
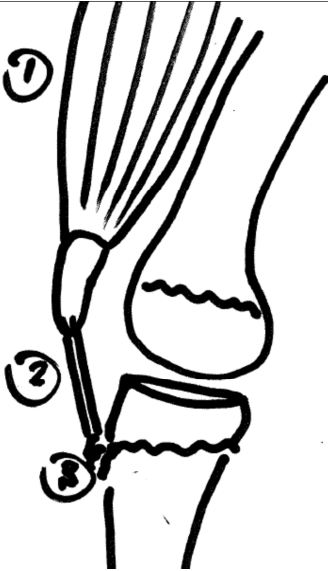


## Osgood-Schlatter disease (growth disturbance of the knee)

Knee pain in children and adolescents may originate from very different sources. Most problems though represent harmless, so-called growth disturbances in the region of the upper shin bone (tibia, outside the joint), typically as Osgood-Schlatter disease. Causative for the pain is an irritation of the upper tibial growth zone, right where the large anterior thigh muscle (quadriceps) inserts with its patellar tendon at the tibial tuberosity (see figure 1). The complaints and the clinical findings are mostly so typical that a clinical assessment is sufficient. Only in rare cases an additional radiograph or magnetic resonance imaging (MRI) is indicated. Longterm sequelae apart from a local bony prominence (e.g. osteoarthritis, instability) do not occur since the knee joint itself is not affected and the pathology is self-limiting at the end of growth of the legs, usually at age 14 in girls and 16 in boys, respectively.

	
<p>Figure 1: Knee radiograph from the side. The arrow indicates the insertion of the large quadriceps muscle. Traction of this muscle irritates the growth zone and provokes formation of extra bone. The dark lines represent the cartilaginous growth zones which weaken at the beginning of puberty.</p>	<p>Figure 2: The large thigh muscle (1, quadriceps) inserts with a large tendon (2, Ligamentum patellae) directly at the growth zone of the tibia (3). Each activation of this muscle – mainly when stopping a movement (excentric muscle work) – leads to traction forces which pull on a soft growth zone.</p>



***Which complaints are typical ?***

- Typically they occur during or after physical activity
- Below the knee cap (patella) in the region of the tibia
- The intensity may vary from slight to strong, sometimes bilateral pain which leads to limping and sports incapacity
- Pain at rest, night pain, as well as fever are lacking
- A bony, tender prominence at the tibial head
- Keeling on hard surfaces causes pain

***How does a growth disturbance develop ?***

- Overuse and irritations of growth zones are frequently seen during the period of fast growth of the legs, typically between the age of 10 and 14 (girls) and 16 years (boys), respectively
- During this pubertal period the growth zones are weakened under the influence of the hormones making them more sensitive to mechanic stress
- At that time the legs grow several centimetres per year. Since the muscles grow at a slower pace, they become relatively too short and weak
- High sports activity, particularly in „stop and go“ sports (soccer, tennis, unihockey, basketball etc.) which generate high muscle forces
- In summary: increasing load/forces (sport activity) in combination with muscular shortening hits a weak, loosened cartilaginous growth zone. This imbalance causes a local irritation, pain and extra bone formation with a subsequent tender bony prominence

***What can be done against it ?***

- Reduction / modification of sports activities. In case of very strong pain, cessation of sports for at least 4 weeks should be discussed.
- Physiotherapy including instruction and surveillance of a home exercise program
- Stretching of muscles
- Fascia training
- Taping
- Anti-inflammatory medication for a few days is only rarely indicated in case of strong pain
- In case of long-lasting strong pain which does not respond to restriction of activities and pain killers, immobilisation by an above-knee plaster should be discussed
- Pain reduction allows for a cautious, stepwise return to sports
- Operative interventions with removal of bony pieces to reduce the prominence are only rarely indicated and should only be performed after the end of growth




**How can I prevent recurrency ?**

- Stretching, fascia training on a daily basis

**When do I have to go to the doctor again ?**

- No improvement despite 3-4 weeks of therapy in combination with reduction of physical activity until complete disappearance of pain which usually takes 4-6 months
- Change of the character of pain, for example new appearance of pain at rest or even night pain.
- Rapidly increasing swelling, redness and warming around the knee joint

**Which exercises can I easily perform daily ?**

	<p>Figure 5</p> <p>Relaxation of the fascia (which is a smooth, sensitive layer around a muscle) and quadriceps muscle with a black roll</p>
	<p>Figure 4</p> <p>Dynamic stretching of the quadriceps muscle of the left leg. The pelvis should be kept straight with slowly pushing the upper body back- and forward (the left hip remains extended)</p>
	<p>Figure 5</p> <p>Dynamic stretching as in figure 4 but with more bending of the left knee by placement of the foot on a platform</p>