Chapter 4
Current Evidence for Common Pediatric Conditions

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The Current Evidence: Allergic Rhinitis

Case Example The mother of a 15-year-old female presents with a long history of allergic rhinitis (AR). The patient has tried allergy shots but she continues to suffer. She is currently taking daily montelukast sodium and cetirizine. She wants to know more about the neti pot and potentially other nonmedicine treatments. She loves playing soccer and wants to spend more time outdoors without sneezing and rubbing her eyes.

Background Allergic rhinitis is a common, chronic medical problem that affects patients of all ages. Eighty percent of individuals develop symptoms of AR before 20 years of age, with 40 % of patients becoming symptomatic by age 6 years (Skoner 2001). Approximately 30–40 % of children suffer from AR (McCrory et al. 2003; Zutavern et al. 2008). Although allergic rhinitis is not life-threatening, it causes significant morbidity and is an economic burden.

Diagnosis The diagnosis of allergic rhinitis is made from history of typical symptoms and physical exam findings.

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Current Evidence of Integrative Approaches to Allergic Rhinitis

Approach	Comments/Evidence
Lifestyle approaches	
Diet	Delayed solid food introduction is unlikely to affect atopic disease (Rosekranz et al. 2012) A more meat-based diet may pose risk for asthma and hay fever in Australian adults (Erkkola 2012) High maternal consumption of fruit and berry juices was positively associated with the risk of allergic rhinitis in children (Seo et al. 2013)
Environment	Environment plays a role in the onset of allergy events (Mims and Biddy 2013) Relocating patients to low-allergen environments demonstrates clinical improvement (AAAAI 2013a) Recommendations from American Academy of Allergy, Asthma and Immunology (AAAAI 2013b): 1. Encase mattresses, box springs, and pillows in special allergen-proof fabric covers or airtight, zippered plastic covers. Bedding should be washed weekly in hot water (130° F) and dried in a hot dryer. Allergen-proof covers are available for comforters and pillows that cannot be regularly washed 2. Keep humidity low by using a dehumidifier or air conditioning. Wall-to-wall carpeting should be removed as much as possible. Instead, throw rugs may be used if they are regularly washed or dry-cleaned
Food avoidance	Maternal dietary restriction in breastfeeding mothers to decrease risk of AR in the child is not recommended (Castro et al. 2013)
Nasal cleaning	No studies in children are available for nasal irrigation, nasal saline drops, or neti pot, but the practices cleanse the nasal passages
Probiotics	Probiotics cannot be recommended for primary prevention of atopic disease (Yao et al. 2010; Loo et al. 2013; Prescott and Tang 2005)
Vitamins	Possible benefit from vitamin C supplementation. Vitamin C intake influences AR symptoms (Ozdemir 2010)
Prevention/treatment	
Acupuncture	Penetrating needling at head acupoints is a safe therapy for patients suffering from AR, and favorable effects can be found in both the short term and long term (Wang et al. 2013) Acupuncture is an effective intervention that results in improved quality of life in patients with seasonal AR, but in times of limited resources for health care, acupuncture for AR may not be a cost-effective intervention (Reinhold et al. 2013)
Ayurveda	One adult study showed that Aller-7/NR-A2 (a combination of 7 herbal extracts) is well tolerated and efficacious in adult patients with allergic rhinitis (Saxena et al. 2004) *Tinospora cordifolia* (TC) significantly decreases all symptoms of allergic rhinitis in adults, and nasal smear cytology and leukocyte count correlate with clinical findings. TC is well tolerated in adults (Badar et al. 2005)
Chiropractic	No formal studies are available, but many allergy sufferers visit chiropractors before visiting otolaryngologists (Krouse and Krouse 1999)
Clinical hypnotherapy	Clinical hypnosis can lessen symptoms of AR in adults (Madrid et al. 1995)

