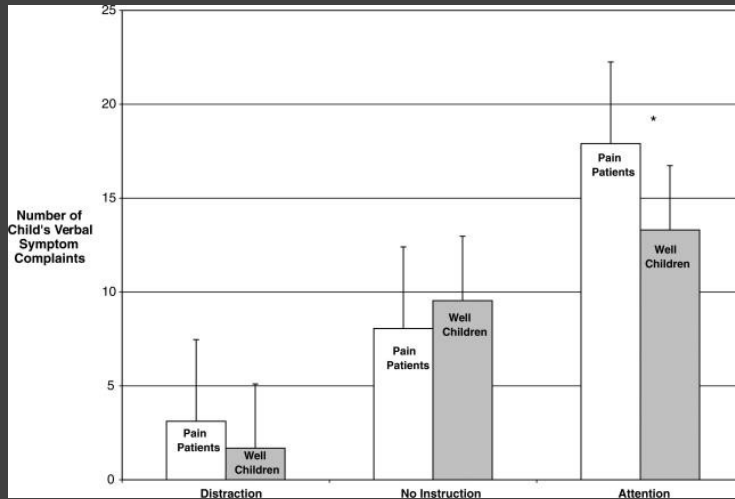
- Peppermint oil (Cherry, 2022)
 - Calcium channel blocker => smooth muscle relaxation, with 1 study showing no significant impact on overall motility
 - Risk of lower esophageal sphincter relaxation and increased reflux
 - enteric coated peppermint capsule 187mg TID (1 cap 30-45kg, 2 caps >45 kg)
- Iberogast (STW 5)
 - Blend of 9 herbal extracts
 - Improves gastric motility and functional dyspepsia
 - Comparable to metaclopramide and cisapride
 - Contraindications: allergy to components, case reports of liver toxicity, contains small amount of alcohol, less palatable

Drink (Teas)

- Chamomile: soothes GI tract, calming, body relaxation
 - Contraindications: allergic to ragweed family
- Ginger: improved GI motility, anti-nausea. Few studies in children. 1gm ginger powder divided TID(20-40kg) or 2gm divided TID 40-60kg (Cherry, 2022)
 - Increases bleeding time, most common side effects = gi irritation, burping, heartburn
- Roasted dandelion root tea: pro-kinetic
- Fennel: gastric emptying / accomodation, antispasmodic, carminitive, commonly used across cultures to treat infantile colic, child gas/constipation and seems to be safe and well –tolerated. Some adult studies show promise in IBS, esp with curcumin. pediatric data lacking. (Cherry, 2022)

Stress: Teach parents how to respond to their child's pain: (Walker, 2006)(Levy, 2010)

- In the study by Walker, both well and chronic abd pain patients and their parents were divided into 3 groups:attention, distraction, no intervention / control. They underwent a water test, in which they drink until very full. As compared to the control group, both well and chronic pain children in the attention group had a doubling of GI symptom complaint, as opposed to both pain and well children in the distraction group had a decrease by half. The effect of the attention on pain symptoms was especially significant in female patients. Additionally, both well and pain children in the distraction group reported parents made them feel better, compared to the attention and control groups.
- Similarly, in a study by Levy in 2010 demonstrated that CBT for both patients and parents, enforcing coping and wellness behaviors and less solicitous behavior on the part of the parents had a significant impact in GI symptom complaints, with improvements in both parental solicitous behaviors and pain and GI symptoms continuing at 3 and 6 month follow up.
- Both studies showed that parents had different perceptions of how to address their child's pain prior to the study, emphasizing that educating parents about how to address their child's complaints can be highly impactful. The study by Levy, CBT was provided by licensed trained professionals, and a referral for CBT / social learning CBT for both parents and child may be warranted.
- Hypnotherapy: 5 RCTs in children with IBS or FAP hypnotx w therapist or home-based CD. Substantial improvement in QOL, doctor visits, missed school days. At 1&5 yr follow-up, 85%/68% symptom free vs control 25%/20% (Thapar, 2020)



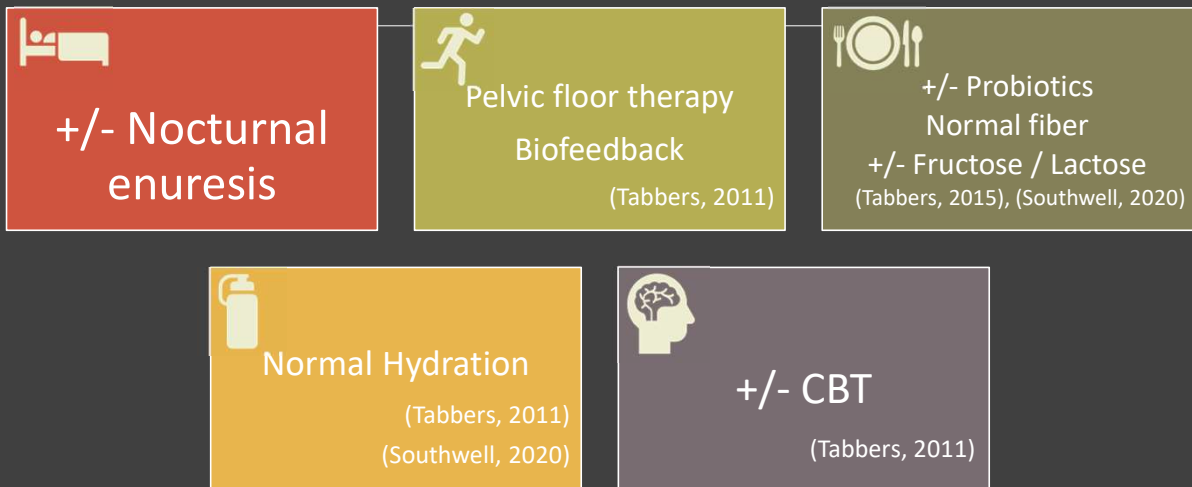
Walker, 2006

This chart shows the child's symptoms based on parental response.

