


# Banana Fibers Masquerading as Worms in the Stool of a 14-Month-Old Girl

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A 14-month-old girl with no past medical history presented to the pediatric emergency department with diarrhea for the previous 9 days. On the first day of illness, she had vomiting that resolved on that day. On the second day of illness, she had a fever of 101.9°F but had been afebrile since. Her mother noticed small streaks of blood in the diarrhea on the fifth day of illness that resolved by the following day. She was brought to the emergency department because the patient's mother noted dark brown and black thread-like substances in the stool starting 2 days prior. Mother was concerned that these were worms and reported that she saw them moving in the stool. She presented a dirty diaper (Figure 1). The substances noted in the stool were still. Mother denied any recent changes in the patient's diet. When asked if anyone else cared for her, mother stated that the patient's grandfather watched her in the mornings. Mother was asked to call grandfather to inquire about any changes in the patient's diet while she was under his care. Over the phone, grandfather stated that he had been feeding her several slices of banana each morning during the illness.

In the emergency department, the patient was afebrile with a temperature of 98.5°F, and the remainder of her vital signs were normal. On examination, the child was playful and interactive. Her abdomen was nontender and not distended. There were no anal fissures visible and no rash in the diaper area.

Stool was sent to the lab for ova and parasite and culture. Examination for ova and parasite was negative. The thread-like substances in the child's stool were taken to the clinical lab, examined under a microscope and compared with a sample taken from a banana from the hospital's cafeteria. The two samples showed an identical structure except for color (Figure 2). Stool culture was positive for *Campylobacter jejuni*, and the child's mother was contacted to bring her back to the emergency department 2 days after the initial visit. At that time, she was well appearing, but had continued diarrhea, so she was treated as an outpatient with a 3-day course of azithromycin.

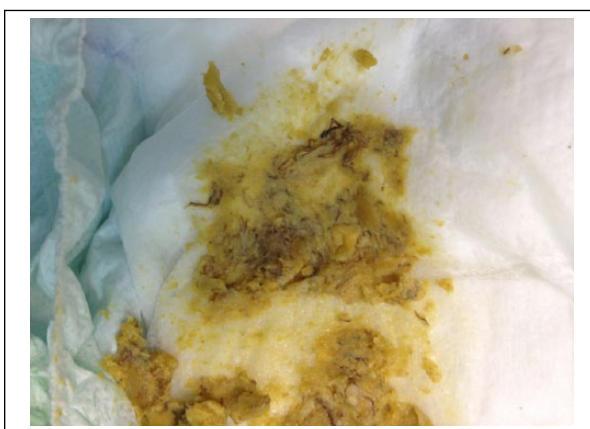


Figure 1. The child's diaper.

## Discussion

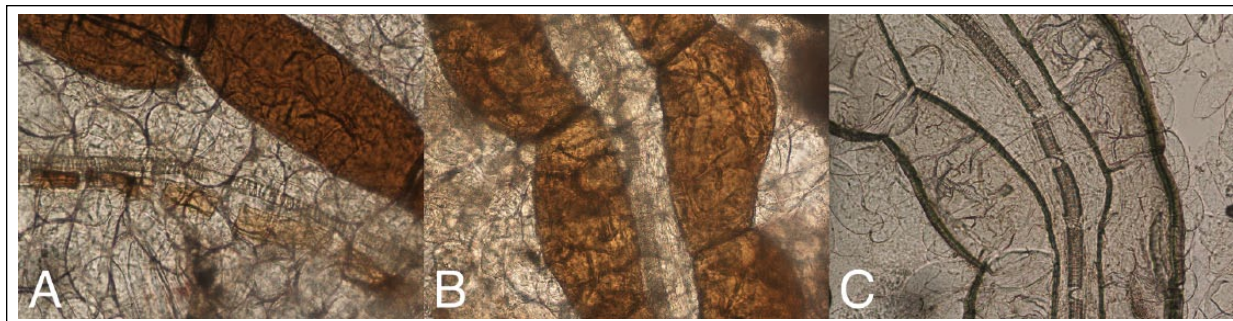
Descriptions of banana fibers in the stool mimicking worms appear surprisingly early in the medical literature. Walter Bierring described the identification of banana fibers in the stool of a 5-year-old child suspected of having tapeworm 111 years ago by preparing a sample of the child's stool and a separate sample of a banana with potassium hydroxide and examining both under a microscope.<sup>1</sup> This was the method used in the case presented above. More modern descriptions are infrequent. One report described the identification of banana fibers in the setting of a parent concerned for black worms in a child's stool in a pediatric clinic.<sup>2</sup> Banana fibers have been recovered at endoscopy by a gastroenterologist who initially mistook them for worms.<sup>3</sup> This information is not available in medical textbooks. A computer-driven search

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**Figure 2.** Microscopic examination of the substances in the stool at 100× magnification (A and B) revealed a structure that was identical to that seen when a piece of banana was examined under the same settings (C).

of 2 major pediatric gastroenterology textbooks yields mention of bananas only in the context of the BRAT diet (bananas, rice, apple sauce, and toast), and no mention of banana fibers masquerading in the stool as worms.<sup>4,5</sup> An Internet search is more helpful for information regarding this phenomenon. Searching for “black worms diaper” in Google on December 1, 2013 yielded 10 results on the first page. Every result was either a blog post by an affected parent or a forum post made by a concerned one. When each result was followed, the word “banana” appeared on the subsequent page.

The most common intestinal helminths in the United States, in order of decreasing frequency, are *Enterobius vermicularis* (pinworm), *Necator americanus* (hookworm), *Trichuris trichiura* (whipworm), and the roundworm *Ascaris lumbricoides*.<sup>6</sup> Pinworm is a small 1-cm white worm that particularly affects children and usually presents with anal itching.<sup>7</sup> The hookworm is similarly sized, grayish-white, and may be accompanied by an iron-deficiency anemia.<sup>7</sup> Whipworm is roughly 4 cm in length, pinkish-gray, and is named for its thin anterior part, which is shaped like a whip and used to attach to the bowel.<sup>7</sup> Infestation with whipworm may be accompanied by bloody dysentery-type stools and rectal prolapse. *Ascaris lumbricoides* worms are quite large (15-40 cm), white or pinkish in color, and resemble earthworms.<sup>7,8</sup> None of these descriptions match the dark substances found in this patient’s stool.

The patient’s stool culture was positive for *Campylobacter*. Vomiting, watery diarrhea, fever, and bloody stool have all been reported in the setting of *Campylobacter* infection, but the appearance of worm-like substances in the stool has not.<sup>9</sup> The relationship of the *Campylobacter* infection to the appearance of the stool in this case is likely explained by the diarrhea spurring the family to feed the child bananas.

This case illustrates that, when presented with a similar clinical scenario in which the history and appearance

of stools fit the presence of banana fibers, providers can avoid unnecessary parasite testing and focus on reassuring the child’s family.

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