High femoral antetorsion

Femoral antetorsion is the forward rotation of the femoral neck at the hip joint relative to the posterior surface of the femur at the knee joint. It is thus a torsion of the thigh bone in itself. In infancy, this forward rotation amounts to approx. 35°. As a result of the "backward rotation" during growth - this is referred to as physiological derotation - at the age of approx. 12 years, a femoral antetorsion of 15° on average remains (normal value 10 - 25°!).

How does high femoral antetorsion occur ?
There is no evident reason for the absence of physiological derotation in the healthy child. It must be assumed that it is a "genetically" caused growth disorder. Occasionally, an unrecognized underlying neurological disease, primarily mild cerebral palsy, is responsible for the lack of correction during growth. Occasionally, unilateral increased antetorsion of the femur may be the result of fracture treatment.

What results from the high femoral antetorsion ?
If the femoral antetorsion remains high, this leads primarily to an inward gait with internally rotated knee and foot axes ("kneeing-in and toeing-in"). This is due to the high femoral antetorsion, which results in an increased internal rotation ability with a simultaneous largely absent external rotation ability at the hip joint. Children with a high femoral antetorsion are therefore unable to perform the normal cross-legged sitting position and thus sit on the floor in the Naiad sitting position (see Figure 1). Usually, high femoral antetorsion is also accompanied by an increased lumbar lordosis because of a conflict situation between the femoral neck and the posterior parts of the hip joint, called dorsal impingement. In addition, the poor leverage for the gluteal muscles can result in a waddling gait pattern. At the age of less than 10 years the problem hardly leads to pain, at a higher age it can lead to low back pain or as a result of the insufficient work of the gluteal muscles to functional pain on the outer side of the thigh, starting from the hip and extending to the knee joint. In rare cases the muscle / tendon, which extends from the pelvis to the knee joint, then snaps over the greater trochanter - this is the very outer part of the bone of the hip joint. This is called external snapping hip or coxa saltans. An anterior instability of the hip joint occurs in rare cases only. If present, it primarily causes pain in the groin when lying down with the legs extended and turned outwards.

How to detect high femoral antetorsion ?
Clinically, as mentioned, an inward gait and an increased ability to rotate the hip internally are seen (see Fig. 2). The femoral antetorsion can also “approximately” be measured clinically. Today, the actual detection of excessive forward rotation of the femur is done by MRI, which allows a fairly accurate determination based on the comparison of the position of the femoral neck with that of the posterior

surface of the knee joint. Occasionally, a gait analysis is also performed to show the effect of the high femoral antetorsion on the gait pattern.

What can you do about it ?

Conservatively, there are no possibilities to correct femoral antetorsion. Acceleration of femoral derotation by physiotherapeutic or similar measures is not possible. In our opinion, increased activation of the muscles that rotate the hip or leg outward, e.g., during inline skating or ice skating, is also of no use. If a correction of the torsion of the thigh is necessary, this can only be done surgically.

When is an operation necessary ?

Corrective surgery is usually not performed before the age of 12 to wait for the physiological derotation to take place. If there is still a disruptive inward walk or a hyperlordosis, surgical correction can be performed if the patient or patient's parents wish to do so. In the literature, some authors recommend performing the procedure if external rotation in the hip joint is less than 15°.
If there are complaints that can be attributed to the high femoral antetorsion (functional pain in the lateral thigh; pain in the small of the back; signs of painful impingement of the femur on the acetabulum or ischium; groin pain due to ventral instability) which do not improve despite intensive physiotherapy with stabilization of the trunk and the leg axis, surgery can also be considered.
Occasionally, a high femoral anteversion is corrected even if it is only present on one side and thus leads to a compensatory malalignment of the pelvis and, in particular, of the lumbar spine.
Under no circumstances can it be said that the correction of high femoral antetorsion is mandatory! It is not a pre-arthrosis of the large joints on the legs.

What is done during an operation ?

A so-called externally rotating osteotomy (bone transection) of the femur is performed on both sides in one session. In order to enable mobilization on canes in a 4-point gait immediately after the operation, the bone transection is stabilized with an angle-stable plate. (see Figure 3) The procedure can be performed below the hip or above the knee joint. In general, a cut a few centimeters below the hip joint is chosen.

What does the follow-up treatment look like after an operation ?

As already mentioned, mobilization on canes in a 4-point gait is possible immediately after the operation. As a rule, this gait must be maintained for 6 weeks. The hip and knee joints may be moved freely during this time. After 6 weeks, a radiological check is performed, after which walking without canes is usually allowed. After 6 more weeks and another x-ray check, sporting activities can slowly be increased. Physiotherapy is important as part of the follow-up treatment. This primarily involves working on the correct use of the gluteal muscles. In girls in particular, it often takes a long time for these

muscles to be strengthened again and to work properly. Therefore, these patients often limp for several months and parents must be informed accordingly. The plate is usually removed after 12 to 18 months.

Fig 1: Najaden-position

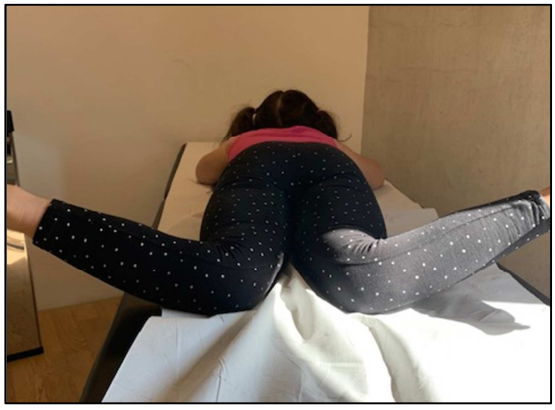

Fig 2: increased internal rotation in prone position with extended hips

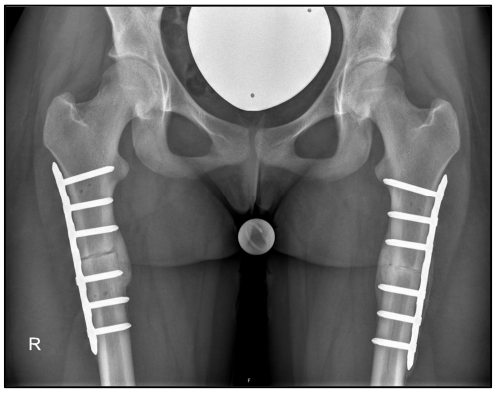

Fig 3: 3 months after externally rotating femoral osteotomy