Approach	Comments/Evidence
Herbs	Treatment with Nasya/Prevalin nasal spray was effective in adults for preventing allergic reactions induced by dust mite allergen challenge (Stoelzel et al. 2013; Kids preparation is available, but there are no available studies in children)
	Butterbur leaf special extract Ze 339 has been confirmed by 3 Good Clinical Practice trials and 2 postmarketing surveillance trials to be safe and efficacious in the treatment of adult patients with seasonal allergic rhinitis (Käufeler 2006)
	Cat's claw root is often used but needs to be used with caution in children and may interfere with effectiveness of fexofenadine (Altmedicine 2013)
	Both intranasal budesonide and oral choline are effective in relieving symptoms of allergic rhinitis in adults. Budesonide was found to be the statistically superior drug (Das et al. 2005)
	Freeze-dried nettles and a tonic made from the herb goldenseal are recommended by Mary Hardy, MD, director of integrative medicine at Cedars Sinai Medical Center in Los Angeles (WebMD 2013)
	Spirulina is clinically effective on allergic rhinitis in adults when compared with placebo (Cingi et al. 2008)
Honey	Honey ingestion at a high dose (1 g/kg body weight of honey daily in separate doses) improves the overall and individual symptoms of AR, and could serve as complementary therapy for AR (Asha'ari et al. 2013)
	Birch pollen honey could serve as complementary therapy for birch pollen allergy (Saarinen et al. 2011)
	One study in 36 adults did not confirm the widely held belief that honey relieves the symptoms of allergic rhinoconjunctivitis (Rajan et al. 2002)
Osteopathy	No available studies in children
Traditional Chinese medicine (TCM)	TCM herbs are used in addition to acupuncture for allergic rhinitis. TCM is safe and can be effective in improving symptoms (Guo and Liu 2013)
	RCM-102 (a combination of eight Chinese herbs) was safe in an adult study but not more beneficial than placebo for patients with seasonal AR (Lenon et al. 2012)
	Positive signals indicate the therapeutic effectiveness of *Astragalus membranaceus* in patients with AR (Matkovic et al. 2010)
Yoga	Per Jeff Migdow, MD, calming yoga poses can reduce stress, which in turn can improve allergic rhinitis symptoms (Migdow 2013)
	Per Harriet (Bhumi) Russell, director of Bhumi's Yoga and Wellness Center in Cleveland, Ohio, Sarvangasana (Shoulderstand) and Halasana (Plow Pose) can open nasal passages, ensuring proper drainage of sinuses, but Adho Mukha Svanasana (Downward-facing dog) and Sirsasana (Headstand) should be avoided as they can put extra pressure on nasal passages (Russell 2013)

The Current Evidence: Asthma

Case Example A 7-year-old boy with moderate, persistent asthma presents with his concerned mother. She is worried about long-term effects of inhaled steroids, and she has also heard about increase risk of sudden death associated with inhaled long-acting beta-agonists. She has come to your clinic for your opinion on alternative treatments.

Background Asthma is a chronic disease with significant morbidity and mortality. It is a complex disease with a genetic component as well as an environmental component. According to the National Heath Interview Survey, over 10 million U.S. children under age 18 (14%) have ever been diagnosed with asthma and 7 million children still have asthma (10%) (Bloom et al. 2012). A prevalence study from Canada showed that 13% of asthmatic children used CAM, and the most common forms used were vitamins, homeopathy, and acupuncture (Torres-Llenza et al. 2010).

Diagnosis The diagnosis of asthma is clinical. The most widely used classification of asthma severity is from "The Expert Panel Report 3 (EPR3): Guidelines for the Diagnosis and Management of Asthma" from the National Heart, Lung, and Blood Institute of the NIH (NHLBI 2007).

Current Evidence of Integrative Approaches to Asthma

Approach	Comments/Evidence
Lifestyle approaches	
Diet	Diet-induced weight loss can achieve significant improvements in clinical outcomes for obese children with asthma (Jensen et al. 2013) Consuming fruits, vegetables, and nuts (traditional Mediterranean diet) during childhood protects against asthma and rhinitis. Increased nut intake is inversely proportional to wheezing. Increased margarine intake increases risk of wheezing (Chatzi et al. 2007) Increased milk and egg consumption is related to decreased current wheezing (Mitchell et al. 2009) Benefit of omega fatty acids is controversial. Omega-6 and omega-3 fatty acids may improve allergy symptoms (Rosenlund et al. 2012). Omega-3 fatty acids may improve asthma symptoms, but omega-6 fatty acids may increase wheezing (Miles and Calder 2014). Aspirin-sensitive individuals should avoid fish oils (Jaber 2002) Low maternal consumption of leafy vegetables, malaceous fruits, and chocolate were positively associated with risk of wheeze in children (Erkkola et al. 2012) L-carnitine given at a daily dose of 1050 mg daily to children with moderate, persistent asthma showed improvement in FEV1 and overall asthma score using the Childhood Asthma Control Test (Al-Biltagi et al. 2012)

