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# The Boy With a Thorn in His Joints

By SUSANNAH MEADOWS

When my son, Shepherd, was 3 years old, he and his twin brother, Beau, took soccer lessons for the first time. They were so excited that they slept in their uniforms — a purple T-shirt with a yellow star kicking the ball with one of its points — the night before their first practice. But when we got to the field the next day, Shepherd’s enthusiasm evaporated. While Beau and the other kids ran zigzags around the cones, Shepherd stood still and looked bewildered. When it was his turn to kick the ball, he seemed lost. After 15 minutes, he walked off the field and sat down in my lap, saying he was too tired to play. We watched the other kids, and I pointed out to him the drills I thought he might enjoy, the ones that Beau was charging through. But he refused to go back to the field. His passivity didn’t concern me much — he was 3, after all, and I already thought of him, in the way that parents tend to categorize their children even as we tell ourselves we shouldn’t, as a little clingy and not especially athletic. My husband, Darin, and I had recently noticed that Shepherd occasionally walked with a limp, but it was faint enough that sometimes when you looked for it, it was gone. Faint enough — though it seems incredible now — that we didn’t connect it to his reluctance on the field.

I assumed that Shepherd would warm to his soccer lessons the next time around. He and Beau still donned their jerseys at bedtime and talked each night about “soccer school” at the dinner table. But the following Saturday, Shepherd burst into tears the moment he started to run.

That week we saw our pediatrician, who referred us to an orthopedist. When no injury showed up on the X-ray, the doctor said that arthritis was most likely the issue. Arthritis in a 3-year-old? It sounded more odd than alarming at first, but over the next few weeks, we watched Shepherd spend more and more time on the couch. His stiff-legged walk became more pronounced, though he claimed that he was just walking like a penguin. Then he started having trouble getting out of bed.

A month after our first appointment, we went to see Philip Kahn, a pediatric rheumatologist at NYU Langone Medical Center, who gave Shepherd a diagnosis of [juvenile idiopathic arthritis](#) (J.I.A.), an autoimmune disease that causes painful swelling in the joints. J.I.A. can lead to stunted growth, disability and, rarely, blindness.

When Dr. Kahn tested his joints, Shepherd denied that it hurt even as he teared up in pain. Our son was stoic, Dr. Kahn said, as the kids he treated often were. Shepherd turned out to have

arthritis in both knees and both wrists, as well as in his left shoulder and elbow. It was only when I started working on this article that a particular memory came back to me, its attendant guilt still intact: we'd bribed him to go to that last practice with the promise of ice cream.

Before driving home, all four of us stopped for lunch at a hummus place that Dr. Kahn recommended. We sat outside on the sidewalk, and Darin and I pretended that we were celebrating. This is great news, we told Shepherd. Now that we know what's wrong, you can take medicine that will make you feel better. Darin remembers thinking that we were lying to him, but he was trying to be more optimistic than he felt, for Shepherd's sake and for mine. Shepherd barely ate his lunch.

When we got home, I called my sister, Rae. She knew that overwhelmed feeling of getting a child's diagnosis all too well; she'd been through it with her daughter, also 3, who had severe asthma and 14 food allergies. Rae talked about how that moment when you receive the diagnosis eclipses everything, but she tried to reassure me that if an illness isn't life-threatening, the fear eventually dies down, and coping with it becomes routine.

Before we hung up, she mentioned that her sister-in-law had a friend who sent her own son's arthritis into remission with alternative medicine. Her name was Char Walker, short for Charlotte. Did I want to talk to her? I told her that I didn't, that we liked Dr. Kahn and wanted to follow his advice for now. We were starting Shepherd on a course of naproxen, a relative of the nonsteroidal anti-inflammatory ibuprofen. We didn't want to mess around with something that might not work, when conventional treatments were known to be effective. What I thought that day but didn't say to Rae was, We don't want to waste time talking to a kook.

