The name of the procedure is a limb salvage surgery for skeletal sarcoma in a growing child.

So skeletal sarcomas or bone sarcomas are a type of cancer that are very challenging in younger patients where it's necessary to remove the bone that includes the growth plate in order to clear the patient of their cancer or provide them with local control.

Once we have a diagnosis of a skeletal bone sarcoma in a growing child, the next step would be for them to meet with our medical oncology team.

And they usually will get upfront chemotherapy.

And when it comes time to remove the tumor, we usually will review all of their imaging studies and make plans on the best type of resection and reconstruction for the patient.

Sometimes that is amputation, and sometimes there's a limb salvage option.

In a growing child, the additional challenge of maintaining longitudinal growth as they progress after their treatment, this procedure gives a unique opportunity for us to be able to do that in a non-invasive way.

We can utilize magnets and gears to actually lengthen the extremity in proportion to their growth.

So once we choose that option, we have that implant manufactured based upon our resection length and how much we're going to have to rebuild.

And then we go to the operating room and perform the procedure and put the prosthesis in place and then get the patient through their surgery.

And then they'll usually have some chemotherapy after the surgery, in which time the child usually doesn't grow very much, but we'll start assessing them for leg length discrepancies and begin lengthening them shortly after their post-operative chemotherapy.

Once we get to the operating room and we finish our necessary positioning and prepping and draping, we'll proceed with the surgical approach and the removal of the tumor.

Once we do that with preserving the important arteries and nerves and we have an adequate margin around the tumor, we'll start the reconstruction.

And the reconstruction consists of rebuilding the knee joint, say, in the instance of a distal thigh bone tumor and getting the length of the resection back that we need to.

We'll usually cement in a stem into the remaining femoral canal and, at this point, rebuild the knee with the prosthesis that we have templated on previously.

Once all of the bone implant interfaces are secure, then we begin our soft tissue reconstruction and tissue closure.

And then once we've achieved that, the patient's admitted back to the hospital for post-operative recovery.

Before surgery, we calculate how much growth is left in a particular growth plate and we take that into account with our skeletal reconstruction.

Once the patient's through their surgery and have completed their post-operative chemotherapy, we'll start assessing them for leg length discrepancy and utilizing a non-invasive, expandable way to lengthen the extremity, which is basically how long you spend in the magnet.

So the extremity's put into a magnet.

And for every four minutes in the magnet, the prosthesis will lengthen about a millimeter.

And we can use that with certain x-rays to make sure that we are keeping pace with the child's own growth and preventing a leg length discrepancy at the time of skeletal maturity.

So the frequency at which they need to be lengthened really depends on the child's age and what we think of as their peak height velocity, so when they're going to be growing the fastest.

So as adolescence comes on, a little bit earlier in girls than boys, that's when they're growing the fastest.

And that's when we usually like to try to increase their frequency.

Sometimes it's every three months.

Sometimes it's a little bit longer, depending on what we're actually measuring at the time of our evaluation.

So every time we see them, we'll get a leg length film, which will compare side to side how long the extremities are and getting a pretty good idea about how close we are to getting them a balanced bilateral lower extremities.

There are several contraindications to this procedure.

Not every child is eligible for limb salvage surgery.

And that's an important discussion to have with any orthopedic surgical oncologist.

Really young patients, I think, are more challenging, because they've got so much growth remaining.

And sometimes, there's individual tumor characteristics that really prevent us from being able to do limb salvage surgery.

The goal of the operation really is to get rid of the tumor in a safe way.

And it's a secondary goal to have a functional extremity.

And if we can do that and not compromise our oncologic safety, that's really our first goal.