Approach	Comments/Evidence
Environment	Limit exposure to specific allergens that worsen symptoms, particularly smoke, pet dander, cockroaches, and dust (AAAAI 2013)
Food avoidance	Dairy elimination may not improve asthma symptoms (Mitchell et al. 2009) In a small population, dairy elimination improved respiratory tract mucus production (Bartley and McGlashan 2010)
Hydration	Limited studies have not proven importance of hydration in asthma, but hydration is important in exercise-induced asthma sufferers (Manz and Wentz 2005) Asthmatics who increase water consumption by 1 oz of water per kg of body weight daily have anecdotally shown improvement of symptoms (Batmanghelidj 2000)
Physical activity	Watching television for 5 or more hours per day was associated with increased risk of current wheeze (Mitchell et al. 2009) Sedentary lifestyle leads to excess risk of asthma during childhood (Konstantaki et al. 2013) Physical activity may not play an important role in the development of respiratory symptoms in preschool children (Driessen et al. 2013)
Sleep	Importance of adequate sleep was demonstrated in urban children, especially in Latino families, with asthma (Daniel et al. 2012)
Stress management	Positive results were found in asthma-related stress management training in school setting (Long et al. 2011) Clinical hypnosis provided improvement or resolution of pulmonary symptoms (Anbar and Hummell 2005)
Vitamin	Magnesium intake seems to have a protective effect on childhood asthma (Saadeh et al. 2013) (Rosenlund et al. 2012) Studies are inconclusive, but there is possible benefit of vitamin C in exercise-induced breathlessness (Milan et al. 2013)
Prevention/treatment	
Acupuncture	Acupuncture has an effect on asthma in preschool children during the treatment course as assessed by subjective parameters and need for medication (Karlson and Bennicke 2013) Low-intensity laser acupuncture can be a safe and effective treatment in asthmatic children (Elseify et al. 2013) Acupuncture has regulatory effects on immunity and may be an adjunctive therapy for allergic asthma (Yang et al. 2013)
Breathing exercises	The Papworth method (integrated breathing and relaxation exercises) appears to ameliorate respiratory symptoms, dysfunctional breathing, and adverse mood in adults compared with usual care (Holloway and West 2007) The Buteyko method (used by millions in the former Soviet Union) teaches breathing exercises through an instructional VDO to increase $PaCO_2$. The method showed significant improvement in quality of life and reduction of bronchodilator use in a study of 36 patients (Opat et al. 2000)
Chiropractic	There has been a favorable response to subjective and objective outcome measures of asthma in both patients and parents to spinal manipulative therapy (SMT) (Gleberzon et al. 2012)

Approach	Comments/Evidence
Herbs/Ayurveda/ traditional Chinese medicine	One study in adults showed *Boswellia serrata*, *Curcuma longa*, and Glycyrrhiza have pronounced effects in the management of bronchial asthma (Houssen et al. 2010) In studies of Bharangyadi Avaleha and Vasa Avaleha, results have shown less recurrence of asthma symptoms (Gohel et al. 2011) In a systematic review, "Single studies of Boswellia, Mai-Men-Dong-Tang, Pycnogenol, Jia-Wei-Si-Jun-Zi-Tang and *Tylophora indica* showed potential to improve lung function, and a study of 1.8-Cineol (eucalyptol) showed reduced daily oral steroid dosage" (Clark et al. 2010)
Osteopathy	Benefits not proven in systematic studies, but small studies show benefit (Posadzki et al. 2013)
Yoga	There have been positive associations shown between exercise habit after school and muscular strength and endurance among asthmatic children (Chen et al. 2009) There is significant benefit of yoga seen soon after starting the exercise (Khanam et al. 1996) Physiological benefits of yoga for the pediatric population may help children through the rehabilitation process (Galantino et al. 2008)

The Current Evidence: Attention-Deficit/Hyperactivity Disorder

Case Example A 9-year-old male presents to your clinic with a history of attention-deficit/hyperactivity disorder (ADHD), inattentive-type. He has been on Adderall and Vyvanse over the last 2 years, and his mother is concerned that he is losing weight due to poor appetite. The pediatrician thinks that the child will not succeed in school without stimulant medication.

Background ADHD is a commonly diagnosed childhood disorder characterized by impulsivity, inattention, and hyperactivity. ADHD affects up to 10% of children in the United States. Many different forms of CAM are used for ADHD but treatments appear to be most effective when prescribed holistically and according to each individual's characteristic symptoms (Pellow et al. 2011).

Diagnosis ADHD is diagnosed according to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders—Fifth Edition (DSM-5). The DSM-5 has defined consensus criteria for the diagnosis of ADHD, which is categorized into three divisions: 1) Predominantly hyperactive, 2) Predominantly impulsive, and 3) Combined (APA 2013).

