Limb Discrepancies: Identify, Assess, Treat (Maybe)

BY DAMIAN McNAMARA
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MIAMI — To successfully evaluate the child who presents with a limb discrepancy, identify the etiology, understand normal limb growth, estimate the ultimate deficiency, and guide the family regarding intervention, Dr. Christopher A. Iobst recommended at a pediatric update sponsored by Miami Children's Hospital.

"Many people have a slight discrepancy in their leg lengths. Leg length discrepancies below 3% are generally not a concern," Dr. Iobst said. One of the options, therefore, is to do nothing but observe and monitor the child.

"Some kids do fine with a minor discrepancy, others freak out and want something done to correct it. Realistically, any discrepancy greater than 1.5 cm should be treated," said Dr. Iobst, attending physician in the department of orthopedic surgery at the hospital.

Options include an operation on the shoe or an operation on the child. Shoe lifts correct a length discrepancy without surgery, but most kids don't like wearing shoes with a noticeable lift, Dr. Iobst said. Up to 1 cm can be added inside a shoe. "I don't like prescribing lifts greater than 5 cm because they become dangerous."

Operations on the patient include techniques to either lengthen or shorten the affected limb. Epiphysiodesis or ablation of the physis is the most common surgery Dr. Iobst performs to shorten a limb. The number of growth plates permanently destroyed depends on the degree of the limb discrepancy.

Epiphysiodesis can be performed as a percutaneous, outpatient procedure. The surgery can be done through a small incision with minimal soft-tissue disruption. "The problem is, I am reducing their overall height, so if they are already [short], they may not want to do this."

To lengthen a limb, the bone is cut and gradually distracted to produce new bone. For example, with the Ilizarov technique, an external frame is placed around the leg and slowly adjusted to promote natural bone healing and bone growth.

An attendee asked about pain management during limb lengthening. "When we apply fixators and the frame, we leave it alone for 5-7 days at first so the bone starts to repair the fracture we caused," Dr. Iobst said. "It's not as painful as it looks. We are lengthening about 1 mm/day, so it's not as noticeable to them in terms of pain." He added that most patients discontinue pain medication by 2-3 weeks.

Immediate physical therapy is essential to postoperative success. "We want them weight bearing as soon as possible." Patients are instructed on daily pin care and to come for weekly follow-up visits.

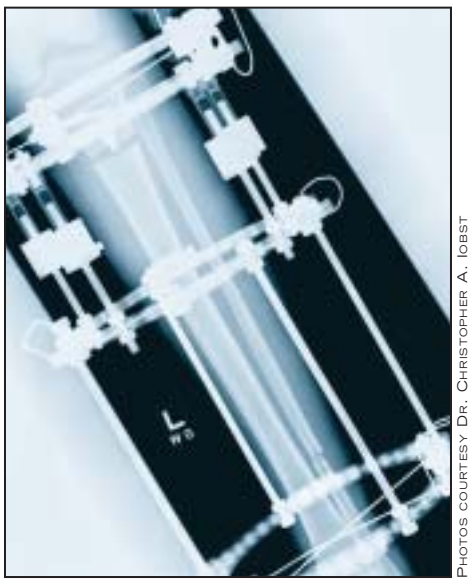
"They have to be in these frames a long time. It can take 6-9 months for new growth," Dr. Iobst said. The duration of wearing the fixator could be shortened by combining the use of an external fixator and an intramedullary nail. "We can save a patient anywhere from 3 to 6 months by using [a] rod along with an outside frame," he said. "Once the length is achieved, screws are placed in the rod to hold it, and the frame is removed."

"My practice is pediatric, and these rods go through the growth plates, so one adaptation is to place a plate (instead of a rod) that protects the growth plates when the frame is removed," Dr. Iobst said.

Hydroxyapatite-coated pins or screws put directly into bone to stimulate growth are another option in development. Researchers are also assessing the Taylor Spatial Frame, which is fitted and adjusted via computer.

When evaluating a child with a leg length discrepancy, most of the time the abnormal limb is obvious, Dr. Iobst said. But sometimes you cannot immediately tell. Many pediatricians were taught to measure from the spine of the pelvis down to the ankle,

A percutaneous osteotomy incision is made while the patient wears the frame.



A circular external fixator is positioned to lengthen the tibia and fibula.

PHOTOS COURTESY DR. CHRISTOPHER A. IOBST

he said. "Throw away the tape measure—it is a very unreliable way to measure leg lengths. Overall length can vary by as much as 3 cm just by incorrectly positioning the lower extremity by 10 degrees."