Children with chronic abdominal pain and well children ingested volume of water to point of discomfort. In the intervention groups: parents were instructed to respond to their child's complaints of discomfort by paying close attention, or to acknowledge and empathize then distract the child from the pain. The control parental group received no instruction

As you can see, the children in the distraction group had the fewest complaints and those in the attention group had the highest. The children in the distraction group, reported their parents helped them to feel better opposed to the other groups, this was true for both the well children and those with chronic pain.

Constipation



Sleep:

Mixed results on impact of constipation on nocturnal enuresis

Exercise: (Tabbers, 2011)

no studies found on exercise and constipation

Physiotherapy for pelvic floor / abd muscle / toilet posture + std med care promising compared to biofeedback and anorectal manometry in 4 RCTs. All 3 interventions show promise compared to std med care alone

PT + SMC > behavioral therapy

Eat: systematic review of 12 studies in children, poor evidence quality (Tabbers, 2015) synthesis of systematic reviews and meta-analyses (Southwell, 2020)

Probiotics: may increase stooling frequency but more RCT needed in children

Fiber: normal amounts of dietary fiber but no evidence for increased intake

Fructose and lactose intolerance can cause constipation and elimination can help relieve sx (Southwell, 2020)

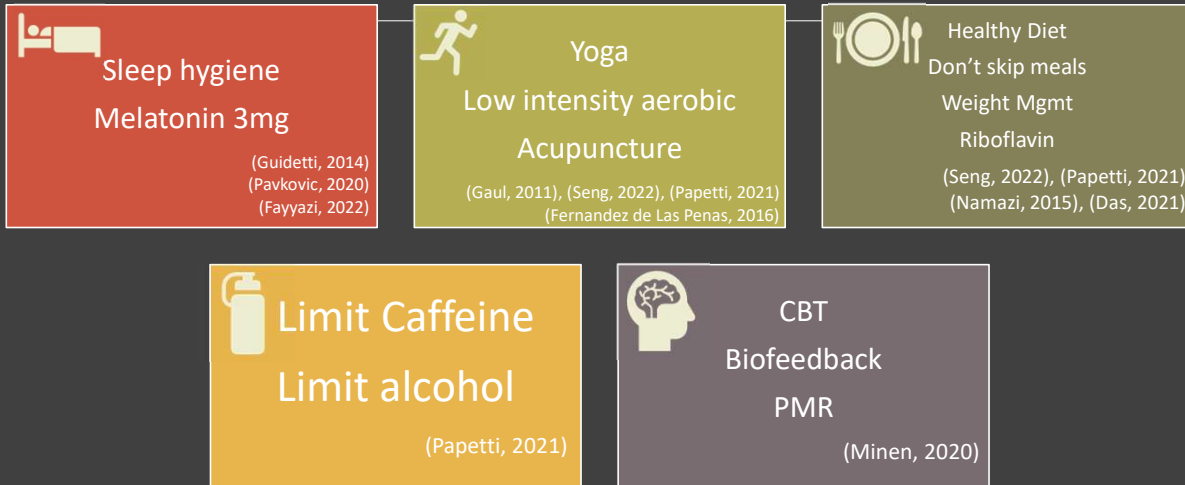
Drink:

Normal hydration, but no evidence for increased intake (Southwell, 2020) (Tabbers, 2011)

Stress

1 high quality RCT CBT w psychologist (reduce phobic reactions to defecation) vs conventional tx w GI (education, toilet training w reward) w same laxative use in both. No sig difference after 22 weeks, fewer behavior problems in CBT group (Tabbers, 2011)

Migraine



Sleep:

Literature review suggests sleep hygiene could increase success of treatment (Guidetti, 2014)
Pathways for sleep and migraines are closely related. Sleep disorders = most common comorbidity with migraines. bidirectional impact (Pavkovic, 2020)
Small study showed benefit of 3mg daily melatonin + propranolol vs propranolol alone in reducing migraines but not impact sleep although other studies they cited previously have shown sleep benefits also (Fayyazi, 2022)

Exercise:

Adherence to lifestyle modifications in one adult observational study, including exercise, was better than pharmacologic prophylaxis and predicted effectiveness of a multi-modal approach to migraine management (Gaul, 2011)
Aerobic and low intensity yoga both show promise in preventing migraines (Seng, 2022)
Sedentary lifestyle is associated with increased risk of migraine attacks in adults and adolescents (Papetti 2021)
Spinal manipulation therapies: evidence is conflicting. Ongoing safety concerns (Fernandez de Las Penas, 2016)
A Cochrane review in 2009 reports consistent evidence that acupuncture has benefits for migraine prophylaxis and treatment of acute attacks, whereas other meta-analyses report data is conflicting in tension type headaches (Fernandez de Las Penas, 2016)

Eat:

Healthy diets can reduce migraine attacks. Skipping meals can trigger (Seng, 2022)
7-44% patients report at least 1 food trigger, however evidence does not support food allergy as a trigger (Papetti, 2021)
Multiple studies demonstrate an association b/t obesity and migraines. A multi-center study in 2013

looking at obese adolescents w migraines showed significant decrease in frequency and severity of migraines with weight loss. (Papetti, 2021)

Some evidence in adults supporting ketogenic diet, however, more evidence needed in pediatrics (Papetti, 2021)

Additional studies in children needed regarding nutraceuticals.

