

## Unleash Your Superhero Challenge – Your Path to the Prize

January 15, 2017

Some of us possess a favorite book, a special toy, or a soft blanket from childhood. Tucked away in my closet, among the treasures reminiscent of early days, there is a large monthly calendar featuring pictures of steam locomotives.

The steam engine calendar is marked with stars, check marks, stickers, and funny pictures on each day I pooped. Yes, when I pooped. I suffered from chronic childhood constipation since I was a few months old. Before moving my bowels, I would experience a sharp abdominal pain, often intensifying to the point where I would hold my bowels for a week at a time just to avoid it. Without knowing the consequences - by holding bowel movements in - I severely worsened the situation. In fact, I can still clearly recall the grueling trips to the emergency room, when it occasionally came to that.

The treatment of constipation is a combination of behavioral changes as well as medication; each marking on the “poop book” along with my childhood obsession with trains serving as the incentive to move my bowels. As for the medical aspect of the treatment, I ingested MiraLax daily, a stool softener which made the stool semi-liquid and easy to pass. This medication helped me tremendously, as it significantly decreased pain resulting from bowel movements. I curbed my habits by my fourth year, finally being able to get off MiraLax and to discontinue the calendar system.

Fast-forward to the present. When my father mentioned to me the NASA Space Poop challenge, I immediately thought of my childhood struggle. The objective of the challenge is to devise a method to manage solid waste in a tightly closed environment, such as an astronaut’s spacesuit. Over the course of the next several weeks, my father

and I spent evenings designing and planning our solid waste-carrying mechanism. We decided that prescribing astronauts with laxative medications would serve as the foundation of our system, given its intriguing ability to morph solid waste into a mushy liquid substance, greatly alleviating its departure from the body (as proven time and time again during my early childhood). From there, we would add a weak suctioning device in order to direct the waste into an antibacterial receptacle. This, however, catalyzed another problem: How would we ensure that the waste would be carried in the right direction and would not divert from that path?

Baffling us for a considerable amount of time, we found the answer lying within my father's career as a gastroenterologist, a physician specializing in the functions of the digestive track. When dealing with patients who suffer from incontinence, a rectal seal such as Flexi-Seal is utilized, carrying waste through an airtight tube attached to the user and avoiding misdirection of the stool. Because the desired outcomes of our astronauts and incontinent patients were largely similar, my father strongly suggested the use of this device in the spacesuit. The last piece of the puzzle finally came into light.

At last, we had pieced together a functional mechanism which would transfer solid waste from an astronaut's body, while remaining completely sanitary. Who knew, though, that some of my most dreaded experiences as a toddler over ten years ago would substantially assist the creation of one of the largest, most commendable joint efforts between me and my father.