Osgood-Schlatter Disease
For the past 3 years, a 17-year-old boy had experienced intermittent pain in the right knee. The pain worsened when he went up and down stairs, ran, jumped, or knelt.

Tender swelling was noted over the right tibial tubercle. A radiograph of the right knee showed fragmentation and irregularity of the outline of the tibial tuberosity with soft tissue swelling.

Osgood-Schlatter disease is caused by traumatic stress from a contracted quadriceps mechanism on the proximal tibial tuberosity. The pull of the ligamentum patellae detaches bone fragments from the tibial tuberosity.

Osgood-Schlatter disease typically presents at puberty and most often affects boys. The condition is bilateral in 25% to 50% of patients. The patient usually has a history of rapid growth and active participation in sports. Generally, treatment consists of rest and avoidance of activities that involve quadriceps contraction. If necessary, NSAIDs may be used to ameliorate pain. The patient may resume normal activities when the pain disappears, which usually occurs over time, or when the pain abates and no longer interferes with normal movement.

In patients with severe disease or in those who do not respond to conservative therapy, a brace or a cast may be needed to immobilize the knee. This patient used a knee brace for 6 months; his recovery was uneventful.

(Case and image courtesy of Drs Edmond K. H. Liu and Alexander K. C. Leung.)
Episternal Ossicle
An 87-year-old woman was referred for a newly discovered neck mass. She denied any history of neck mass, dysphagia, odynophagia, stridor, shortness of breath, or globus sensation. She had experienced no change in voice.

The patient was thin, alert, and oriented. The ears, nose, and throat were normal, with the exception of a 2- × 2-cm, firm, midline mass located in and immediately below the thyroid gland at the level of the clavicles. The lesion, which did not elevate with tongue protrusion, was nontender and fairly immobile. No associated lymphadenopathy was noted.

Needle aspiration for a tissue evaluation was attempted. The 21-gauge needle was unable to penetrate the mass. A very recent chest film had disclosed no abnormality. A high-resolution CT scan of the neck was obtained (Figure); an episternal ossicle was depicted (arrow).

Episternal ossicles are a normal variant of the sternum. First described by Cobb in 1937,1 episternal ossicles have received scant recognition. The development of increasingly accurate imaging technologies has led to more frequent identification of these anatomic structures.2

When growth is normal, the dagger-shaped sternum is divided into three sections: the manubrium, or upper handle; the body, or mid blade; and the xiphoid process, which is the lower, cartilaginous segment. The xiphoid—the smallest portion of the sternum—ossifies during adulthood. The manubrium articulates with the clavicle and the first rib; the next nine ribs join the body of the sternum directly or indirectly. The body is a flat, cancellous bone that measures 16 to 20 cm in adults. Episternal ossicles usually occur superior or posterior to the manubrium and between the clavicles.

Episternal ossicles are also known as ossa suprasternalia, subternal ossicles, and accessory sesamoids of the sternum. They originate by the sixth month of gestation as supernumerary ossification sites from median sternal mesoderm. Episternal ossicles are initially cartilaginous; they generally ossify between the ages of 17 and 23 years but have been noted to ossify as early as age 12 years.

Ossicles are more often unilateral than bilateral; when unilateral, they occur twice as commonly on the left. They may be fused to the manubrium or sternoclavicular joint disc.3 Some have a joint capsule that can be either separate from or continuous with the manubrium.

The overall incidence of episternal ossicles ranges from 1.5% to 2.5% in the general population.4 They are more common in white than in black persons.4 There is no gender predilection.

Here, a single or fused pair of ossicles is seen in the midline of the neck, with the clavicle visible laterally. The ossicles show central hypointensity, suggestive of cortex or medullary bone. This ossicle was 17 mm in diameter, which is larger than the average of 10.5 mm.5 Before modern imaging techniques, these ossicles were not noticed until advanced age and neck muscle atrophy made the masses palpable.

It is important to recognize episternal ossicles as a normal variant of sternal development. On physical examination, they may be mistaken for lymph nodes, thyroid nodules, thyroid goiters, or vascular calcification. Usually, a chest film is negative. However, on a CT scan of the neck and sternum, episternal ossicles are obvious. The CT scan is the diagnostic procedure of choice.5,6,7

This patient continues to have no symptoms. No treatment is needed or recommended for sternal ossicles.

REFERENCES:

(Case and image courtesy of Drs Paul E. Lomeo, David R. Rabaja, Michael A. Schmidt, and John E. McDonald.)

(Continued on page 689f.)
Blount Disease

A 16-year-old African American boy complained of exertional pain below his left knee that severely limited his ability to participate in sports. The patient had had bilateral bowed legs until his early school years, when the right knee straightened. For the past year, exertional pain had been present below the left knee in the epiphyseal area.

Tibia vara, or Blount disease, is responsible for the bowing of the patient’s left lower leg. The radiographs reveal beaking of the metaphysis and calcification and widening of the proximal tibial epiphyseal plate medially, which has produced a varus deformity at the knee.

Blount disease causes bowing at the proximal tibia that affects only the proximal tibial epiphysis. The disorder is found primarily in obese or large black children and adolescents who begin walking early, which creates excessive force on the medial physis of the proximal tibia and inhibits the normal growth of this segment. The lateral physis continues to grow normally, thereby producing the bowing at the knee. The bowing may be unilateral or bilateral.

Refer patients with Blount disease for an orthopedic evaluation. Treatment of tibia vara depends on the age of the patient and stage of the disease. Bracing and surgery may be appropriate for younger children; adolescents usually require operative intervention.