Mag, CoQ10, omega 3 showed no benefit over placebo. (Papetti, 2021)

Riboflavin (B2) wih supportive evidence in adults, more evidence needed in kids. (Papetti, 2021) (Namazi, 2015)

A small retrospective study showed decrease in migraine frequency, missed school days, and use of acute medications in patients treated with riboflavin (Das, 2021)

Drink: (Papetti, 2021)

Caffeine: Children consume large amounts of caffeinated beverages. Caffiene and migraines widely studied in adults, need more data in children. Can trigger directly, or due to withdrawal

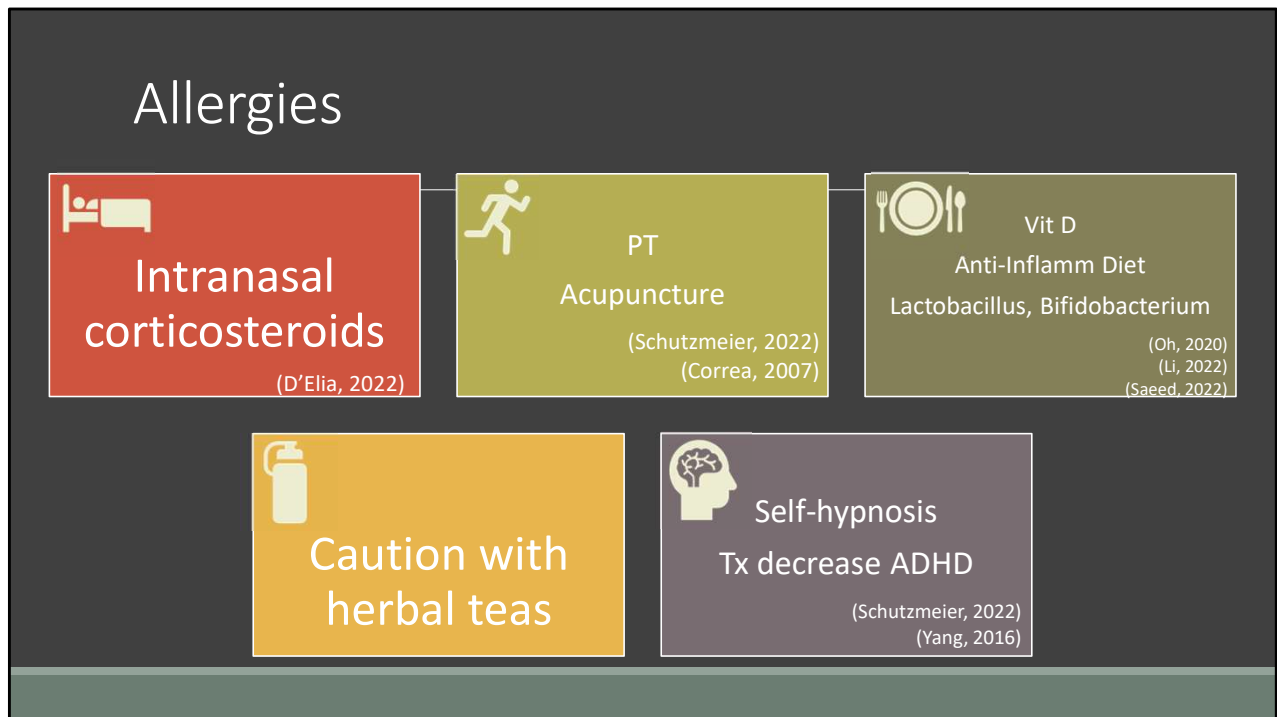
Alcohol: studies in adults show alcohol as a trigger. No studies in adolescents regarding alcohol and migraines, however, recent studies showed adolescents account for 25% of alcohol consumption in US

Stress (Minen, 2020)

CBT, biofeedback and progressive muscle relaxation have level A evidence for migraine management

This small pilot study shows use of smartphone based PMR recommended in the primary care setting is feasible, acceptable, and has promising evidence for efficacy although study size was not large enough to prove statistical significance

Allergies



- Allergies and asthma are among the top 15 most common medical conditions in which integrative therapies are used
- Co-morbidities: Inflammatory condition, Interference with sleep and daily activities, Mental health / Stress, Obesity

Sleep (D'Elia, 2022)

AR associated with higher sleep disturbance, decreased efficiency, increased sleep disorders (insomnia, RLS, enuresis, OSA) and increased daytime sleep-related impairment

Treatment of congestion and inflammation, such as intranasal corticosteroids, improve sleep markers
Need more high quality pediatric studies

Exercise (Schutzmeier, 2022)

Acupuncture: weak evidence for short term improvements in symptoms and QOL, further studies needed, including specific treatment

There are numerous small studies suggesting a change in head positioning and body posture associated with mouth breathing 2/2 nasal obstruction, including lasting changes in adulthood. This small study suggests benefits of PT for postural and naso-diaphragmatic breathing exercises (Correa, 2007)

Nutrition / Supplements:

Anti-Inflammatory diet: High vegetable diet in Korean study of 7 year old children demonstrated lower risk of mild and persistent AR in high vegetable diet pattern in low genetic risk populations (Oh, 2020)