**While he was taking** the naproxen, Shepherd's arthritis spread. Joints in his fingers and thumbs ballooned, and he developed nodules on his knuckles, suggestive of serious rheumatic disease. He started wetting his pants more frequently because, we realized, his fingers hurt too much for him to pull his pants down. We went back to Dr. Kahn, who said it was time to try methotrexate, an immune suppressant that is the most commonly used treatment for juvenile idiopathic arthritis. In significantly higher doses, it is used as chemotherapy. At the dose Shepherd would be getting, a minuscule fraction of that, methotrexate can still cause nausea, dizziness and drowsiness. The list of more serious possible side effects was terrifying — including liver damage and increased risk of lymphoma — even though Dr. Kahn told us that those risks were practically nonexistent. Kids like Shepherd, with polyarticular J.I.A. — meaning five or more joints affected — are unlikely ever to outgrow it; he would probably be on medication for life. What were the long-term effects on 3-year-olds taking this drug? It was a question I tended to visit in the middle of the night, when Dr. Kahn's reassurances that methotrexate was completely safe gave the least amount of comfort.

When I first gave Shepherd his methotrexate pills, he was enthusiastic about taking them. The pills were orange, his favorite color. The real coup: Beau didn't get to take them. But watching my son gulp them down defeated me. It reinforced an image of Shepherd as sick, forever dependent on a drug I felt afraid of, however unreasonable a doctor might tell me that fear was.

One morning, while the boys were at preschool and Darin was out of the house, I decided to call Char Walker. She answered the phone, and within minutes I was crying to this woman I had never met. Walker told me that when her son Shane was a month old, he started waking up seven or eight times a night screaming and crying, which he continued to do for a year and a half. He didn't have any symptoms that she could see. What was wrong? Soon she was crying every night, too. And then at around 18 months, he learned to talk and told her what hurt: his leg, his hip and his wrist. Once they had the diagnosis, Walker realized he'd probably been in pain every night of his life.

Walker is a social worker and massage therapist who works with cancer patients at NorthShore University HealthSystem outside Chicago. When Shane's rheumatologist presented methotrexate or steroid injections as the only choices, she was horrified. Because she worked in the integrative medicine department — a combination of alternative and conventional treatments — she knew there were other things to try. She dug into medical-literature databases. She learned about a centuries-old, anti-inflammatory Chinese concoction called four-marvels powder from a visiting naturopath. And she sought guidance from her colleague, Dr. Leslie Mendoza Temple, the head of the hospital's integrative medicine program, who, while wary of the risks, had been comfortable giving Walker's program a three-month trial. "I tried everything that I knew was safe to see what would work," Walker told me.

I grabbed my pen and paper and started taking notes. No gluten. No dairy. No refined sugar. No nightshades, a group of plants that includes potatoes and tomatoes, which are thought by some to be potentially inflammatory, as is sugar. Every day, Shane took a probiotic. Plus two tablespoons of sour Montmorency cherry juice and at least 2,000 milligrams of omega-3's from fish oil, known for their anti-inflammatory properties. Instead of naproxen, Shane took a combination of ibuprofen and Tylenol to lower his overall intake of nonsteroidal anti-inflammatories, which can be hard on the gut. And a quarter teaspoon, daily, of the four-marvels powder.

Walker said she believed that her son's arthritis was caused by something I had never heard of before — leaky-gut syndrome, a concept that has been accepted in alternative circles for years despite a name that asks you not to take it seriously. The idea is that inflammation in the gut causes the tight junctions between the cells that make up the intestinal lining to loosen. Then, like a lax bouncer, the barrier starts letting through undesirables, various proteins or bacteria

that would normally be rebuffed; they then leak into surrounding tissues. The uninvited guests, the hypothesis goes, then trigger an offensive by the body, which uses inflammation to try to get rid of them. That sustained inflammatory response characterizes autoimmune disease.

What could have caused the inflammation in Shane's gut in the first place? Walker suspected an allergy or sensitivity to gluten and dairy (common perpetrators). She also implicated antibiotics, since they can decimate protective, good bacteria along with the bad. A week before he started waking up so frequently, Shane was given antibiotics for a 104-degree fever. By the time he was 1, he would have at least five more courses for urinary tract infections. After Walker told me this, I noted that Shepherd had started limping not long after taking amoxicillin for pneumonia. There's no proof of causation, of course, and lots of children take antibiotics and don't get arthritis, but it was an intriguing detail.

Six weeks into the alternative therapy, Shane started feeling better. After three months, his arthritis pain was gone. He'd been in remission for almost two years, Walker told me, much better than anything we were told to expect.