Current Evidence for Integrative Approaches to ADHD

Approach	Comments/Evidence
Lifestyle approaches	
Diet	From a 2013 editorial by Rommelse and Buitelaar, "...there is a future for dietary interventions in ADHD clinical practice, but valid and important points of criticism should be tackled first before implementation in clinical practice can be considered" (Rommelse and Buitelaar 2013)
Food avoidance	Salicylate elimination diet: not enough evidence to recommend (Gray et al. 2013) Artificial food color (AFC): A trial of AFC elimination is appropriate in cases where a child has not responded satisfactorily to conventional treatment or whose parents wish to pursue a dietary investigation. Oligoantigenic diet studies suggested that some children, in addition to being sensitive to AFCs, are also sensitive to common nonsalicylate foods (milk, chocolate, soy, eggs, wheat, corn, legumes) as well as salicylate-containing grapes, tomatoes, and oranges. Trial of elimination may be satisfactory (Stevens et al. 2011) Free fatty acid supplementation produces small but significant reductions in ADHD symptoms. AFC exclusion can be beneficial in individuals with food sensitivities. Better evidence for efficacy from blinded assessments is required for behavioral interventions, neurofeedback, cognitive training, and restricted elimination diets before they can be supported as treatments for core ADHD symptoms (Sonuga-Barke et al. 2013) The large Impact of Nutrition on Children with ADHD (INCA) study stated, "A strictly supervised restricted elimination diet is a valuable instrument to assess whether ADHD is induced by food. The prescription of diets on the basis of IgG blood tests should be discouraged" (Pelsser et al. 2011)
Vitamins	One study showed that lower maternal folate level in early pregnancy might impair fetal brain development and affect hyperactivity/inattention and peer problems in childhood (Schlotz et al. 2010) Mineral supplementation is indicated for those with documented deficiencies (iron, zinc) but is not supported for others with ADHD (Hurt et al. 2011; Sarris et al. 2011) Carnitine/l-acetyl carnitine supplementation may benefit symptom of inattention, but evidence is limited and inconclusive (Hurt et al. 2011; Abbasi et al. 2011) There is inconclusive evidence for use of omega-3 (Sarris et al. 2011)
Physical activity	Physical exercise may lessen severity of children's ADHD symptoms (Rommel et al. 2013)
Environment	Doubling the prenatal lead exposure (cord blood lead levels) was associated with a 3.43 times higher risk for hyperactivity in both boys and girls (Sioen et al. 2013) Postnatal lead exposure may be associated with higher risk of clinical ADHD, but not the postnatal exposure to mercury or cadmium (Kim et al. 2013)

Approach	Comments/Evidence
Treatment	
Yoga	Yoga has shown promise as an add-on therapy for ADHD (Hariprasad et al. 2013)
Meditation	In a 2010 Cochrane database survey, the authors were unable to draw any conclusions regarding the effectiveness of meditation therapy for ADHD (Krisanaprakornkit et al. 2010)
Yoga/meditation/play therapy	The "Climb-Up" program in India enlisted 69 children with ADHD and instituted peer-mediated in-school yoga, meditation, and play therapy twice weekly. This resulted in remarkable improvements in the students' school performances that were sustained throughout the year (Mehta et al. 2011; Mehta et al. 2012)
Osteopathy	No studies available
Herbals/traditional Chinese medicine	*Pinus marinus* (French maritime pine bark) and a Chinese herbal formula (Ningdong) were found to have moderate evidence in a systematic review that also showed that *Ginkgo biloba* (ginkgo) and *Hypercium perforatum* (St. John's wort) are ineffective in treating ADHD (Hurt et al. 2011) Compound herbal preparation (CHP): Under the brand name Nurture & Clarity, the combination of *Paeoniae alba, Withania somnifera, Centella asiatica, Spirulina platensis, Bacopa monieri,* and *Mellissa officinalis* demonstrated improved attention, cognition, and impulse control, indicating promise as an ADHD treatment in children (Katz et al. 2010)
Naturopathy	No studies available
Chiropractic	A case study in a 5-year-old showed benefit of chiropractic care, including spinal manipulative therapy and soft tissue therapy, for ADHD symptoms (Muir 2012) There are measurable benefits of chiropractic spinal manipulative therapy for children with ADHD (Alcantara and Davis 2010)
Homeopathy	In a systematic review from 2011, there was insufficient evidence to draw robust conclusions about the effectiveness of any particular form of homeopathy for the treatment of ADHD (Keen and Hadijikoumi 2011) Another review in 2011 concluded: "The database on studies of homeopathy and placebo in psychiatry (including ADHD) is very limited, but results do not preclude the possibility of some benefit (Davidson et al. 2011)
Ayurveda	An ayurvedic compound drug and Shirodhara were both effective in improving the reaction time of ADHD-affected children (Singhal et al. 2010)
Acupuncture	There is limited data on the effectiveness of acupuncture as a treatment for ADHD (Lee et al. 2011; Li et al. 2011)

The Current Evidence: Migraine Headaches

Case Example A 13-year-old female presents with a 5-year history of migraine headaches. She has consulted with a pediatric neurologist and had a reportedly negative work-up for concerning pathology. The neurologist placed the patient on propranolol for migraine prophylaxis, and she uses ibuprofen for abortive therapy. Her mother is concerned about long-term side effects of propranolol, and is curious about alternative treatments.