Observational studies show lower vitamin D levels in children with allergic disease. In a meta-analysis, Vit D supplementation decreases symptoms in allergic rhinitis (4 RCTs) and decrease severity of atopic dermatitis if Vit D < 30 (Li, 2022)

Microbiome: Pro-biotics – lactobacillus, Bifidobacterium for improving symptoms. Evidence lacking for

prophylactic use in high-risk (Saeed, 2022), minimize antibiotic use

Drink:

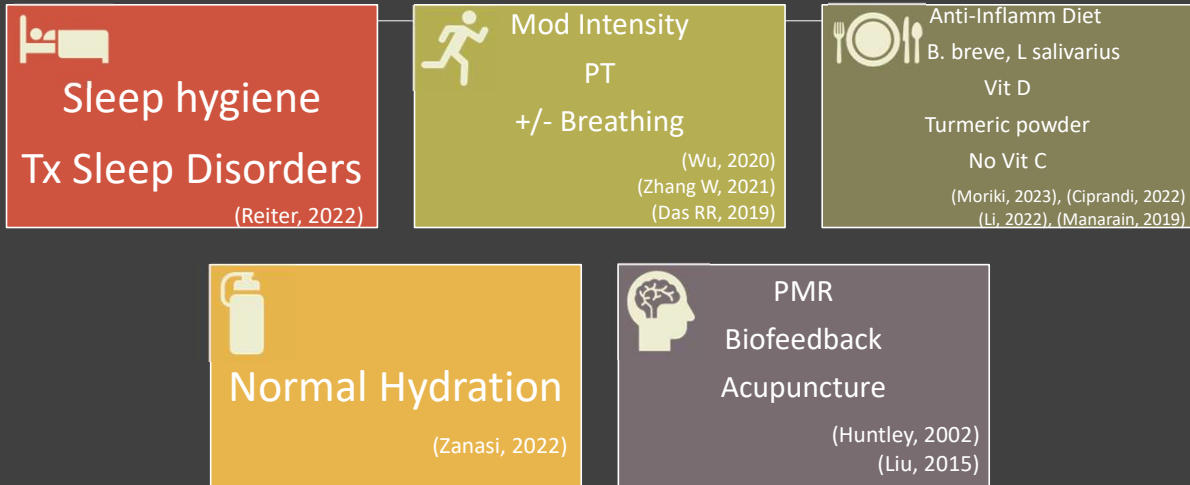
Potential allergies to herbal teas / supplements: chamomile and echinacea are related to ragweed / daisy which are common allergens. Reactions can be severe.

Stress:

Weak evidence for self-hypnosis for improved symptoms and decreased medication use (Schutzmeier, 2022)

Small study suggests treatment of allergic rhinitis symptoms can significantly improve ADHD scores (Yang, 2016)

Asthma



Multifactorial:

- Neuromuscular
- Inflammatory
- Psychological

Sleep (Reiter, 2022)

- Coexistence of sleep disorders and asthma
- Bidirectional relationship of sleep-related breathing disorders and asthma

Exercise

- Overall fitness is protective +/- pre-treatment
- Association with obesity
- Moderate intensity aerobic training improves lung function and quality of life (Wu, 2020)
- Physical training can improve FVC significantly in children with asthma, marker of lung capacity (Zhang W, 2021)
- Breathing exercises, no adverse events, maybe some benefits in chronic but not acute asthma, insufficient data (Das RR, 2019)

Eat

- Anti-inflammatory diet assoc with 58% reduction in symptoms in adolescents (Moriki, 2023)
- Microbiome: Bifidobacterium breve and Lactobacillus salivarius significantly improve asthma control, decreasing frequency of attacks to 1/2 to 1/3. Evidence lacking for prevention of asthma development with probiotics (Ciprandi, 2022)
- Vit D supplementation may reduce exacerbation risk in pts with levels < 10 (Li, 2022)

Vit C – anti-oxidant, insufficient evidence for use in asthma
Curcuma longa (turmeric) powder showed better asthma control at 3 and 6 months compared to placebo (Manarain, 2019)

Drink (Zanasi, 2022)

Normal hydration can protect airway epithelium and mucociliary clearance. Dehydration can promote production of inflammatory mediators

This study in students < 16 years old showed increased dehydration in asthmatics vs non-asthmatics, and in symptomatic asthmatics vs asymptomatic asthmatics

Coughing episodes and severity correlated with dehydration status

Stress (Huntley, 2002)

Association with mental health disorders, esp anxiety & depression

Stress can exacerbate acute and chronic asthma symptoms

Immune modulation, increased sense of control, decreased anxiety / depression, better sleep

More studies are needed, there may be some evidence for progressive muscle relaxation and biofeedback

Systematic review of 7 RCT studies looking at acupuncture in pediatric asthma showed some benefit in children, study design variability, low risk, need more standardized large-scale studies (Liu, 2015)

Obesity / Metabolic Syndrome



Sleep: bidirectional relationship

Exercise

Nutrition / Supplements

Anti-Inflammatory Diet

Omega-3 FA - reduce triglycerides, benefits on insulin sensitivity, improve regulation of inflammation
Cinnamon – anti-inflammatory & increase insulin sensitivity, mixed results in human studies, low risk of adverse effects

Curcumin – anti-inflammatory & immune modulating, animal and initial human studies show promise in inflammation-related insulin resistance. Can exacerbate gallbladder disease

Microbiome - Pro-biotics

Mindful Eating

Drink

- Normal hydration, limit sugar
- Green tea assoc with wt loss and maintenance in numerous adult studies, including PCOS
- Apple Cider Vinegar: one systematic review and meta analysis of 9 studies in adult patients found consumption of ACV associated with lowered total cholesterol and fasting blood glucose levels, and a trend toward significant effect for serum triglycerides. This effect was especially notable in diabetic patients, duration > 8 weeks, and doses of < / = 15ml / day. Due to study limitations, further studies are needed. Side effects included GI intolerance. (Hadi 2021). More studies in pediatrics are needed. Additionally, there is a risk of enamel erosion with regular ACV consumption. Case report of 43 yo F with severe life-threatening ketogenic acidosis due to trifecta of keto diet, ACV ingestion, and metformin.

