Scoliosis and the Swimmer: How Robotic Spine Surgery Kept a Teen's Olympic Dreams Afloat

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Peer Reviewed

For most 12-year-olds, a routine physical is just that—*routine*. But for Ashlyn Fiorilli of McKinney, Texas, a simple doctor's visit was the beginning of a scoliosis journey that put her dreams of swimming at the Olympic Games in jeopardy.

"I never saw it coming," said Ashlyn, thinking back to that day four years ago. "I went in for my physical, bent over, and my doctor said I should get checked for scoliosis."

Would she ever swim again? Would her condition keep getting worse? Ashlyn had more questions than answers, but that would soon change.

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A simple doctor's visit was the beginning of a scoliosis journey for a young swimmer with Olympic dreams.

Ashlyn's Journey with Scoliosis

Ashlyn fell in love with swimming at age 6. By age 12, she earned first place in her age group in a state meet. At 15, she competed at the Olympic Trials.

During Ashlyn's physical when she was 12, her primary care physician used the Adam's Forward Bending Test (/conditions/scoliosis/scoliosis-children) to determine if she had an abnormal spinal curve. At the time, the abnormal curve wasn't severe, but Ashlyn's doctor encouraged her to seek a spine specialist's advice.

That led Ashlyn and her family to the Scoliosis and Spine Tumor Center at Texas Health Presbyterian Hospital Plano, where they met Medical Director Isador H. Lieberman, MD, MBA, FRCSC (/author/1500/lieberman).

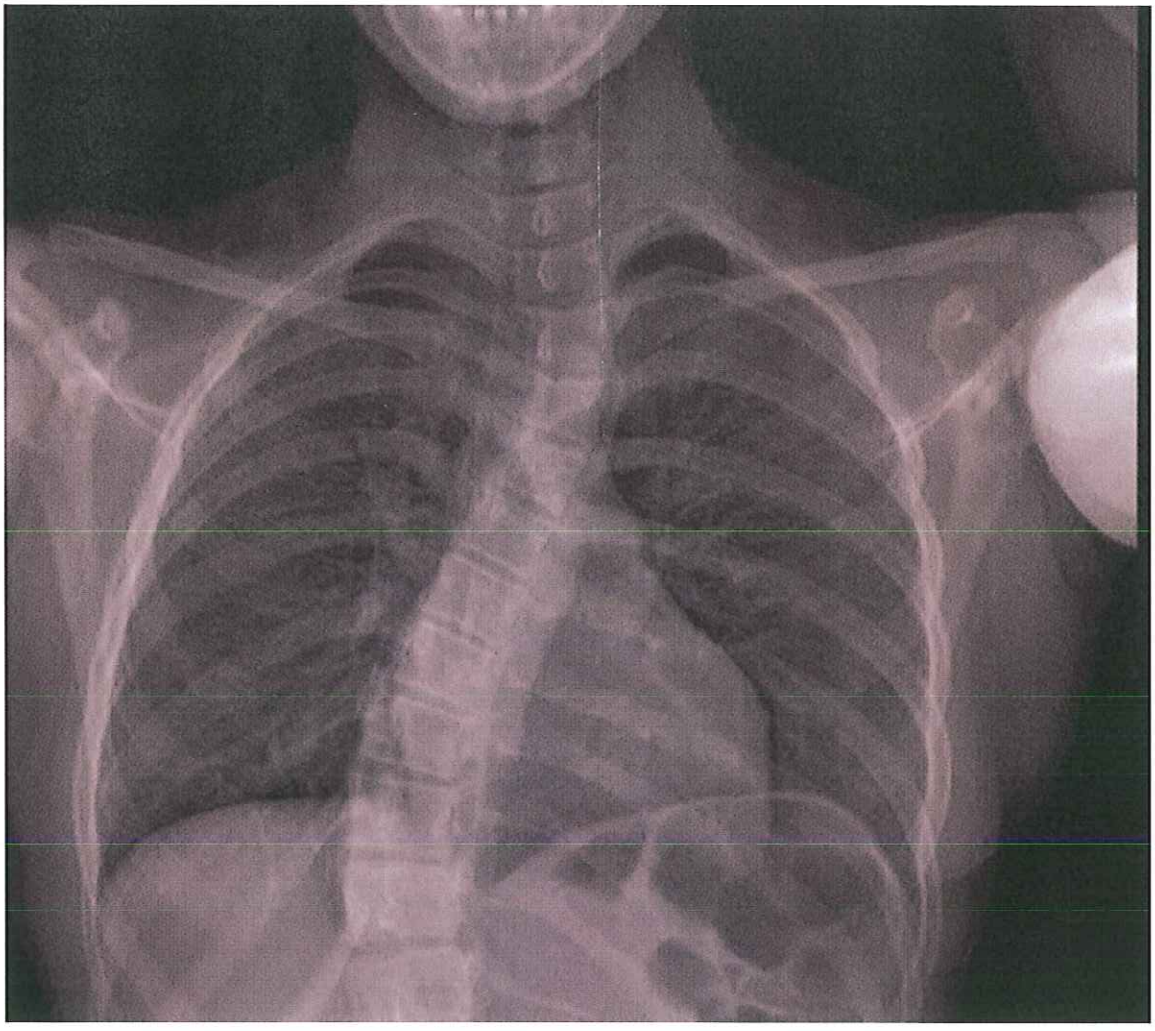
While Ashlyn's curve would progress, they had the right medical team. Dr. Lieberman is a pioneer in using minimally invasive techniques to address Ashlyn's progressive scoliosis while preserving her dream of competitive swimming.

