

Pica in a Four-Year-Old Girl with Global Developmental Delay

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CASE: Emily is a 4 and half-year-old girl whose foster mother is concerned about her odd eating behaviors. Emily has been with her foster mother for 1 year after exposure to domestic violence. Emily's habit of eating nonfood items led to her foster mother providing "100% supervision." Emily constantly picks up, smells, and tastes nonfood items, particularly rocks and things made of metal. She "explores everything with her tongue." Emily scoops dirt and gravel from sidewalk crevices into her mouth. Although toileting, she catches and licks urine in her hand and searches for stool to put in her mouth. With redirection, Emily stopped putting feces into her mouth, but after spending time with her biological family, this behavior recurred.

Emily does not like to eat foods that are hard or require chewing. She does not choke or gag on solid foods or liquids. She likes foods that are sweet. She refuses to eat vegetables and foods with certain textures. Emily pulls food apart with her hands before putting it in her mouth.

Emily has global developmental delay, cerebral palsy, contractures in her legs, and strabismus. A medical workup resulted in a diagnosis of trisomy 4p and monosomy 9p. Emily works with a physical therapist and occupational therapist; she attends preschool in a special day class. She is an alert, playful, and socially engaging girl who walks with an abnormal gait, speaks in short sentences, and follows simple directions.

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Pica is the persistent eating of nonnutritive, nonfood items. The first use of the term pica in a medical text was in 1563. The condition is named after the magpie (of the genus *Pica*), a bird that eats edible and nonedible items.¹

Pica is defined in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) as persistent eating of nonnutritive, nonfood items for at least 1 month.² DSM-5 recognizes the importance of context in understanding pica:

1. Eating nonnutritive substances may be culturally supported or socially normative. Pica is not diagnosed in those situations. For example, eating dirt or clay (geophagia) is prevalent in Africa and is thought by some to alleviate morning sickness or induce cosmetic change.³
2. The behavior must be developmentally inappropriate. Since oral exploration of objects is normal in infants and toddlers, a minimum age of 2 years for diagnosis is suggested.¹
3. In some conditions (e.g., intellectual disability, autism spectrum disorder, and pregnancy) associated with eating nonfood items, pica is present only when the behavior is severe enough to necessitate clinical attention.

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Pica is diagnosed by history. Although Emily has global developmental delay, her cognitive-adaptive functioning is above 2 years of age, and the persistence and severity of her behaviors are atypical. Emily's unusual eating patterns are indicative of pica. The prevalence of pica is unknown. Pica can occur at all ages. Neglect, lack of supervision, and developmental delay increase risk.¹ Pica is most common in individuals with developmental disabilities (e.g., intellectual disability, and autism spectrum disorder). Emily's developmental delay places her at risk. It is unclear if neglect and lack of supervision were present.

Pica can have significant medical consequences. Ingesting sharp objects (e.g., nails, glass) may cause dental injury or intestinal perforation. Ingesting toxic substances (e.g., lead-based paint and household cleaners) can lead to respiratory distress, seizures, or metabolic abnormalities. Ingesting dirt or feces may result in parasitic infection. Ingesting hair (trichophagia) may cause intestinal obstruction. Moreover, pica has been associated with micronutrient deficiencies (e.g., iron and zinc) and anemia.⁴ It is unclear if pica causes deficiencies or if deficiencies result in pica. To evaluate for complications, testing could include a blood test for hemoglobin and lead, stool for ova and parasites, and abdominal imaging. In addition, evaluation for developmental disability should be considered.

Prevention is important. Parents should supervise their child closely and remove items unsafe for ingestion from their environment. Documented treatments for pica include behavioral approaches (e.g., aversive stimuli, overcorrection, habit reversal, restraint, time-out, response blocking, interruption, environmental enrichment, and reinforcement), pharmacology (e.g., selective

serotonin reuptake inhibitor and methylphenidate), and nutritional supplements (e.g., iron and multivitamin).⁵ Little data are available on pharmacologic interventions. Studies on nutritional interventions have mixed results. Applied behavior analysis (ABA) therapy has the most evidence for treating pica although which specific strategies are most effective is unknown.⁶ Emily's foster mother found that blocking Emily from eating her feces was partially effective but exhausting. Emily qualified for state services for individuals with developmental disabilities and was able to access intensive ABA therapy to address her abnormal nonnutritive eating behaviors.