Mental health / Stress Management

Mindfulness Based Stress Reduction – studies in adult obese women show improvement

Clinical Hypnosis – Established use in eating disorders. Prelim adult studies show benefit in obesity

Guided Imagery + Lifestyle education – beneficial in small study of obese Latino adolescents

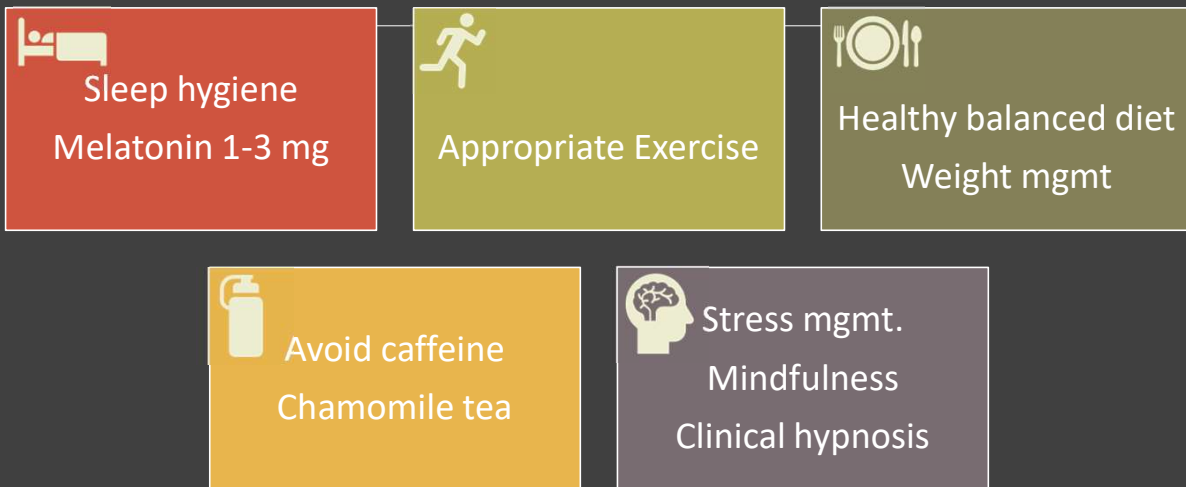
- Social factors:

Who they eat with can influence what / how they eat.

Get whole family on board vs isolating patient, another reason why the anti-inflammatory diet is a good option

Social implication of obesity: physical challenges to participate in social activities, bullying

Sleep Disorders



Majority of sleep problems in kids can be managed with behavior and lifestyle interventions

Nutrition, wt management, physical activity, stress management, avoid caffeine, avoid light at night, sleep hygiene

Melatonin: useful in sleep latency but not maintenance, use 1 hour before desired sleep time, dose 1-3mg, unclear long-term endocrine / puberty effect

Eat / Drink:

Healthy diet

Foods with melatonin: milk, red grapes, tart cherries / juice

Kiwis associated with better sleep

Chamomile: Widely used, not strong evidence but can be used as part of relaxing bedtime routine (anti-ox, anti-inflamm, GI anti-spasmodic, mild anxiolytic), safe except if patient has ragweed / mugwort allergy

Valerian, Hops, Lemon balm: no RCT in kids, no conclusive evidence for efficacy in adults, relatively safe

Mind Body Treatments:

Mindfulness: study in teens with psych history, intervention with modified MBSR => improved quality of sleep, better self-esteem, decrease anxiety /depression, improvement in diagnosis

Clinical hypnosis: historical successful use, small study in kids showed resolution of insomnia after 1-2 sessions in 85%

CBT

Guided Imagery

Consult Pediatric Integrative Medicine

How to place Outpatient Consult referrals:

1. Go to: book.phoenixchildrens.com
2. Follow the prompts and select program/service of pain medicine.
3. Type New Patient- Integrative Medicine
4. The referral will submit to our teams and we will complete the scheduling

Consult Pediatric Integrative Medicine

Outpatient Consult referrals in SCM:

Outpatient Appointment Order Set

- Division: "Pain Medicine"
- Consult (new patient)
- Appointment Type: "Integrative Medicine + Nutrition"
- Provider: "Shukla"
- See patient in: "Next Available"
- Reason for visit

Outpatient Appointment Order Set (0 orders of 10 are selected)

<input checked="" type="checkbox"/> Division	<input checked="" type="checkbox"/> Consult or Follow-Up	<input checked="" type="checkbox"/> Appointment Type	<input checked="" type="checkbox"/> Provider	<input checked="" type="checkbox"/> See Patient in	<input checked="" type="checkbox"/> Reason for Visit
<input type="checkbox"/> Pain Medicine	<input type="checkbox"/> Consult	<input type="checkbox"/> Integrative Medicine	<input type="checkbox"/> Shukla, Sanya	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Consult Pediatric Integrative Medicine

How to request Inpatient Consults:

1. Submit a consult order in SCM under "Physician Consult" and choose "Integrative Medicine" from the drop-down menu.
2. Please call to discuss the patient and reason for consult. Vocera "PCMG Integrative Medicine"

* Inpatient consults are non-urgent and will be provided on a case-by-case basis. Please refer to outpatient if an inpatient consult is not feasible prior to discharge. As demand grows, inpatient consults will be offered on a consistent schedule.