At Miami Children's Hospital, Dr. Iobst and his colleagues place blocks under one foot to normalize the pelvis. If it is difficult to tell if the pelvis is horizontal, use the underwear line as a reference, Dr. Iobst suggested. A radiographic assessment can be helpful, such as a standing anteroposterior view of bilateral lower extremities taken from the hips down.

A scanogram is another option. This imaging modality takes three scans at intervals along the lower extremities. "This gives an accurate length determination, but it's my second choice," Dr. Iobst said. "You can miss an anomaly in the areas not scanned."

A thorough physical examination includes observation of alignment while the child stands. Also, observe their gait from different angles because "kids are good at compensating," Dr. Iobst said. Also, assess joint range of motion and stability; motor strength, sensation, and tone; and limb symmetry.

"We need to see the entire lower extremities, so don't examine patients in jeans or shorts, use a gown," Dr. Iobst said.

It is often helpful to predict the growth remaining in a child, Dr. Iobst said. It can be challenging because growth is not uniform but is a succession of phases. Keep in mind that height increases an average 350% from birth to adulthood, at which time weight also increases 20 times, the femur and tibia lengths increase 3 times, and the spine length increases 2 times.

Although there are more complicated methods to calculate growth remaining, Dr. Iobst recommended the Menelaus Method. "It is the simplest. You can do it in your office." The distal femur grows 3/8 inch per year, and the proximal tibia grows 1/4 inch per year. Assume growth cessation at 16 years for boys and 14 years for girls. Use chronologic age, not skeletal age, he added, for the simplest estimate of growth remaining. ■

Science on Gout Advances; Uses for New and Old Drugs Shift

BY SARAH PRESSMAN LOVINGER
Contributing Writer

CHICAGO — Physicians treating gout and other crystal deposition diseases should consider both new medications and new uses for already available drugs, Dr. Lloyd Klickstein said at a meeting sponsored by the American College of Rheumatology.

"Some of the most exciting news in 2006 was the new understanding of the role of IL-1 in crystal-induced arthritis," Dr. Klickstein said.

Basic science research indicates that interleukin (IL)-1R is needed to signal gouty inflammation. An open-label study of 10 patients showed that treatment with anakinra, a recombinant interleukin-1RA inhibitor, effectively lessened the symptoms of acute gout.

Other new drugs for gout are also in clinical trials. The U.S. Food and Drug Administration is currently reviewing febuxostat, an oral drug that noncompetitively inhibits xanthine oxidase production.

"It is very unlikely to have any of the problems associated with allopurinol," said Dr. Klickstein, of the Novartis Institutes for Biomedical Research in Cambridge, Mass. Approval of the drug seemed imminent early in 2006, but the agency seems stalled in its decision.

Researchers recently completed phase III trials assessing the safety and efficacy of puricase, a pegylated recombinant porcine uricase that is given subcutaneously.

For patients who have not responded to conventional therapy, clinicians may also consider using drugs currently available for other conditions. Fibric acid derivatives, such as losartan, can lower uric acid, and some patients may have improved symptoms with this drug, said Dr. Klickstein.

"These little changes can really make a difference," he said. Sevelamer, a phosphate binder, also binds uric acid. Dr. Klickstein pointed out that this treatment is not used as often as it could be. Sevelamer is "an option we don't think about very often in rheumatology," he said.

Rarely patients may need treatment with rasburicase, an aspergillus-derived enzyme used in tumor lysis syndrome. Although it can be effective in lowering uric acid, it can lead to allergic reactions and should not be used in patients with known glucose-6-phosphate dehydrogenase deficiency.

In addition to gout patients who do not respond well to traditional therapy, dialysis patients with musculoskeletal complaints also may benefit from treatment that does not rely on conventional therapy. Lowering phosphorus may be the key to treating musculoskeletal complaints, which affect half of the 0.12% of the U.S. population on dialysis.

Clinicians should start by measuring calcium phosphate and encourage a low-phosphate diet. But phosphates are present in many foods, so encouraging a low-phosphate diet may lead to minimal results. "This is always worth talking about, but it's not always successful," said Dr. Klickstein.

Another approach is to try lanthanum or another phosphate binder. This drug requires gastric acid to work properly, so patients cannot take proton pump inhibitors concurrently. Patients who fail treatment with phosphate binders may respond better to calcimimetics. Cinacalcet, the only drug in its class currently available, treats the secondary hyperparathyroidism of renal disease by lowering phosphate.

Ultimately, patients with end-stage renal disease who do not respond to drug therapy may require nocturnal dialysis for the treatment of crystal arthropathies. Clinicians should not be put off by the complexity of arranging for this treatment if it leads to an improvement in symptoms. "Management can make a huge difference in people's lives so they can live without pain," he said. ■