A week later, we told Dr. Kahn about Shane's story and floated the possibility of following the same course. He wasn't familiar with leaky gut but agreed that it wouldn't be harmful to try Walker's regimen. He was adamant, though, that we not quit the medication. In fact, he wanted to up the dose of methotrexate from 10 milligrams to 15 milligrams, because we were seeing the full effects of the initial dosage and Shepherd was still in pain. He now sobbed in the middle of the night, saying his ankle hurt. Arthritis had now leached into his toes. He hadn't grown in at least four months, and so Dr. Kahn was opposed to cutting two major categories of food out of Shepherd's diet. But he was O.K. with the rest of Walker's regimen as long as it was complementary to the methotrexate, not used in place of it. He jotted down "four-marvels powder" in Shepherd's chart with a good-natured smile. He once told us about a patient of his whose Chinese grandmother was giving him a tea along with his medication that appeared to be helping. He was a believer, he said, in anything that worked.

I was nervous about keeping Shepherd on methotrexate, but Darin didn't share my squeamishness. He has always been more comfortable with pharmaceuticals, more trusting in general. As we talked it over on the way back from Dr. Kahn's, Darin agreed that if Walker's treatment worked for her son, there was certainly a chance it could work for Shepherd. But we both had to admit it was iffy. I was desperate to find a way to solve Shepherd's problems without the drugs; maybe my hope was misplaced. What if Darin was right and methotrexate was the only effective course? Darin worried that I might start insisting on no medication at all, and that I'd win. We compromised by trying Walker's regimen while we continued with the drug. Walker said it took six weeks for Shane to start feeling better. Dr. Kahn and Darin agreed

to hold off on increasing the methotrexate until we gave the experiment that much time.

But after five weeks on Walker's regimen and the initial dose of methotrexate, Shepherd seemed to be getting worse. He was already nauseated and could barely eat for two days after taking his weekly pills. He now spent entire afternoons on my lap. He started using a stroller again, and we went to physical therapy, occupational therapy or a doctor's appointment almost daily. Conversations with Darin became pain diaries. I would report on everything that hurt Shepherd that day, whether he could walk home from the playground or not. We no longer slept, and we moved through our days in a fog of depression. Beau started pointing out that he was stronger than his brother, who'd always been his almost literal equal.

Three months after Shepherd first saw Dr. Kahn, we sought a second opinion from Lisa Imundo, director of pediatric rheumatology at NewYork-Presbyterian/Columbia University Medical Center. Dr. Imundo wanted to more than double the dose of methotrexate. She had treated thousands of kids with arthritis, she said, and diet changes did not work. I tried to explain leaky gut, but I'm sure I was stammering and blushing. She handed me a piece of paper with a list of hospital resources that included a name next to the words "complementary medicine."

After the drubbing Walker's regimen took from Dr. Imundo, Darin was in a froth. A top doctor in New York had just said Walker's regimen wouldn't work, so it must be true. In general, Darin is almost pathologically easygoing. Now he was cornering me in the kitchen to press his case. Shepherd is in bad shape, you are in bad shape, I am in bad shape, he said. What the hell are we doing? I promised that I would agree to up the dose immediately after the six-week deadline, if he would give it until then. Darin says now that I was steely and shut down, and he remembers worrying that this was the kind of thing that breaks up marriages, that if Shepherd didn't get better, he didn't know what would happen to us. That month, I lost my purse, then my suitcase, and then I got into a car accident. Though it wasn't serious, the boys were in the back seat, and I was shaken. I called Darin and cried. "I can't handle it. I can't handle it. I can't handle it." He brought home a pink orchid that night. I made an appointment with a therapist.

A couple of days shy of six weeks, with Shepherd still struggling, I heard back from Elena Ladas, the complementary-medicine researcher Dr. Imundo passed me off to. Her message was simple and direct. Yes, she said of Walker's regimen, if it seems to be helping, keep going. We weren't fools after all, I thought. That short phone call was the thing that got us all to the finish line.