Contact Information

For Patients:

Monday – Friday Phone: 602.933.4560

Email:

IntegrativeMedicine@PhoenixChildrens.com

Internal Use Only (not for patients):

Integrative Medicine Team

dg_Integrative_Medicine@phoenixchildrens.com

Vocera group: PCMG Integrative Medicine
602.933.4560

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Additional Resources

Andrew Weil Center for Integrative Medicine, University of Arizona Tucson

- <https://awcim.arizona.edu/>
- <https://cancertoolkit.integrativemedicine.arizona.edu>

Academy of Pediatric Integrative Medicine

- <https://www.apim.org/>

Stanford Pediatric Integrative Medicine Fellowship

- <https://med.stanford.edu/pimfellowship.html>

References

- 2017 National Health Interview Study
- Anheyer D, Lauche R, Schumann D, Dobos G, Cramer H. Herbal medicines in children with attention deficit hyperactivity disorder (ADHD): A systematic review. *Complement Ther Med.* 2017 Feb;30:14-23.
- Birdee GS, Phillips RS, Davis RB, Gardiner P. Factors associated with pediatric use of complementary and alternative medicine. *Pediatrics.* 2010 Feb;125(2):249-56.
- Brands MM, Purperhart H, Deckers-Kocken JM. A pilot study of yoga treatment in children with functional abdominal pain and irritable bowel syndrome. *Complement Ther Med.* 2011 Jun;19(3):109-14.
- Cagigal C, Silva T, Jesus M, Silva C. Does Diet Affect the Symptoms of ADHD? *Curr Pharm Biotechnol.* 2019;20(2):130-136.
- Cherry, R.N.; Blanchard, S.S.; Chogle, A.; Santucci, N.R.; Mehta, K.; Russell, A.C. Herbal Approaches to Pediatric Functional Abdominal Pain. *Children* **2022**, *9*, 1266.
- Ciprandi G, Tosca MA. Probiotics in Children with Asthma. *Children (Basel).* 2022 Jun 29;9(7):978.
- Corrêa EC, Bêrzin F. Efficacy of physical therapy on cervical muscle activity and on body posture in school-age mouth breathing children. *Int J Pediatr Otorhinolaryngol.* 2007 Oct;71(10):1527-35.
- Das R, Qubty W. Retrospective Observational Study on Riboflavin Prophylaxis in Child and Adolescent Migraine. *Pediatr Neurol.* 2021 Jan;114:5-8.
- Das RR, Sankar J, Kabra SK. Role of Breathing Exercises and Yoga/Pranayama in Childhood Asthma: A Systematic Review. *Curr Pediatr Rev.* 2019;15(3):175-183.
- D'Elia C, Gozal D, Bruni O, Goudouris E, Meira E Cruz M. Allergic rhinitis and sleep disorders in children - coexistence and reciprocal interactions. *J Pediatr (Rio J).* 2022 Sep-Oct;98(5):444-454.
- Esparham A, Misra SM, Misra S, Sibinga E, Culbert T, Kemper K, McClafferty H, Vohra S, Rosen L. Pediatric Integrative Medicine: Vision for the Future. *Children (Basel).* 2018 Aug 20;5(8):111.
- Fayyazi A, Abdollahi A, Moradi A, Bazmamoun H. Administration in Efficacy of Melatonin Reducing Headaches in Children With Migraines and Sleep Disorders: A Randomized Clinical Trial Study. *Iran J Child Neurol.* 2022 Fall;16(4):55-64.
- Fernández-de-Las-Peñas C, Cuadrado ML. Physical therapy for headaches. *Cephalalgia.* 2016 Oct;36(12):1134-1142.
- Gaul C, van Doorn C, Webering N, Dlugaj M, Katsarava Z, Diener HC, Fritsche G. Clinical outcome of a headache-specific multidisciplinary treatment program and adherence to treatment recommendations in a tertiary headache center: an observational study. *J Headache Pain.* 2011 Aug;12(4):475-83.
- Gontard AV, Kuwertz-Brökling E. The Diagnosis and Treatment of Enuresis and Functional Daytime Urinary Incontinence. *Dtsch Arztebl Int.* 2019 Apr 19;116(16):279-285.
- Guidetti V, Dosi C, Bruni O. The relationship between sleep and headache in children: implications for treatment. *Cephalalgia.* 2014 Sep;34(10):767-76.

