

Minor surgery, major impact

Gentle correction of knock-knees,
bowlegs and differing leg lengths
in children and adolescents

Information
for parents



Preface



**Dear Parents,
Dear Patients,**

Sometimes legs don't grow quite the way they're supposed to.

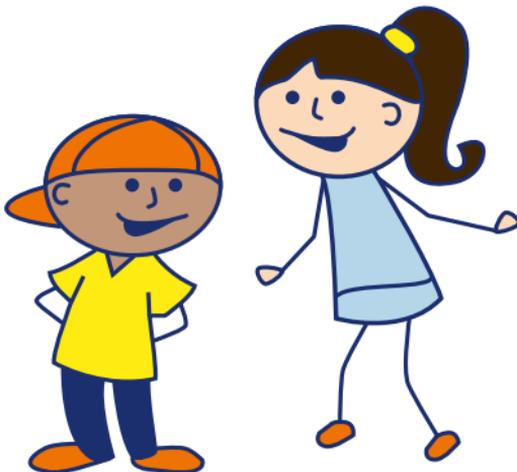
They may grow crookedly, bending either inward ("knock-knees") or outward ("bowlegs"), or one may grow slower than the other. Small differences in leg length are harmless, and so are slightly crooked legs. More significant bending, or length differences of more than 2 cm, can cause long-term problems. To decide whether a patient with crooked or unevenly long legs needs treatment, the doctor checks the patient and takes X-rays.

There are very simple and gentle ways of correcting these issues in patients who are still growing. The easiest way of getting crooked legs to grow straight again is to regulate growth. Selectively stopping growth makes it possible to straighten out a bent leg or give the short leg time to catch up with the longer one.

This brochure is designed to help you prepare for the upcoming operation by giving you information about the condition and explaining the treatment process.

Best regards,
Professor Robert Rödl, MD
Münster University Hospital

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Knock-knees, bowlegs, and differences in leg length

All about knock-knees, bowlegs and differences in leg length

Your doctor has given you this parents' information brochure because your child's leg growth condition will not go away on its own. Having knock-knees, bowlegs, or legs of unequal length may make walking or running difficult for your child, or even painful. If left untreated, these issues can cause wear on his or her joints later in life. This is why your doctor has planned surgery to help your child grow in a healthy way.

This isn't unusual. Doctors have been treating children with these conditions for more than 60 years now. In Germany alone, more than 8,000 children between the ages of 18 months and 17 years undergo surgery every year to help their legs grow straight.

Together with Head Physician Professor Robert Rödl, MD (Münster University Hospital), Merete GmbH has developed new solutions for these issues.

The implants presented here are manufactured in Germany and patented worldwide. They are subject to Germany's strict regulations and certification requirements on medical technology.

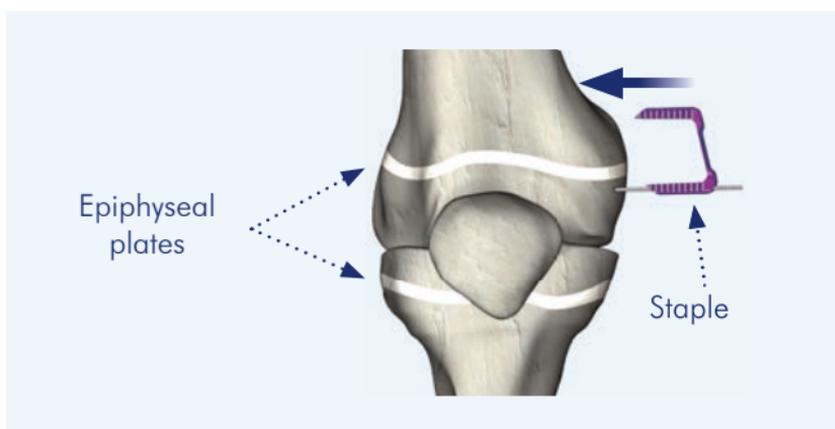
Turn to Page 12 to find some terms that you may encounter in this brochure or during your doctor's visit.

Gentle correction through growth guiding

Gentle correction, gently guided growth

The German-made implants are a modern, conservative and safe solution for correcting your child's joint alignment. The implants are made of titanium alloy, so they are safe even for children with allergies (titanium allergies are extremely rare).

These implants are shaped like staples. They are anatomically formed to help them fit to the shape of the bone.



The staples temporarily suppress growth on one or both sides of the growth plate. As the child continues to grow, the alignment issues gradually balance out. In most cases, children cannot feel these small staples at all.

The staples usually remain in the child's leg for 6-24 months.

Once the problem has been corrected successfully, the staples are removed.

FlexTack™ or RigidTack™ implants can be used in children anywhere from 18 months to 17 years old, as long as they are still growing. The staples are available in different sizes.