Background Headache is one of the most common neurological symptoms reported in childhood and adolescence, leading to high levels of school absences and being associated with several comorbid conditions including depression, anxiety disorders, epilepsy, sleep disorders, ADHD, and Tourette syndrome. It has also been shown to be associated with atopic disease and cardiovascular disease, especially ischemic stroke and patent foramen ovale (PFO) (Bellini et al. 2013).

Diagnosis The International Headache Society has established diagnostic criteria for migraine headaches in children and adolescents (ISH 2004).

Current Evidence Behind Integrative Approaches to Migraine Headaches

Approach	Comments/Evidence
Lifestyle approaches	
Diet	Three meals and one to two snacks per day should be eaten at routine times Breakfast should not be skipped
Hydration	Inadequate hydration should be avoided. Adolescents are encouraged to drink 2 liters of noncaffeinated liquids, ideally water, per day, increasing to 3 L a day during the summer and periods of exertion (Lewis et al. 2005)
Food avoidance	Avoidance diets are not recommended unless a trigger has been identified (Millichap and Yee 2003). Common triggers include chocolate, citrus fruits, cheeses, processed meats, yogurt, fried foods, monosodium glutamate, aspartame, alcoholic beverages, and caffeine
Physical activity	At least 30 min of enjoyable, aerobic activity should be performed 3–7 days a week with family or friends. Migraine sufferers and their parents should AVOID excessive or unrealistic expectations of performance in school, athletics, and other activities which may contribute to migraines (Holroyd et al. 1991; Ahn 2013; Gil-Martinez et al. 2013)
Stress management	Yoga and meditation are beneficial (John et al. 2007)
Sleep	Adequate nightly sleep is essential and good sleep hygiene is important (Lewis et al. 2005) According to Bigal and Hargreaves, "The relationship between sleep and migraine headaches is complex. Changes in sleep patterns can trigger migraine attacks, and sleep disorders may be associated with increased migraine frequency" (Bigal and Hargreaves 2013)

Approach	Comments/Evidence
Prevention/Prophylaxis	
Butterbur (Petasites)	AHS/AAN Migraine Prevention Guidelines 2012 label Butterbur as Level A (effective) Adults: 50–75 mg BID (Loder et al. 2012) Dosing from a study in children ages 6–17 years was 50–150 mg of butterbur root extract daily (Pothman and Danesch 2005)
Feverfew (*Tanacetum parthenium*)	AHS/AAN Migraine Prevention Guidelines 2012 label Feverfew as Level B (probably effective) (Loder et al. 2012) Adults: 50–300 mg BID; 2.08–18.75 mg TID for MIG-99 preparation
Coenzyme Q10	Numerous studies have shown efficacy (Hershey et al. 2007; Slater et al. 2011) AHS/AAN Migraine Prevention Guidelines 2012 label Coenzyme Q10 as Level C (possibly effective) Adults: 100 mg TID (Loder et al. 2012)
Magnesium	Studied in children ages 3–17 years (9 mg/kg per day by mouth divided 3 times a day with food) (Wang et al. 2003)
Acupuncture	Acupuncture is effective and should be considered as a prophylactic measure for patients with frequent or insufficiently controlled migraine attacks (Schiapparelli et al. 2010) According to a Cochrane review of studies in adults by Linde and colleagues, "Acupuncture is at least as effective, or possibly more effective than, prophylactic drug treatment, and has fewer adverse effects"(Linde et al. 2009)
Mind-body Therapies	Biofeedback, Clinical Hypnosis, and Progressive Relaxation can improve migraines (Nestoriuc and Martin 2007; Legarda et al. 2011; Shah and Kalra 2009; Fentress et al. 1986)
Music Therapy	Music therapy is a possible treatment for schoolchildren (Oelkers-Ax et al. 2008)
Treatment/Abortive	
Feverfew/Ginger	Sublingual feverfew/ginger appears safe and effective as a first-line abortive treatment for those who frequently experience mild headache prior to the onset of moderate to severe headache (Cady et al. 2011)
Ginger (*Zingiber officinale*)	The effectiveness of ginger powder in the treatment of common migraine attacks is statistically comparable to sumatriptan (Mehdi et al. 2013 Ginger is considered to be generally safe by the FDA
Migrelief (Feverfew + B2 + Magnesium)	A children's formulation is available No specific studies are available in children
Capsaicin	For children, recommend in food (Kemper 1996)
Intravenous Magnesium	30 mg/kg with a maximum dose of 2000 mg infused over 30 min (Gertsch et al. 2014)