- Healy S, Aigner CJ, Haegele JA, Patterson F. Meeting the 24-hr movement guidelines: An update on US youth with autism spectrum disorder from the 2016 National Survey of Children's Health. *Autism Res.* 2019 Jun;12(6):941-951.
- Huntley A, White AR, Ernst E. Relaxation therapies for asthma: a systematic review. *Thorax.* 2002 Feb;57(2):127-31.
- Kong C, Chen A, Ludyga S, Herold F, Healy S, Zhao M, Taylor A, Müller NG, Kramer AF, Chen S, Tremblay MS, Zou L. Associations between meeting 24-hour movement guidelines and quality of life among children and adolescents with autism spectrum disorder. *J Sport Health Sci.* 2023 Jan;12(1):73-86.
- Larsson J, Aili K, Lönn M, Svedberg P, Nygren JM, Ivarsson A, Johansson P. Sleep interventions for children with attention deficit hyperactivity disorder (ADHD): A systematic literature review. *Sleep Med.* 2023 Feb;102:64-75.
- Lee YC, Chen CR, Lin KC. Effects of Mindfulness-Based Interventions in Children and Adolescents with ADHD: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Int J Environ Res Public Health.* 2022 Nov 17;19(22):15198.
- Levy RL, Langer SL, Walker LS, Romano JM, Christie DL, Youssef N, DuPen MM, Feld AD, Ballard SA, Welsh EM, Jeffery RW, Young M, Coffey MJ, Whitehead WE. Cognitive-behavioral therapy for children with functional abdominal pain and their parents decreases pain and other symptoms. *Am J Gastroenterol.* 2010 Apr;105(4):946-56.
- Li Q, Zhou Q, Zhang G, Tian X, Li Y, Wang Z, Zhao Y, Chen Y, Luo Z. Vitamin D Supplementation and Allergic Diseases during Childhood: A Systematic Review and Meta-Analysis. *Nutrients.* 2022 Sep 23;14(19):3947.
- Liu CF, Chien LW. Efficacy of acupuncture in children with asthma: a systematic review. *Ital J Pediatr.* 2015 Jul 7;41:48.
- Manarin G, Anderson D, Silva JME, Coppede JDS, Roxo-Junior P, Pereira AMS, Carmona F. Curcuma longa L. ameliorates asthma control in children and adolescents: A randomized, double-blind, controlled trial. *J Ethnopharmacol.* 2019 Jun 28;238:111882.
- Miller CK, Kristeller JL, Headings A, Nagaraja H. Comparison of a Mindful Eating Intervention to a Diabetes Self-Management Intervention Among Adults With Type 2 Diabetes: A Randomized Controlled Trial. *Health Education & Behavior.* 2014;41(2):145-154.
- Minen MT, Adhikari S, Padikkala J, Tasheem S, Bagheri A, Goldberg E, Powers S, Lipton RB. Smartphone-Delivered Progressive Muscle Relaxation for the Treatment of Migraine in Primary Care: A Randomized Controlled Trial. *Headache.* 2020 Nov;60(10):2232-2246.
- Moriki D, Antonogeorgos G, Koumpagioti D, Chaloutsis D, Ellwood P, García-Marcos L, Priftis KN, Douros K, Panagiotakos D. Adherence to an Anti-Inflammatory Diet and Atopic Diseases' Prevalence in Adolescence: The Greek Global Asthma Network Study. *Nutrients.* 2023 Jul 19;15(14):3191.
- Namazi N, Heshmati J, Tarighat-Esfanjani A. Supplementation with Riboflavin (Vitamin B2) for Migraine Prophylaxis in Adults and Children: A Review. *Int J Vitam Nutr Res.* 2015;85(1-2):79-87.
- Ng QX, Loke W, Venkatanarayanan N, Lim DY, Soh AYS, Yeo WS. A Systematic Review of the Role of Prebiotics and Probiotics in Autism Spectrum Disorders. *Medicina (Kaunas).* 2019 May 10;55(5):129.
- Nogueira HA, de Castro CT, da Silva DCG, Pereira M. Melatonin for sleep disorders in people with autism: Systematic review and meta-analysis. *Prog Neuropsychopharmacol Biol Psychiatry.* 2023 Apr 20;123:110695.