Ask your doctor for more detailed information.

Which staples are for which condition?

Which staples are for which condition?

The FlexTack™ for knock-knees and bowlegs

Knock-knees and bowlegs are everyday expressions referring to axis misalignments of the legs. Many children inherit these conditions from their parents, but they occasionally result from broken bones. Now, though, these potentially painful misalignments can be corrected easily and gently through surgery as long as the child's epiphyseal plates (growth plates) have not yet closed.



Varus misalignment
("bowlegs")



Valgus misalignment
("knock-knees")



Implant -
original size (25mm)

The Merete PediatrOS™ **FlexTack™** for knock-knees and bowlegs temporarily suppresses growth on one side of the epiphyseal plate, while the other side continues growing as usual.



Before treatment with the
PediatrOS™ FlexTack™



After treatment with the
PediatrOS™ FlexTack™

Which staples are for which condition?

The RigidTack™ for differences in leg length

If your body is a house, your legs are the foundation. And just like a house, if that foundation is crooked, it can eventually cause problems. If your child's legs differ in length by 1.5 cm or more, it's best to have it corrected. Fortunately, when children's epiphyseal plates are still open (they have not finished growing), correcting the difference is a simple, gentle procedure.

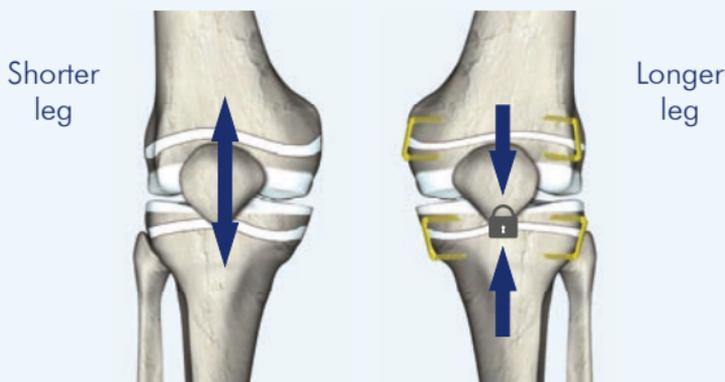


Leg length differences



Implant - original size (25mm)

The Merete PediatrOS™ **RigidTack™ for leg length differences** temporarily suppresses growth on both sides of the epiphyseal plate, stopping the longer leg from growing so that the shorter leg can catch up.

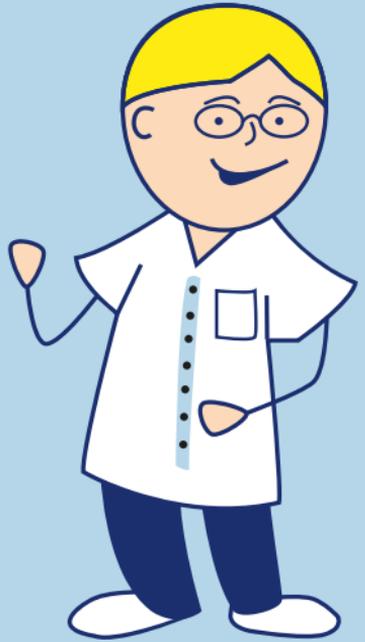


Correcting leg length differences using the **PediatrOS™ RigidTack™**

The big day of the (little) procedure



I mustn't eat anything before the operation. My parents can stay with me until I get anesthesia, or walk with me until just before I go into the operating room.



The FlexTack™ is placed on the inward-facing side of the bone to correct knock-knees; for bowlegs, it is placed on the outward-facing side.

To correct differences in leg length, RigidTack™ staples are inserted on both sides of the epiphyseal plate on the longer leg. Multiple alignment issues can be corrected at the same time.

The big day of the (little) procedure

The operation is performed under general anesthesia, and takes about 20 minutes per staple. Anesthesiologists closely monitor the patient the entire time to make sure he or she is getting the right amount of anesthesia.

The doctor will make a 2-3 cm cut at the growth plates of the bone being corrected. This is called "minimally invasive surgery" an operation that injures the skin as little as possible. Usually, the incision is closed using absorbable surgical suture.

Once your child's leg growth has been corrected, a second operation is performed to remove the staples.

Parents and child see each other again in the recovery room. Your child can put weight on the leg immediately after surgery. He or she will not need a cast, but should avoid playing sports for the first two weeks after the operation.

After about three to five days, your child can leave the hospital.