This patient had osteotomies of the tibia and fibula with internal fixation. Results of the surgery were good.

(Case and images courtesy of Drs Robert P. Blereau and Timothy Haley.)

(Continued on page 689h.)
Baker’s Cyst
A 47-year-old woman complained of pain and swelling of the right knee of 3 days’ duration. Positive fullness of the popliteal area with no pulsations was discerned. Doppler ultrasound showed a 2.5 cm $\times$ 1.5 cm cystic structure in the right popliteal region; this confirmed the diagnosis of a Baker’s cyst.

The semimembranosogastrocnemial bursa, commonly called a cyst, lies in the posterior medial aspect of the knee, behind the femoral condyle. In 50% of affected persons, the cyst is continuous with the knee joint.

The cyst is best seen and palpated when the patient is standing. These lesions are frequently asymptomatic and rarely infected. Swelling of the bursa is commonly associated with other knee disorders such as rheumatoid arthritis and degenerative arthritis. The differential diagnosis for posterior knee fullness includes an aneurysm of the popliteal artery. Therefore, it is important to palpate any fullness for pulsations.

Rupture of a Baker’s cyst can cause vague discomfort or feeling of fullness behind the knee, acute swelling, pain, and erythema of the calf and lower leg (pseudothrombophlebitis syndrome). A Doppler study or venography will exclude thrombophlebitis; sonography, MRI, and arthrography can visualize the cyst. Rarely, an unruptured Baker’s cyst can compress deep veins and cause thrombophlebitis.

This patient’s uncomplicated Baker’s cyst was treated with the standard therapies, which include aspiration, corticosteroid injections, bed rest, heat, leg elevation, and nonsteroidal anti-inflammatory agents. The patient was advised to avoid weight bearing and use elastic bandages. As in this case, the response to therapy is usually excellent.

(Case and image courtesy of Drs Gamil Kostandy, Maged Ghaly, Hesham Taha, Rahman Ilkhaqni, and Bruce Sosler.)
Paget’s Disease

A 74-year-old man, who had been aware of a gradual increase in hat size over the past 3 years, complained of a mild headache and backache. His serum phosphatase level was 1,475 U/L (upper normal limit, 120 U/L). Skull films showed calvarial enlargement caused by thickening of the cortical tables, radiolucency in the frontal and occipital regions, and patchy osteosclerosis that produced a cotton-wool appearance. Paget’s disease was diagnosed.

Persons with Paget’s disease generally have no or minimal symptoms; bone pain and skeletal deformity are the most common complaints. Extensive multifocal disease can be associated with considerable pain, deformity, and disability. The lumbosacral spine, skull, pelvis, femur, and tibia are affected most frequently by the disease.

The earliest phase of Paget’s disease is characterized by an increase in osteoclastic bone resorption, which is seen on radiographs as a localized osteolytic area, often in the skull (osteoporosis circumscripta), or as a flame-shaped or “blade-of-grass” radiolucency in the ends of long bones.

In time, a compensatory increase in osteoblastic activity occurs, characterized by disorganized formation of new bone that lacks the normal trabecular pattern. In the mixed phase of the disease, expanded bones with cortical thickening, coarse trabecular markings, and both lytic and sclerotic areas are seen on radiographs.

Radionuclide bone scans offer the most sensitive surveys of pagetic sites. Biochemical markers of bone formation, such as serum alkaline phosphatase and osteocalcin levels, and bone resorption, as indicated by urinary excretion of hydroxyproline and pyridinolines, are increased in persons with active Paget’s disease.

Complications of Paget’s disease include pathologic fractures during the destructive phase of the disease, high output heart failure in extensive involvement of the skeleton, deafness, hyperuricemia and gout, urinary stone formation, and osteogenic sarcoma (in fewer than 1% of patients). Medical therapy focuses on specific inhibitors of osteoclast-mediated bone resorption, such as the bisphosphonates (eg, alendronate, etidronate, and pamidronate), calcitonins, mithramycin, and gallium nitrate.

A 6-month course of oral alendronate therapy was prescribed for this patient. After 4 months, his symptoms improved and the serum alkaline phosphatase level fell to 680 U/L.

(Case and images courtesy of Drs Dimitrios Papaioannides, Ch. Tatsis, and N. Akritides.)
Legg-Calvé-Perthes Disease

A 10-year-old boy presented with a limp and occasional pain in the right knee of 2 years’ duration. A roentgenogram of the pelvis revealed fragmentation of the right capital femoral epiphysis with an irregular acetabulum.

Legg-Calvé-Perthes disease was diagnosed. The condition is characterized by ischemic necrosis of the proximal femoral epiphysis with later resorption. About 75% of affected youngsters are male; 80% of cases are unilateral.

The onset of Legg-Calvé-Perthes disease usually occurs between ages 4 and 8 years. Most children present with occasional mild pain in the anterior thigh or knee and a limp. The classic presentation has been described as a “painless limp.”

Children younger than 6 years with involvement of less than half of the femoral head need to be followed closely for likely disease progression. Nonsurgical or surgical containment of the femoral head is indicated if more than half the femoral head is involved or if the child is older than 6 years at clinical onset.

Abduction casts (Petrie) or orthoses commonly are used to contain the femoral head within the acetabulum. The Scottish Rite orthosis, which does not extend below the knee, is frequently used. Surgical treatment—either femoral osteotomy or pelvic osteotomy—is an option for patients in whom conservative treatment is undesirable or unacceptable.

This patient used a Scottish Rite orthosis for 12 months. His condition improved.

(Case and image courtesy of Drs Edmond K. H. Liu and Alexander K. C. Leung.)