- Ogden J, Coop N, Cousins C, Crump R, Field L, Hughes S, Woodger N. Distraction, the desire to eat and food intake. Towards an expanded model of mindless eating. *Appetite*. 2013;Volume 62:119-26
- Oh HY, Lee SY, Yoon J, Cho HJ, Kim YH, Suh DJ, Yang SJ, Kwon JW, Jang GC, Sun YH, Woo SJ, Youn YS, Park KS, Cho HJ, Kook MH, Yi HR, Chung HL, Kim JH, Kim HY, Jung S, Jung JA, Woo HO, Koo KO, Kwon SO, Lee JK, Chang WS, Kim E, Lee J, Kim S, Hong SJ. Vegetable dietary pattern may protect mild and persistent allergic rhinitis phenotype depending on genetic risk in school children. *Pediatr Allergy Immunol*. 2020 Nov;31(8):920-929.
- Papetti L, Moavero R, Ferilli MAN, Sforza G, Tarantino S, Ursitti F, Ruscitto C, Vigevano F, Valeriani M. Truths and Myths in Pediatric Migraine and Nutrition. *Nutrients*. 2021 Aug 6;13(8):2714.
- Pavkovic IM, Kothare SV. Migraine and Sleep in Children: A Bidirectional Relationship. *Pediatr Neurol*. 2020 Aug;109:20-27.
- Rayan A, Ahmad M. Effectiveness of mindfulness-based interventions on quality of life and positive reappraisal coping among parents of children with autism spectrum disorder. *Res Dev Disabil*. 2016 Aug;55:185-96.
- Reiter J, Ramagopal M, Gileles-Hillel A, Forno E. Sleep disorders in children with asthma. *Pediatr Pulmonol*. 2022 Aug;57(8):1851-1859.
- Ríos-Hernández A, Alda JA, Farran-Codina A, Ferreira-García E, Izquierdo-Pulido M. The Mediterranean Diet and ADHD in Children and Adolescents. *Pediatrics*. 2017 Feb;139(2):e20162027.
- Saeed NK, Al-Beltagi M, Bediwy AS, El-Sawaf Y, Toema O. Gut microbiota in various childhood disorders: Implication and indications. *World J Gastroenterol*. 2022 May 14;28(18):1875-1901.
- Schutzeimer P, Kutzora S, Mittermeier J, Becker J, Bergmann KC, Böse-O'Reilly S, Buters J, Damialis A, Heinrich J, Kabesch M, Mertes H, Nowak D, Korbely C, Walser-Reichenbach S, Weinberger A, Heinze S, Steckling-Muschack N, Herr C. Non-pharmacological interventions for pollen-induced allergic symptoms: Systematic literature review. *Pediatr Allergy Immunol*. 2022 Jan;33(1):e13690.
- Seng EK, Gosnell I, Sutton L, Grinberg AS. Behavioral Management of Episodic Migraine: Maintaining a Healthy Consistent Lifestyle. *Curr Pain Headache Rep*. 2022 Mar;26(3):247-252.
- Southwell BR. Treatment of childhood constipation: a synthesis of systematic reviews and meta-analyses. *Expert Rev Gastroenterol Hepatol*. 2020 Mar;14(3):163-174.
- Stanszus LS, Frank P, Geiger SM. Healthy eating and sustainable nutrition through mindfulness? Mixed method results of a controlled intervention study. *Appetite*. 2019;Volume 141, 104325
- Tabbers MM, Benninga MA. Constipation in children: fibre and probiotics. *BMJ Clin Evid*. 2015 Mar 10;2015:0303.
- Tabbers MM, Boluyt N, Berger MY, Benninga MA. Nonpharmacologic treatments for childhood constipation: systematic review. *Pediatrics*. 2011 Oct;128(4):753-61.
- Tan Q, Orsso CE, Deehan EC, Kung JY, Tun HM, Wine E, Madsen KL, Zwaigenbaum L, Haqq AM. Probiotics, prebiotics, synbiotics, and fecal microbiota transplantation in the treatment of behavioral symptoms of autism spectrum disorder: A systematic review. *Autism Res*. 2021 Sep;14(9):1820-1836.
- Tandon PS, Sasser T, Gonzalez ES, Whitlock KB, Christakis DA, Stein MA. Physical Activity, Screen Time, and Sleep in Children With ADHD. *J Phys Act Health*. 2019 Jun 1;16(6):416-422.

- Thapar, N., Benninga, M.A., Crowell, M.D. *et al.* Paediatric functional abdominal pain disorders. *Nat Rev Dis Primers* **6**, 89 (2020).
- Trivić I, Niseteo T, Jadrešin O, Hojsak I. Use of probiotics in the treatment of functional abdominal pain in children-systematic review and meta-analysis. *Eur J Pediatr.* 2021 Feb;180(2):339-351.
- Yang MT, Chen CC, Lee WT, Liang JS, Fu WM, Yang YH. Attention-deficit/hyperactivity disorder-related symptoms improved with allergic rhinitis treatment in children. *Am J Rhinol Allergy.* 2016 May;30(3):209-14.
- Walker LS, Williams SE, Smith CA, Garber J, Van Slyke DA, Lipani TA. Parent attention versus distraction: impact on symptom complaints by children with and without chronic functional abdominal pain. *Pain.* 2006 May;122(1-2):43-52.
- Wallace C, Gordon M, Sinopoulou V, Akobeng AK. Probiotics for management of functional abdominal pain disorders in children. *Cochrane Database Syst Rev.* 2023 Feb 17;2(2):CD012849.
- Warren JM, Smith N, Ashwell M. A structured literature review on the role of mindfulness, mindful eating and intuitive eating in changing eating behaviours: effectiveness and associated potential mechanisms. *Nutr Res Rev.* 2017 Dec;30(2):272-283.
- Wu X, Gao S, Lian Y. Effects of continuous aerobic exercise on lung function and quality of life with asthma: a systematic review and meta-analysis. *J Thorac Dis.* 2020 Sep;12(9):4781-4795.
- Zanasi A, Dal Negro RW. Coughing Can Be Modulated by the Hydration Status in Adolescents with Asthma. *Children (Basel).* 2022 Apr 18;9(4):577.
- Zhang W, Wang Q, Liu L, Yang W, Liu H. Effects of physical therapy on lung function in children with asthma: a systematic review and meta-analysis. *Pediatr Res.* 2021 May;89(6):1343-1351.
- Zhang Y, Fein EB, Fein SB. Feeding of dietary botanical supplements and teas to infants in the United States. *Pediatrics.* 2011 Jun;127(6):1060-6.
- Zia JK, Lenhart A, Yang PL, Heitkemper MM, Baker J, Keefer L, Saps M, Cuff C, Hungria G, Videlock EJ, Chang L. Risk Factors for Abdominal Pain-Related Disorders of Gut-Brain Interaction in Adults and Children: A Systematic Review. *Gastroenterology.* 2022 Oct;163(4):995-1023.e3.
- Hadi A, Pourmasoumi M, Najafgholizadeh A, Clark CCT, Esmailzadeh A. The effect of apple cider vinegar on lipid profiles and glycemic parameters: a systematic review and meta-analysis of randomized clinical trials. *BMC Complement Med Ther.* 2021 Jun 29;21(1):179.

Questions?