The Current Evidence: Otalgia and Otitis Media

Case Example The mother of a 2-year-old daughter brings in her child for 1-day history of right-sided ear pain. Mom is concerned about the possibility of an ear infection and has read about the consequences of antibiotic overuse. She wants to

take a holistic approach to her child's ear pain. The child has not had fever or any other symptoms. This is the child's first episode of ear pain. She was breastfed for 18 months and is up to date on her immunizations.

Background Ear pain, effusions, and infections are frequent reasons for physician office visits. The correct differentiation of otalgia versus serous otitis media versus purulent otitis media is vital to the appropriate treatment of an ear (Wald 2005). A study from Italy in 2011 showed that 46 % of the children used complementary and alternative medicine (CAM) for recurrent acute otitis media (AOM), significantly more than the number who used immunizations for influenza or pneumococcus. The main reasons for using CAM were a fear of the adverse effects of conventional medicine (40 %) and to increase host defenses (20 %). CAM was widely seen as safe (95 %) and highly effective (68 %) (Marchisio et al. 2011).

Diagnosis The American Academy of Pediatrics in 2013 published an updated "Clinical Practice Guideline: The Diagnosis and Management of Acute Otitis Media" which provides a specific, stringent definition of AOM, addresses pain management and initial observation versus antibiotic treatment, provides appropriate choices of antibiotic agents and preventive measures, and describes management of recurrent AOM (Lieberthal et al. 2013).

Current Evidence of Integrative Approaches to Otalgia and Otitis Media

Approach	Comments/Evidence
Lifestyle approaches	
Diet	A diet high in fruits and vegetables may be protective against AOM (Esplugues et al. 2013)
Environment	Removal of second-hand smoke is protective (Strachan and Cook 1998; Uhari et al. 1996; Ladomenou et al. 2010)
Food Avoidance	Stop bottle and pacifier use after 1 year of age (Uhari et al. 1996; Ladomenou et al. 2010)
Physical Activity	Baby swimming (infants < 6 months of age) does not increase risk of AOM (Nystad et al. 2008) According to Wang et al, "Patients with chronic otitis media with active drainage should avoid swimming…. Children with ventilation tubes may surface swim in clean, chlorinated swimming pool" (Wang et al. 2005)
Vitamins and Supplements	Zinc and vitamin A deficiency may lead to middle ear disease (Elemraid et al. 2009) Vitamin A deficiency has been shown as a significant factor in the etiology of acute and chronic suppurative otitis media (Lasisi 2009) The level of Vitamin 25(OH)D needed to prevent ear infections has not been defined (Linday et al. 2008) One study showed decreased antibiotic usage in children given cod liver oil (long chain omega-3 fatty acid) and selenium supplementation (Linday et al. 2002)

Approach	Comments/Evidence
Prevention/Treatment	
Chiropractic	There is limited quality evidence for use of spinal manipulative therapy in children with AOM (Pohlman and Holton-Brown 2012).
Herbals	Herbal eardrops may help relieve symptoms (Levi et al. 2013) Echinacea purpurea may increase risk of AOM when used for upper respiratory infections (Wahl et al. 2008) Xylitol gum, syrup, and lozenges have shown efficacy in the treatment of acute otitis media (Blazek-O'Neill 2005) No studies are available on common herbs used for ear pain including peppermint oil, cloves oil or calendula oil, olive oil, garlic cloves in mustard oil, Mullein flower oil, holy basil leaves juice, and lemon balm
Homeopathy	Using homeopathy may decrease antibiotic usage (Fixsen 2013) Homeopathy may help decrease pain and lead to faster resolution of infection (Levi et al. 2013)
Naturopathy	Otikon is as effective as anaesthetic ear drops and appropriate for management of AOM-associated ear pain (Sarrell et al. 2001; Sarrell et al. 2003).
Osteopathy	Not enough evidence exists to make a recommendation (Posadzki et al. 2013; Wahl et al. 2008)

The Current Evidence: Upper Respiratory Tract Infections

Clinical Case A 12-year-old male presents because of a history of recurrent upper respiratory tract infections (URIs). His mother is concerned that his pediatrician is always prescribing antibiotics, and she is very worried about overusage of antibiotics. She wants to try a more holistic approach to her child's health. She has tried giving the child Echinacea for prevention of URIs but had to stop the herb due to the side effect of headaches. The mother is open to any suggestions.

