

[MUSIC PLAYING]

Procedure that we did on our patient, who was 15 months old, was technically called a spinal cord tethering procedure, but it was actually a little bit more in-depth than that.

The initial procedure that we had planned was to release the spinal cord from a point at which it was tethered or held down because as the patient grows and the spinal cord lengthens, the nerves that are within the spinal cord will get stretched and can get injured.

It ended up being a little more in-depth because we found that not only was the spinal cord tethered, but there was a fluid pocket that could be released at the time of surgery, and so we were able to do that as well.

The procedure that we did used a new form of magnification and visualization called a digital exoscope.

Now, the biggest difference between that and what we used to do, literally a week ago, is that in the past, we would look through the lenses of a microscope.

What that does immediately is that completely eliminates your peripheral view.

Now, an exoscope sits on top, over top of the patient, and provides visualization of what you're looking at, but you don't lose your 3D perspective.

And in this case specifically, this exoscope has 3D capabilities, so when we put on our 3D glasses, we can look onto a gigantic 55-inch monitor in a very ergonomic way and see 3D down into the patient without ever having to look down into the patient.

So this technology is part of a system of technologies under a corporation called Synaptive Medical.

The way that this new technology helps patients is that, first of all, it keeps the surgeon in a comfortable ergonomic manner.

So we all know that, especially in lengthy procedures, the surgeon's fatigue weighs in to the technical abilities of the surgeon as the procedure goes on.

So first and foremost, I think it makes us comfortable.

I think the second part is that the amount of zoom capability with this technology is even far surpassing what the newest microscopes can do.

And what that does is it allows you to see tissue definitions much more clearly and be able to distinguish between different planes of tissues.

So in the past, the microscope focuses on a very, very small portion of your working field, and the more zoomed in you get, the smaller that focal distance becomes.

So inherently, you might be looking at a very small area, zoomed in high power, but you won't see anything around it in focus.

And so the potential for injuring that as you're moving instruments in and out is not insignificant.

In this case, where the camera is above you and the entire area of operating field is in focus, it's almost impossible to hit anything or accidentally injure anything because everything is obviously in focus, and you can see it all.

You don't lose your peripheral view.

This becomes extremely important in vascular cases where blood vessels that are in focus in one area are autofocused literally millimeter or centimeters away.

This technology allows everything to be in focus all at the same time.

So in this case, step-by-step procedural needs were very important because it all started well before the operating room.

So given that it's a baby, a 15-month-old, we specifically didn't start the surgery until the patient was over a year old.

So we knew that this abnormality was in the spinal cord shortly after birth.

However, we also know that doing surgery on a newborn is not the greatest thing in the world.

The tolerance of them for surgery is not great.

Our ability to perform the operation safely increases as they get older.

We picked about a year because what that allows us to do is remove the bony portion of the back of the spine and replace it at the very end because the bone has grown enough for us to be able to replace it.

So the initial procedure started in the MRI, where one of our neuroradiologists was great enough to come over and mark the patient in the MRI machine with a small, little dot needle puncture after the patient was asleep to be able to tell us exactly what location we needed to operate on.

And that becomes very important because this was sort of in the middle of the back.

So there's no identifying marks that you can say, that's the spot you want to go.

Typically speaking, we would bring in an X-ray machine into the operating room and shoot a bunch of X-rays to find exactly what the location was that we needed.

First, that's not great because it's radiation to a child.

Second, it's not great because the bones aren't well-defined, and so the X-ray machine doesn't give you a good picture.

So this process that we've done now in a few patients has worked out very well.

So once the patient went to sleep in the MRI and was marked, they were brought to the operating room, where the neurophysiologist put electrodes onto the patient in different locations for us to be able to monitor the electrophysiology of the spinal cord during our surgery.

This allowed us to not only be safe but also allowed us to be aggressive appropriately so that we could release the spinal cord, make holes and cuts where we needed to, knowing that the neurophysiologists have continuous monitoring of the nerves so that we don't accidentally cut something we don't want to.

After all that was done, we position the patient in a way that we would be able to access specifically where the neuroradiologist marked the spot for us to access.

And we made an incision that was only big enough for us to be able to get the one level removed that we needed to.

We were able to remove that piece of bone using a ultrasonic technique that minimized the amount of bone loss, given that it's a small piece of bone, which at the end, allowed us to put that piece of bone back on with a system that absorbs over time, and the bone can heal back into its anatomical position.

Once we removed that piece of bone, we were then looking at the dura, which is the covering of the spinal cord.

And we brought in a high-power ultrasound to be able to verify that we're in the right location.

So secondary verification.

And that was great because it showed a very big dilated area of spinal cord, so we knew immediately we were in the right space.

At that point, we brought in the exoscope, which is our magnifying visualization.

And immediately, we had great visualization of the dura.

That allowed us to open the dura under high-power magnification so we wouldn't accidentally hit the spinal cord.

Once the dura was open, we were able to open the fluid channels.

We were able to release the spinal cord, like I said earlier, and we did this at the highest power zoom that the exoscope allows, which is about 12 and 1/2 times normal vision.

This is significantly higher than any microscope that's out there right now.

When we were all done, we were able to verify that we released the fluid by doing another ultrasound right then and there, and then we closed up the covering of the spinal cord using a very small needle and thread and then put the bone back on, like I said, with absorbable system that allows it to fixate in place within that.

All the plating and the attachments all absorb into the body, and you're left with literally the most normal anatomical position that you started with.

The patient's outcome was great.

Pain was controlled well, and they left the hospital about three days after surgery.

The day that the patient left the hospital, she was running around in her room and smiling and had no pain whatsoever.