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This is a complex case involving a feeding disorder in a young girl with developmental delays (DD) and psychosocial stressors. Pica is frequently exhibited in children with DD or cognitive impairments (CI). The prevalence of pica in individuals with DD or CI has been estimated to be as high as 26%.¹ Although the types of items ingested by individuals with pica are broad, they often include organic materials, such as rocks, dirt, and feces,¹ as in Emily's case. The sequelae of pica can be severe including poisonings, intestinal obstruction or perforation, infections, and nutritional deficiencies. In addition, pica can be extremely distressing to caregivers who, with even the closest supervision, have difficulty preventing all ingestions.

The etiology of pica is often unclear and likely multifactorial,¹ as it is for Emily. Although pica can be associated with medical conditions such as iron-deficiency anemia or zinc deficiency, these behaviors can also be initiated and maintained by environmental stressors, mental health conditions, and drive for sensory input. The association with stressful life experiences is possible for Emily, especially in light of her regression after visits home. Children with DD can also have coexistent mental health conditions, such as anxiety, which may be driving pica as a self-soothing behavior. Additionally, the history would suggest that Emily is experiencing some sensory sensitivities. It has been theorized that individuals with DD ingest items with sensory characteristics that they find satisfying, and the ingestion of those items reinforces the pica behavior.²

The evaluation of pica consists of assessing for medical and psychosocial contributors and also harm caused by the ingestions. Screening laboratory and radiographic studies were discussed in the first commentary. Further neurodevelopmental testing may help clarify Emily's cognitive level and developmental picture. A mental health evaluation with screening for anxiety disorders and autism spectrum disorder is also recommended, given her strong sensory seeking behaviors.

Medical treatment of pica includes correction of any underlying nutritional deficiency, in addition to treatment of resultant toxicities, parasitic infections (e.g., *pinworms*, hookworms, *toxoplasmosis*, or toxocariasis), or obstructions (from bezoars or parasitic burden). Behavioral interventions should be led by a behavioral therapist familiar with pica treatment who can work frequently with Emily and her caregivers on approaches to lessen this behavior. These approaches may include:

1. Overcorrection (practice of an appropriate alternative behavior).
2. Differential reinforcement (using positive reinforcement for the practice of an alternative behavior).
3. Response blocking with redirection (removing pica targets from hands or gently blocking the mouth combined with redirection to a preferred food item or activity).

Continued work with an occupational therapist may also help address the sensory seeking component. Providing Emily with continued close supervision, a stable home environment with her foster mother and brief supervised visits from her biological family are likely to be important.

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My initial clinical experience with young children with pica occurred as a pediatric resident working in a community, where many children were living in poverty with significant psychosocial stress associated with multiple family, environmental, and political challenges.¹ Toddlers were attracted to the sweet taste of lead-based, peeling paint on window sills and walls in their aging tenements. Gastrointestinal, bone, and central nervous systems manifestations of lead poisoning were frequently encountered. Routine screening for blood lead level was not performed at that time; we waited for symptoms and/or a history of pica. Children with chronic abdominal pain, constipation, fatigue, anemia, and manifestation of lead encephalopathy were seen frequently in the emergency department and our continuity clinics. Those kids with significant lead burden received chelation therapy. A

few years later, a municipal home lead abatement program and the federal law eliminating lead in gasoline meant fewer children with significant lead poisoning.

As this case illustrates, the developmental, nutritional, and behavioral aspects of pica in young children have not subsided. Pediatric clinicians recognize that hand-to-mouth exploration in toddlers is a normal developmental stage; it drives our interest in anticipatory guidance to insure a safe environment and monitoring activities of young children. As emphasized in both commentaries, clinically significant pica continues to be a risk in children with developmental delays and cognitive impairments. Direct questions to caregivers if often necessary; Emily was fortunate that her foster mother recognized the importance of bringing pica to the attention of her clinician.

Both commentaries mentioned the progress made in evidence-based behavioral modification therapies for children with pica. Pediatric clinicians can teach parents about behavioral modification techniques with mild forms of pica without medical complications. The best outcomes with more severe cases as exemplified by Emily are referred to a clinical psychologist who can initiate and monitor behavioral therapy with regular visits. It would also be an opportunity for the therapist to assess whether further therapy is needed for Emily's exposure to domestic violence.

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