

When your knee hurts (part 3)

By Dr. med. Ullrich Gebhardt, specialist for general and accident surgery, authorised medical examiner

Day surgery centre Oberlausitz Bautzen/Kirschau

Children's injuries of the anterior cruciate ligament

In general, the conclusion I made in part 2 about lesions of the anterior cruciate ligament in adults applies for children as well.

The treatment of lesions of the anterior cruciate ligament in children has changed dramatically in the last few years; there are several particularities that have to be taken into account.

Infantile lesions of the anterior cruciate ligament can be found quite often when you examine recently injured knee joints of children.

Many of these injuries are due to the high level of activity of these children and teenagers. The biggest cause is sports, followed by traffic accidents. In my group of patients, I found 18% severe knee injuries (injuries of the ligaments with and without injured bones and cartilage – meniscus injuries) in children under 15 years. In Peterson/Zantop "The anterior cruciate ligament", Becker finds 14% in a similar group of patients. Children with hemarthrosis (blood in the joint) often have a ruptured anterior cruciate ligament combined with major accompanying injuries. As mentioned in medical literature, it is difficult to treat children because you can't keep them from moving around, especially when pain is reduced.

The osseous ruptures in ligaments can be diagnosed and treated easily by taking an x-ray image and by either immobilising or operating with continuous adaptation, depending on the severity of the injury.

The injured ligaments that can't be seen on X-ray images are a real problem.

You have to diagnose or eliminate the possibility of an injured ligament by asking about the course of events during the accident, by carefully examining the little patients, by looking for a swollen joint and by finding blood in the joint. An examination in the MRI and, if necessary, an arthroscopy can make things clear and open up therapeutic options.

Today's standard is to transplant soft tissue without any bone material, using a special operating technique to avoid impairing the growth of cartilage in the child's joint.

This is supposed to keep away growth impairments and shifts in the axis of the child's knee-joint. The stabilisation of the a child's lesion of the cruciate ligament by transplanting soft tissue is necessary because the instability of the joint can lead to subsequent damage to the point of losing the meniscus and to damaged cartilage especially in very mobile children who don't listen to orders to keep still. These children can experience an early and uncontrollable abrasion of their knee joint. There are lots of children and teenagers who have worn out their knee joints because of a torn anterior cruciate ligament. We know that these anterior cruciate ligament transplants in children – if inserted correctly – grow with the joint and stay strong.

The reason why children's injuries of the anterior cruciate ligament are supposed to be operated on is that a loss of the meniscus or damage to the cartilage cannot be corrected. Even if the child develops knocked knees or bowed legs because of the operation of the cruciate ligament, this malposition can be corrected after the child's growth has stopped by a correction of the leg axis. I currently have an overview over an astonishing number of children's operated lesions of the anterior cruciate ligament. We haven't witnessed any aberrated leg axes as long as the current operative techniques were used. Of course the little patients have to continue to be treated, ideally by the operating doctor and in agreement with the parents.

Even in children under 10 years, injuries of the anterior cruciate ligament occur quite often.

The anatomical structures of small children are so complex that it is sometimes better not to operate. Children have to be observed closely with the help of their parents. Another possibility with relatively good results is to glue the anterior cruciate ligament.

If the glue doesn't hold, you can still insert a substitute ligament made from soft tissue later on.

By transplanting soft tissue as early as possible and with a very precise operating technique, you can achieve very good overall results that are a lot better than those achieved by conservative therapy in children's lesions of the anterior cruciate ligament. Children can then go back to a high or even very high level of activity and the subsequent damage can be minimised.

The meniscus

The menisci are discs made of cartilage in our joints that improve the contact between the femur and the lower leg. The outer meniscus is more mobile than the inner meniscus. The menisci are wedge-shaped structures that are made of 70% collagen and 30% proteoglycans.

The menisci look like half moons. The rear parts are thicker than the parts on the front. The inner meniscus covers about 80% of the inner area of the tibia joint. Nature gave us a big range of variation.

The menisci have a special vascular supply system that is only developed on the edges of the joint capsule. It determines the ability to regenerate and heal. The inner part of the joint is only supported by the diffusion of joint fluid. This is why tears in the inner part of the joint barely heal.