Clever little staples

After surgery



Advantages for your child

- Quick recovery from the operation
- Leg can bear weight shortly after surgery
- Fast, gentle surgical technique using a small incision; short anesthesia time, low exposure to X-rays
- Gentle, precise alignment correction
- No restrictive casts
- The FlexTack™ and the RigidTack™ are both made of titanium alloy, so they are safe for children with allergies as well (titanium allergies are rare). The staples are available in several sizes, so they can be used in patients of all ages, as long as the child is still growing
- No long-term restrictions for sports

FlexTack™



30 mm



25 mm



20 mm

RigidTack™



30 mm



25 mm



20 mm

When can my child start doing sports again?

When can my child start doing sports again?

Your child can put weight on the leg again immediately. Unlike osteotomies, hemiepiphysiodesis using the PediatrOS™ FlexTack™ or RigidTack™ is a minimally invasive procedure that causes little pain. The child may use a walker for added security after the operation. Physiotherapy is only necessary in rare cases. Your child can walk normally on the operated leg, and should resume all other activities as well. Children can usually start playing sports again after two weeks, as long as they are free of discomfort. If your child does experience pain or discomfort, please bring him or her back to see your doctor again.

The alignment problem will be corrected gradually, over a period of several months to a year.

Your doctor will need to check your child's growth at least once every three to six months. This helps the doctor decide when the staples can be removed. If it is not possible for you and your child to come back and see the doctor every three to six months (for example, because the clinic is too far away), another doctor can take full-body X-rays for you to send to the surgeon who implanted the PediatrOS™ FlexTack™ or RigidTack™. As soon as the problem has been corrected, the surgeon will perform another operation to remove the staples.



Technical terms

Anesthesiologist – a specially trained doctor who uses anesthesia to put the child to sleep during the operation. He or she adjusts and monitors the anesthesia throughout the entire procedure.

Recovery room – a room or area with special monitoring equipment where the child is cared for while the anesthesia wears off, until he or she can be brought back to his or her hospital room.

Leg length difference – where one leg is longer than the other, measured from hip to foot.

Epiphysis – the plates at the ends of the long bones (upper and lower leg) that allow them to grow. Growth plates close naturally at maturity at around age 14 for girls and around age 16 for boys.

Epiphyseal plate – growth plate, see epiphysis.

Epiphysiodesis – an operation that temporarily or permanently stops growth at the epiphyseal plate. The term "epiphysiodesis" comes from the Greek words physis (growth) and desis (suppress or bind). In this operation, which is also known as "epiphyseal stapling," surgeons use surgical staples (normally two or three) to inhibit the growth plate on one side, while the other, non-stapled side can continue to grow.

Hemiepiphysiodesis – using an implant to stop growth on one side of the growth plate (inside or outside).

Implant – a material "implanted into" the body to help support or replace body functions. Common orthopaedic implants include staples, plates, nails, and prosthetics.

Minimally invasive – surgery that uses the smallest possible surgical incision. Compared to osteotomies, hemiepiphysiodesis and epiphysiodesis operations are much smaller surgical procedures for correcting knock-knees, bowlegs and leg length discrepancies.

Osteotomy – Separating a bone into two segments (artificial bone break). Corrective osteotomies are major surgical procedures. Depending on the type of misalignment, the surgeon either inserts or removes a wedge of bone (for knock-knees or bowlegs), or else extends the shorter leg and then realigns the bones. Once

aligned, the bones need to be fixed into place, either with pins or a combination of plate and screws. Casts are necessary in some cases. The treated bones must not bear any weight for a long period of time, and then require physiotherapy later on. In some cases, several osteotomy operations are necessary to completely correct leg alignment.

Reabsorbable surgical suture – a special surgical “thread” made of a material that the body can safely break down on its own. In other words, it simply dissolves.

Titanium alloy – a metallic material containing a large amount of the raw material titanium, which the body tolerates well, so it is often used in implants that will remain in the body either temporarily or permanently.

Valgus misalignment – the axis of the knee is displaced inwards, causing the knees to point towards each other. (“knock-knees”)

Varus misalignment – the axis of the knee is displaced outwards, causing the knees to point away from each other. (“bowlegs”)



Hospital packing list

Have you remembered everything? What would your child like to bring along?

- Doctor's referral form
- Contact information for family doctor or referring physician
- Medication list and/or medications for the first day
- Current X-rays, for example on a digital storage medium
- Current medical reports
- Current laboratory results
- Medical IDs, if any: allergy pass, X-ray pass, diabetic ID, other
- Pajamas
- Slippers or non-slip, comfortable, flat shoes
- Warm socks
- Bathrobe
- Loose, comfortable casual clothes
- Toiletries (toothbrush, soap, lotion, etc.)
- Perhaps the child's favorite pillow

Follow-up appointments

Your child's treating physician will schedule regular checkups to monitor how well his or her growth steering is coming along.

At the end of the treatment, the surgeon will perform a second operation to remove the staples. How long treatment takes can vary from one child to another; your doctor will give you more specific information.

Date	Time	Notes



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