Meeting Dr. Lieberman: His Conservative Approach for a Complex Condition

Like most other spinal disorders, surgery is rarely the first treatment considered. When Dr. Lieberman first met Ashlyn, he recommended a conservative approach to her care—namely, he wanted to monitor Ashlyn's curve to see how much it progressed as she grew before discussing more significant treatment options.

A few months later, Ashlyn's curve progressed rapidly as she grew. While bracing is a common non-surgical treatment option for young people with scoliosis, Ashlyn wasn't a candidate for this treatment because her curve shape, which was more of a "C" than an "S," was not an ideal candidate for bracing.

That's when the conversation turned to surgery.



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Ashlyn's pre-operative standing x-ray of the front of her spine.

"In Ashlyn's case, I was quite concerned, because I knew that any surgery was going to affect the way she swims," Dr. Lieberman said. "If we were able to get all the correction we want in one, confined area, then maybe we could get her back to her high level of swimming."

As a swimmer, Ashlyn needed mobility in her upper spine. So, Dr. Lieberman's surgical approach was to surgically treat the lower portion of Ashlyn's curve, leaving her upper back and shoulders free to move during swimming.

Robotic Spine Surgery: The Intersection of Technology and Surgical Skill

Dr. Lieberman is an international leader in minimally invasive spinal surgery and helped develop the first widely available robotic spine surgery system. Dr. Lieberman recommended Ashlyn undergo a selective fusion of strategic levels, to optimize the correction yet leave mobility in the remainder of the spine and use the robotic technology to improve the efficiency and precision of the procedure.

Using robotic technology during spine surgery affords several benefits to the patient including improved accuracy, less operating time, less exposure to radiation via x-rays, and a less invasive surgical approach.

"Robotic technology shows me exactly where I want to put the screws, and it allows me to be very proficient and precise during surgery," Dr. Lieberman said.

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The robotic technology's advanced software creates a "surgical blueprint" from 3D pre-op CT scans and "facilitates" the surgery, and helps the surgeon be more precise and efficient. Images provided by Isador H. Lieberman, MD, MBA, FRCSC, © Mazor X, Robotic Guidance System for Spinal Surgery, Mazor Robotics.

Before the surgery, the robot's advanced software allows Dr. Lieberman to create a "surgical blueprint" based off a 3D pre-operative computed tomography (CT) scan of the patient's spine. He can plan exactly where to place spinal implants (like screws and rods), cut bone, and decompress spinal nerves. This ability to plan every detail of the surgery ahead of time allows the surgery to more efficient and precise during the actual surgery.

While robotic technology helps make the spine surgery more efficient and accurate, it's important to understand that the robot is not actually performing the surgery.

"The robot *facilitates* the surgery—it helps us be more precise and more efficient because of the pre-operative planning of what we're doing," Dr. Lieberman said. "The surgeon is still doing the surgery, just more efficiently."

During Ashlyn's selective spinal fusion, Dr. Lieberman used a small incision to avoid unnecessarily disrupting her spinal muscles and other tissue. Spinal fusion surgery usually requires implanting spinal instrumentation to support the spine during the fusion process. In Ashlyn's case, Dr. Lieberman used screws and rods to correct the abnormal spine curve.

Dr. Lieberman then used bone graft to stimulate bone growth to facilitate new bone growth necessary to fuse multiple spinal bones into a single bone. This fusion of multiple bones into one stabilizes the spine and keeps that part of the spine from moving or curving.

While precision and efficiency benefit the surgeon, robotic spine surgery also delivers several benefits for the patient. Compared to traditional spine surgery techniques, this minimally invasive technology:

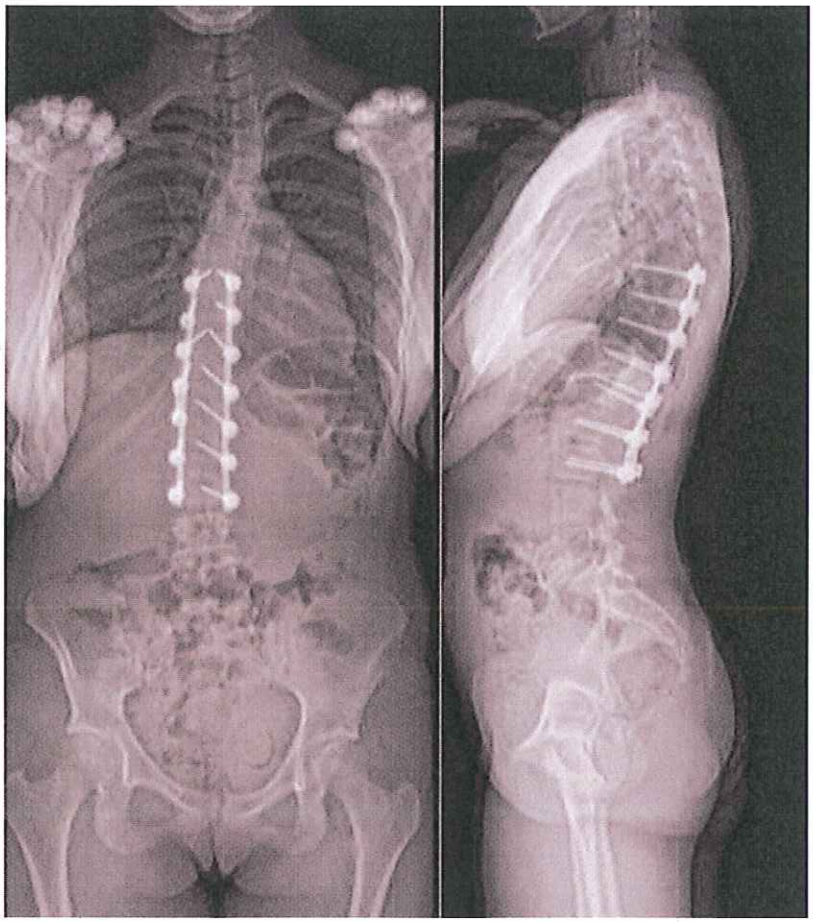
- Cuts infection risk
- Reduces post-surgery pain
- Boasts fewer complications
- Lowers radiation exposure during the procedure
- Has shorter hospital stays
- Has faster recovery times

After Surgery: How Ashlyn's Doing Today

Ashlyn's treatment didn't end with the completion of her surgery. She received top-notch rehabilitative care at Texas Health Plano from a team who made physical therapy enjoyable and rewarding.

"I was walking really soon—the day after my surgery," she said. "The therapists made it really fun, and it was an awesome atmosphere."

Since Ashlyn's second home is in the water, her therapists allowed her to do gentle hydrotherapy (/blogs/anand/spine-surgery-recovery-benefits-hydrotherapy) to slowly build up her strength. Three months after her surgery, Ashlyn was given the green light by Dr. Lieberman to ease into swimming again. By 6 months post-op, Ashlyn was back to competitive swimming.



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Ashlyn's post-operative standing x-rays of the front and side of her spine.

"I feel great now," said Ashlyn, who plans to attend the University of California Berkeley, where she will join the swim team. "I'm swimming just like I used to, and I'm having a lot of fun with it."

Dr. Lieberman said that if Ashlyn continues to stay fit and healthy, he doesn't expect her spine will cause her any problems in the foreseeable future. That means Ashlyn's dreams are still very much attainable. However, he cautioned her that too many gold medals around her neck may be difficult to tolerate.

"I really want to compete in the NCAA championships and maybe get into the Olympics in 2020," she said. "This made me believe I could overcome anything."

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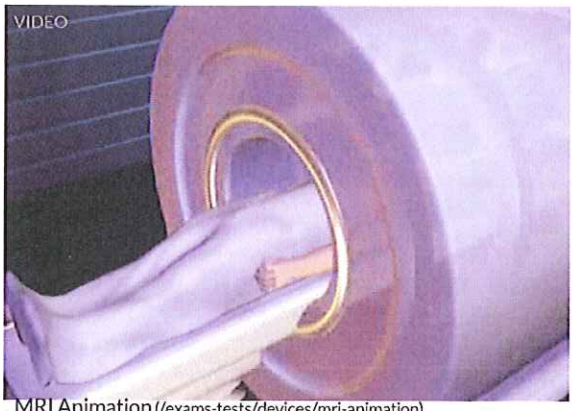

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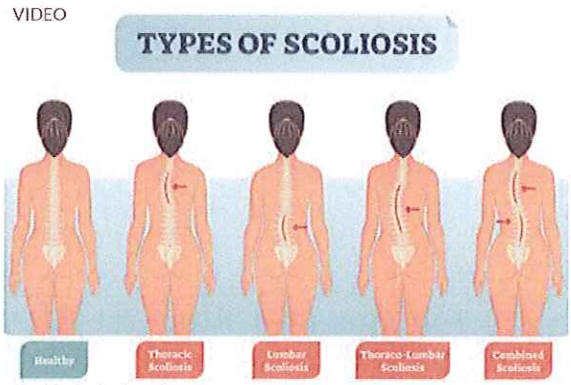

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