The menisci are so-called peripheral stabilisers of the knee joint and carry weight so that it can be dispensed over the whole cartilage when walking. Therefore the menisci are the weight dispensers, shock absorbers and break pads of the joint. These are very important functions of the knee joint's kinematics. Damaged menisci are some of the injuries and diseases of the knee that occur most often. For diagnostics, there are different clinical tests that can be used. One of them is the X-ray. As an additional examining tool in ambiguous cases, the MRI can show a precise image of the lesion. A loss of the meniscus can lead to a severe overload of the articular cartilage of the affected articular compartment and lead to worn out cartilage because of the changed pressure in the joint, especially in younger patients.

When the articular cartilage is more or less worn out, the clinical symptoms of arthrosis like pain, swelling, heat and movement disorders will be accompanied by changes in the leg axis, like knocked knees or bowed legs. The standard today is to keep as much of the damaged meniscus as possible and to remove as little of it as possible. This is even more important if the patient is young. To refixate damaged menisci, numerous implantation systems are available. There is special sewing material just for the meniscus; there are reabsorbable darts and screws. The substitution of menisci is just starting to develop. One promising technique that was already successfully tried out in hospitals with maximal care is the transplantation of menisci taken from corpses. In Germany, the transplantation laws do not allow a widespread use of this method because for such an organ, as strict regulations of the German Pharmaceuticals Act apply.

There are also promising approaches of implanting artificial menisci. Their size depends on the size of the joint, and they are fixed on the articular capsule, the goal being that the body uses blood and stem cells to build its own material along the membranes, enabling it to take over the functions of a real meniscus. However, we know nothing about the long term results of this method. But if a young person is missing a meniscus, this method can offer an alternative to letting the joint wear out. The part of the joint without a meniscus can also be partially relieved by changing the leg axis, but this can lead to an overload of weight on the healthy part of the joint.

This surgery, the so-called readjustment osteotomy, takes place on the bone near the joint, is more invasive and cannot be undone.

This operating method is popular and practical, but more invasive for the patient and less reliable in its long term effects. However, due to the reasons mentioned above, it is often the only alternative.

Another very promising procedure to at least compensate the loss of the meniscus over a long period of time in adults is to implant an interposition spacer. This should not be used on infantile and still growing joints. The interposition-spacer is a titanium implant that is customised individually to each patient's articular anatomy after special examinations in the United States and that is implanted by making a small hole on the front of the joint. Both the inner and outer meniscus can be replaced this way. This titanium disc has a stabilising effect on the leg axis and leads to a pressure compensation on the articular capsule as long as it isn't too thin or damaged to the bone, and reduces the slows down the symptoms of abrasion in the affected articular compartment. This procedure can't be done if the joint is inflamed, if the patient is allergic to metal or if the ligaments on the knee aren't intact. If this procedure fails, then there are still all the conventional procedures of arthrosis therapy left, starting with the changing of the leg axis (the so-called readjustment osteotomy), the implantation of half-prosthesis or total endoprosthesis. The advantage is that the patient gains time in the development of the arthrosis, and it is possible to wait until they are older, in which time total endoprosthesis for the knee will have long-lasting durability. Unfortunately, the producer has taken this product off the market due to the cost of its production.

For the reasons mentioned above and because nature gave us menisci for a reason, you should always try to preserve as much of the meniscus tissue as possible. Obviously this can't always be accomplished if the tissue is already too corroded. Because of the special knee kinematics, the human knee joint reacts in a much more sensitive manner to defects of the outer meniscus than to those of the inner meniscus.

As a surgeon, you have to master these principles of meniscus preservation and you have to follow developments in medical science.

Currently, patients with a loss of meniscus tissue have to be more or less kept away from sports, depending on their age; quite a difficulty especially when children and teenagers and patients with jobs that put a lot of stress on their knees are concerned.

Patient information:

In medicine, the success of a method can naturally not be guaranteed. For this reason, patients always have to be informed comprehensively and without any time pressure before any procedure.

Read on: Part 4 will be published Dec 29th 2010 (week 52) in the WOCHENKURIER:

- changes to the leg axis
- readjustment osteotomy
- the half knee joint
- hemiprosthesis
- unicondylar prosthesis
- the total knee endoprosthesis
- summary

Dr.med. U. Gebhardt

specialist for general and accident surgery

Clinic for surgery and accident surgery
Ambulant joint operating centre Oberlausitz/outpatient clinic
Töpferstraße 17
02625 Bautzen

Tel.: 0 35 92-43 149

Op-zentrum-ol@t-online.de

www.op-zentrum-ol-com