Background The common cold is the most common illness in pediatrics. Infants and children generally have prolonged symptoms compared to adults. This often leads to parents feeling helpless, especially since allopathy prescribes supportive care with little intervention for URIs. The common cold causes school absenteeism and in turn caregiver work absenteeism. In the US, the estimated economic yearly cost of lost productivity due to the common cold approaches $ 25 billion, of which $ 8 billion is attributed to absenteeism, and $ 230 million is attributed to caregiver absenteeism (Bramley et al. 2002).

Diagnosis A common cold is diagnosed by the confluence of common URI symptoms (sore throat, runny nose, sneezing, coughing, fever, and headache) and their duration.

Integrative Approaches to Upper Respiratory Tract Infections

Approach	Comments/Evidence
Lifestyle approaches	
Diet	No studies are available on the role of diet in upper respiratory infections in children
Physical Activity	Vigorous physical activity has a significant association with symptoms of eczema, but not rhinoconjunctivitis (Mitchell et al. 2013)
Vitamins	Vitamin A and iron supplementation together may decrease symptoms of runny nose, fever, and cough (Chen et al. 2013) Lower serum vitamin 25(OH)D levels were associated with increased risk of laboratory-confirmed viral URI in children from Canadian Hutterite communities (Science et al. 2013) A systematic review and meta-analysis in 2012 concluded that vitamin D supplementation decreases the events related to respiratory tract infections; however, there is a need for more well-conducted clinical trials to confirm this conclusion (Charan et al. 2012) A review study by Esposito et al. in 2013 concluded that "further studies are needed to evaluate the impact of vitamin D deficiency and insufficiency in terms of the epidemiology and outcomes of pediatric respiratory tract infection, and whether VitD supplementation favours a positive outcome" (Esposito et al. 2013) With vitamin C supplementation, duration of colds was reduced by 14% in children (7–21%), and 1–2 g/day of vitamin C given to children shortened colds by 18%. Given the consistent effect of vitamin C on the duration and severity of colds in supplementation studies, and the low cost and safety, it may be a useful adjunct for common cold patients (Hemilä and Chalker 2013) In a cluster-randomized study of pediatric visits for upper respiratory illness during the winter and early spring, cod liver oil with a multivitamin containing selenium decreased mean visits/subject/month by 36–58% (Linday 2010) Zinc sulfate improves symptoms in children (Fashner et al. 2012)
Prevention/Treatment	
Chiropractic	The use of manual techniques on children with respiratory diseases may have benefit. Chiropractic, osteopathic medicine, and massage are the most common interventions. The lack of standardized procedures and a limited variety of methods used evidenced the need for more studies on the subject (Pepino et al. 2013)

Approach	Comments/Evidence
Herbals	Echinacea is ineffective in children (Di Pierro et al. 2012) Echinacea purpurea may be effective in reducing the occurrence of subsequent URIs in children (Weber et al. 2005) Polinacea (a highly standardized form of echinacea) could be used for improving the immune response to influenza vaccine (Di Pierro et al. 2012) Pelargonium sidoides (geranium) extract and buckwheat honey improve symptoms in children (Linday 2010) Prophylactic probiotics and the herbal preparation Chizukit reduce the incidence of colds in children (Fashner et al. 2012) Elderberry extract (Sambucol) may be useful for the treatment of viral influenza infections (Vlachojannis et al. 2010) A systematic review concluded that North American ginseng appears to be effective in shortening the duration of colds or URIs in healthy adults when taken preventively for durations of 8–16 weeks (Seida et al. 2011) Standard doses of ginseng were well tolerated in children in a randomized, controlled trial of 2 dosing schedules (Vohra et al. 2008) Astragalus membranaceus supplementation resulted in strongest activation and proliferation of immune cells in a small double-blind, placebo-controlled study that also included Echinacea purpurea and Glycyrrhiza glabra (Brush et al. 2006)
Homeopathy	A pilot study in children concluded that utility of the homeopathic remedies prescribed is based on the concept of individualization in the treatment of URIs in children (Ramchandani 2010) There is insufficient good evidence in adults to enable robust conclusions about Oscillococcinum in the prevention or treatment of influenza and influenza-like illness (Mathie et al. 2012)
Massage Therapy	Massage has proved very helpful in improving general constitution, enhancing the immune functions, and preventing and treating URIs (Zhu et al. 1998)

The Current Evidence: Weight Loss

Case Example A 16-year-old overweight female comes for her annual check-up. During the HEADS exam when the mother has stepped out of the room, she asks about weight loss drugs. Her friend has lost 10 pounds in 2 months by crushing birdseeds and drinking a tea made from the seeds. She wants to know if she should drink the tea or if you have any other suggestions on weight loss remedies.