**At six weeks** — to the day — Shepherd woke up and, for the first time in months, got out of bed himself. I'd gone into his room to help, as I did every morning, and found him standing in

his pajamas. “Mommy,” he said, “my knees don’t hurt anymore.” He was probably wearing the pajamas with the skateboarding monkeys. Beau was probably groggy, still in bed. Honestly, I really don’t know. When I think of it, there’s only Shepherd, standing there, not crying. I was too stunned to say anything back before he scampered out to the kitchen for breakfast. Within several months his arthritis pain was gone.

Shepherd has now been weaned off the methotrexate entirely. The guy we think of as “the old Shepherd” is back, the goofball with the high-beam smile. He initiates running races — and isn’t always the most gracious when he wins. He improvises what he thinks is karate. He pirouettes. While his brother was sick, Beau shot past him in height. Now Shepherd is taller, and he’s closing the gap in weight. On medication, he got sick twice as often as Beau. That side effect is gone now.

He has had five flare-ups since going into remission a year ago. Two of them followed courses of antibiotics. The other three came on the heels of his accidentally eating gluten. He had a chocolate-chip cookie, a couple of bites of toast, less than a quarter of a sandwich on sourdough. Each time, he felt pain within 24 hours, and it lasted as long as two weeks.

To be clear: There is no proof that it was Walker’s regimen that drove away Shane’s and Shepherd’s arthritis. Shane’s case makes a stronger argument, since he didn’t take methotrexate. Still, his arthritis may have gone into spontaneous remission, and a study of one is not much of a study at all.

Methotrexate works for many kids, and its effects can kick in later than the expected four-to-six-week window. We tried so many things at once for Shepherd that there’s no way to know for sure what worked, or what combination of things had an effect. Dr. Imundo remains unmoved. But Dr. Kahn says he believes the dietary regimen may have contributed to his recovery. “I’m mystified by children on a daily basis,” he told me. “I’ve seen kids paralyzed, unbelievably critically ill. I don’t know why they get better. The main thing is, if a kid’s better, run with the football, you know? I’m thrilled.”

One thing we do know is that there is a link between the gut and inflammation, and we’ve known it for some time. During visits over the last year, amid his serious talks with Shepherd about Batman — If he can’t fly, why does he have a cape? — Dr. Kahn told us about a colleague who was researching how the gut and inflammation worked together. When I called José Scher, the director of the Arthritis Clinic at the N.Y.U. Hospital for Joint Diseases, he rattled off four different kinds of arthritis that are connected to inflammatory responses in the gut, including one linked to celiac, a [gluten intolerance](#). He told me he’d also seen some of his autoimmune arthritis patients improve by removing gluten from their diet.

Early on, a celiac blood test came back negative for Shepherd. But could he still have a sensitivity, something short of full-on celiac, that triggers a similar inflammatory response? A small, 2006 study published in the journal *Gut* (you probably subscribe) points to a possible yes. The researchers found significantly elevated antibodies to various foods in the digestive tracts of rheumatoid-arthritis sufferers but not in their blood. So not only were many of the arthritis patients found to have some level of intolerance to certain foods, but it wouldn't necessarily have been detected by a blood test.

**Leaky gut, meanwhile** turns out not to be conjecture after all. "A lot of doctors and people may think that leaky gut itself is sort of a froufrou alternative concept," says Sanford Newmark, a clinical professor at the Osher Center for Integrative Medicine at the University of California, San Francisco. "The real name is 'increased intestinal permeability,' and it is a definitive, scientific fact." It's not known if increased intestinal permeability causes autoimmune arthritis, but some scientists in the field say it's possible.

Many autoimmune arthritis researchers are less focused on the stealthy bacteria of a leaky gut than on the community of gut microbes as a whole. Their work is an outgrowth of the Human Microbiome Project, a National Institutes of Health initiative to catalog all the microbes in our system. What's already clear is that changes in our bacterial populations are associated with changes in our health. In a still-unpublished study, Dr. Scher and his team identified a particular microbe that was common in a large cohort of rheumatoid-arthritis patients but was much less prevalent in the healthy group. In two related studies, researchers discovered a microbe that can activate an immune response; in germ-free mice that were genetically predisposed to autoimmune arthritis, it was enough to cause the disease.

