Osgood-Schlatter disease

Osgood and Schlatter separately described a painful condition of the anterior tibial tubercle characterized by the partial separation of the tongue-like epiphysis of the tibial tuberosity, considered to be caused by continued strain placed upon it by the patellar tendon **(Osgood and Schlatter, 1 9 0 3) .**

The etiology of Osgood-Schlatter disease (OSD) is not known. Avascular necroses, systemic disease, endocrinopathy, structural changes in the patellar tendon, and traumatic avulsion of the cartilage have all been proposed as etiologic theories. In 1975, Ogden and Southwick, through gross and histologic studies, found that OSD appears to be an inability of the developing secondary ossification center to withstand tensile forces, resulting in avulsion of segments of the ossification center and eventual formation of extra bone between the fragments. Gigante et al., (2 0 0 3) studied the relationship between OSD and torsional abnormalities of the lower limbs, and found a significantly increased condylo–malleolar angle and external tibial rotation in patients with OSD. Resnick (2005) stated that the pathologic findings in this condition are most consistent with traumatically induced disruption somewhere along the side of the patellar tendon attachment to the tibial tuberosity.

Currently it is widely accepted that OSD is a traction apophysitis of the tibial tubercle caused by repetitive strain and chronic avulsion of the secondary ossification center of the tibial tuberosity. The repetitive strain is from the strong pull of the quadriceps muscle produced during sporting activities **(Gholve et al., 2007).**

OSD involves the tibial tuberosity in growing children and presents with local pain, swelling, and tenderness of the tuberosity. Pain exacerbates after sporting activity involving jumping (basketball, volleyball, running) and/or on direct contact (e.g. kneeling). Physical examination reveals tenderness, local swelling, and prominence in the area of the tibial tuberosity. Pain can be reproduced with extension of the knee against resistance **(Sarcevic, 2008).**

Plain radiographs (lateral view of the knee with the leg internally rotated 10°–20°) show irregularity of the apophysis with separation from the tibial tuberosity during the early stages of OSD and fragmentation during the later stages. A persistent bony ossicle may be visible in a few cases following fusion of the tibial epiphysis. Anterior soft tissue swelling may be the only sign observed very early in the acute phase when avulsion occurs through the cartilaginous portion of the secondary ossification center ***(Aparicio et al., 1997).***

With the use ultrasound in cases of OSD a reduced exposure of children to X-ray is possible. Ultrasound examination is a clear and easy way to diagnose the disease correctly and evaluate its course and cure ***(Mahlfeld et al., 2001)***.

MRI clarified the progress of OSD. The process of OSD started from the apophyseal stage and a tear appeared in the secondary ossification center, widening to an opened shell-like shape. This damage progressed to an ossicle in some cases. In short, the ossicle was formed from an avulsed portion. It was very difficult to show the course of OSD with radiography. MR images were especially useful for revealing early and progressive lesions of OSD ***(Hirano et al., 2002).***

The standard non-operative treatment of OSD includes application of ice, limitation of activities, oral anti-inflammatory medications, protective knee padding, and physical therapy. Ross and Villard (2003) recommended exercises for strengthening and improving the flexibility of the surrounding musculature, including the quadriceps, hamstrings, iliotibial band, and gastrocnemius muscle.

Surgical treatment has been described for patients who have failed nonoperative management of OSD. OSD almost always resolves at skeletal maturity. Surgery may be indicated for symptoms that persist past skeletal maturity. Previous series present a mix of procedures, including epiphysiodesis (drilling) of the tibial tubercle apophysis, ossicle excision, and tibial tubercleplasty ***(Weiss et al., 2007).***

Arthroscopic technique for debridement can be done. The advantages of this technique include the avoidance of the patellar tendon longitudinal split required for open procedures and the ability to address concomitant intra-articular pathology ***(Deberadino et al., 2007).***

Complications secondary to OSD are rare. Ogden and Roberts (1990) reported on complications of OSD with or without treatment. Those include subluxation of the patella, patella alta, nonunion of the bony fragment to the tibia, and premature fusion of the anterior part of the epiphysis with resulting genu recurvatum.