Background Obesity is a common problem in childhood and adolescents. According to Ogden et al, "in 2009–2010, the prevalence of obesity in children and adolescents was 16.9 %" (Ogden et al. 2012).

Diagnosis The body mass index (BMI) is the accepted standard measure of overweight and obesity for children 2 years of age and older (Deurenberg et al. 1991). All pediatric healthcare professionals should be screening for and guiding the prevention and treatment of normoweight, overweight and obese patients.

Current Evidence for Integrative Approaches to Weight Loss

Approach	Comments/Evidence
Lifestyle approaches	
Diet	Two of the many available resources: 1. American Academy of Pediatrics–Texas Pediatric Society Obesity Toolkit (TPS 2013) 2. Academy of Nutrition and Dietetics (Hoelscher et al. 2013) According to Ho et al., "In the short to medium term, a prescriptive dietary intervention approach is a well-accepted and suitable option for obese adolescents with clinical features of insulin resistance. It may reduce external and emotional eating, led to modest weight loss and did not cause any adverse effect on dietary restraint" (Ho et al. 2013)
Food Avoidance	Benefit from decreased consumption of sugar-sweetened beverages (Malik et al. 2013; Ebbeling et al. 2012) Possible benefit from decreased salt intake (Grimes et al. 2013a)
Vitamins	Vitamin D: The correction of poor vitamin D status through dietary supplementation may be an effective addition to the standard treatment of obesity and its associated insulin resistance (Belenchia et al. 2013). Overweight/obese and non-Hispanic black children are especially likely to be at risk for inadequate 25OHD when not consuming the recommended daily allowance (Au et al. 2013) 100% Fruit juice in moderation may improve nutrient intake and likely does not lead to overweight/obesity (O'Neil et al. 2010, 2012; Nicklas et al. 2008)
Physical Activity	A model of exercise prescription (supervised play-based physical activity) could be considered world-wide by clinicians to improve fitness base in adolescents and help to combat the growing epidemic of childhood obesity (Meucci et al. 2013) The overall effectiveness of video games that include exercise has not been well studied
Sleep	A good night's sleep seems essential to good health, but the relationship between sleep and obesity in children has not been determined. One study has shown that sleep duration does not predict obesity up to age 6–7 years (Hiscock et al. 2011)
Environment	Reduce exposure to BPA. Urinary BPA concentration has been associated with obesity in children and adolescents. Explanations of the association cannot rule out the possibility that obese children ingest food with higher BPA content or have greater adipose stores of BPA (Trasande et al. 2012)
Prevention/Treatment	
Acupuncture	Acupuncture therapy significantly reduces BMI and abdominal adipose tissue in obese children (Zhang et al. 2011) A study in adults showed that acupuncture therapy can reduce body weight by accelerating the peristalsis and inhibiting the hunger sensation (Wang et al. 2007). Photo-acupuncture is a safe, painless, nontraumatic, and effective method for treatment of obesity that is easily accepted by children (Yu et al. 1998) Acupuncture should be recommended for comprehensive treatment of children with constitutional exogenic obesity (Gadzhiev et al. 1993)

Approach	Comments/Evidence
Ayurveda	A number of ayurvedic drugs have hypolipidemic and anti-obesity/hypoglycemic properties (Kumari et al. 2013) Shilajatu (Asphaltum) processed with Agnimantha (Clerodendrum phlomidis Linn.) is statistically effective in helping adults with obesity (Pattonder et al. 2011)
Chiropractic	No available studies in children
Clinical Hypnosis	Adult studies show benefit for weight loss (Steyer and Ables 2009) No available studies in children
Herbals	Although not studied in children, foods containing diacylglycerol oil promote weight loss and body fat reduction and may be useful as an adjunct to diet therapy in the management of obesity (Maki et al. 2002) A case study showed seizures from caffeine in a weight loss herbal product named Zantrex-3 that included niacin, caffeine, and numerous herbs (Pendleton et al. 2012) In a systematic review of adults from 2009, compounds containing ephedra, Cissus quadrangularis (CQ), ginseng, bitter melon, and zingiber were found to be effective in the management of obesity. No significant adverse effects or mortality were observed except in studies with supplements containing ephedra, caffeine, and Bofutsushosan (Hasani-Ranjbar et al. 2009) Green tea extract for weight loss is a potential cause of acute liver failure (Patel et al. 2013)
Homeopathy	There are no available studies in children One adult review stated that there is not enough evidence to recommend homeopathy for weight loss (Pittler and Ernst 2005)

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