"Traditionally we've thought about disease as being caused by a specific bacteria," says Dr. Julie Segre, a senior investigator at the N.I.H.'s National Human Genome Research Institute. But now some scientists think it is more about the balance of a bacterial community. "It may be that if you have a disease-associated bacteria within a healthy population, then the other members of the community may keep that 'bad' bacteria in check."

And if you throw off the delicate ratios in that community, the bad actors might get too much leeway. An example of how this works is *Clostridium difficile*, or *C. diff.*, a bacterial infection that causes severe diarrhea. People don't get sick from acquiring the bacteria — it's already in the gut of some healthy individuals, kept in line by other bacteria. It's only when something like a course of antibiotics wipes out the peacekeepers that *C.diff.* can turn pathogenic.

The same balancing act could be at play with inflammation. If some bacteria in the gut activate immune cells, and others get them to settle down, an imbalance of these microbes could

contribute to the sustained inflammation that characterizes autoimmune arthritis. “So probably the ratio, the combination of bacteria in the gut will determine whether you will get disease or not,” says Ivaylo Ivanov, an assistant professor in microbiology and immunology at Columbia University Medical Center in New York.

Some researchers are optimistic that probiotics, which contain various strains of bacteria, could one day help restore a balanced population. A couple of different ones have been shown to reduce joint inflammation in mice, says Fergus Shanahan, the chairman of the department of medicine at University College, Cork, in Ireland, and a leading probiotics researcher.

Probiotics may also help to tighten up a hyperpermeable gut barrier, says Robert J. Shulman, a professor of pediatrics with a specialty in pediatric gastroenterology at Baylor College of Medicine in Houston. He has an N.I.H. grant to study the effects of a probiotic called VSL No. 3 (which is the kind we gave Shepherd) on gut bacteria and gut-barrier function in children with irritable bowel syndrome, a disorder in which changes in the gut bacterial population are associated with inflammation in the colon.

Another potential method of recolonizing the gut, which is gaining ground, is the fecal transplant. It is exactly what it sounds like. People infected with *C. diff.* have responded well when they’ve been given stool from healthy individuals (usually via colonoscopy). There’s enough excitement about the therapeutic potential of stool that when I spoke to Martin J. Blaser, a professor of medicine and microbiology and the director of the Human Microbiome Program at NYU Langone Medical Center, he suggested I stash some of Beau’s and Shepherd’s in our freezer, which I will do, right next to the peas.

Data on diet and supplements are lacking, at least partly because they are hard to get. It’s hard to design a great study around something with so many variables, like the food we eat. Pharmaceuticals, on the other hand, lend themselves easily to randomized, double-blind, placebo-controlled clinical trials. Plus, anti-arthritic drugs are great for business. Together, the top two sellers, Humira and Enbrel, took in more than \$8 billion in 2012, not including December, according to IMS Health, a health care technology and information company. At the N.I.H., the complementary-and-alternative center’s budget is 0.4 percent of the entire N.I.H. pie.

And yet, if you look hard enough, evidence that diet and supplements can work does exist. In a study published in *The Lancet* more than 20 years ago, a group of rheumatoid-arthritis sufferers was isolated on a “health farm” and, after a week of fasting, were fed a gluten-free, vegan diet. After four weeks, they showed “significant improvement,” compared with the control. In 2001, a study in the journal *Rheumatology* echoed the positive effect of a similar



diet. A 2011 case study in *The Journal of the Royal Society of Medicine* closely tracks Shepherd's story. The evidence for omega-3's also looks strong. Even if we can't know what helped Shepherd for sure, at home, we believe Walker's regimen is what did the trick.

**Sunday night has** always been pizza night in our family, but now it's dairy-free-mozzarella-and-sausage-on-corn-tortilla-night. And these days, everyone also takes fish oil and probiotics. Shortly after Shepherd started his regimen, Darin went off gluten and dairy in solidarity. Now 5, Shepherd often has more energy than Beau. Even so, I don't think I ever look at Shepherd without scrutinizing how he's moving. This will most likely be true for a long time, I realize, but for now, every time I look, I never see anything but a gleeful little boy.

It was almost a year ago that Dr. Kahn examined Shepherd and found that he had no active arthritis. That night when I kissed Shepherd good night, I told him to give me five. "For the no arthritis?" he asked. I nodded, holding out my hand. He slapped my palm again and again, over and over. It sounded like clapping.

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