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Epiphyseal Cleft: A Misleading Radiologic Finding

A 2-year-old boy was referred to the emergency department because of temporary limping after falling from a wall (~80 cm). At admission, his physical examination was unremarkable; neither abnormal gait, pain, nor joint limitation in passive and active range of motion were observed. Due to the high-energy trauma, he underwent plain radiography, which showed a small, bipartite, and irregular epiphyseal nucleus of the right femoral head (**Figure 1**, A). Computed tomography and magnetic resonance imaging (MRI) were performed (**Figure 1**, B and C). Radiologic imaging demonstrated a double epiphyseal nucleus in which cortical bone and growth plate were preserved, and no lytic lesions were observed. Therefore, a diagnosis of epiphyseal cleft was made. After 6 months, the toddler underwent a second radiograph, showing the same, unchanged, radiologic findings. No pain or other complaints were reported.

Epiphyseal clefts or defects are uncommon anatomical variants of the growth plates. They can potentially occur in each epiphysis but are most frequently seen on the basal epiphysis of the proximal phalanx of the big toe. Epiphyseal clefts are accidentally found on radiographs in an otherwise-healthy child as a clear, shining line dividing the epiphysis into 2 parts.[1] A tomography scan and/or an MRI are usually needed to exclude cartilaginous or cortical bone disruption, as well as bone malignancies. The main differential diagnosis (**Figure 2**) encompasses epiphyseal fracture, Legg–Calve–Perthes disease, and Langerhans cell histiocytosis. The rare

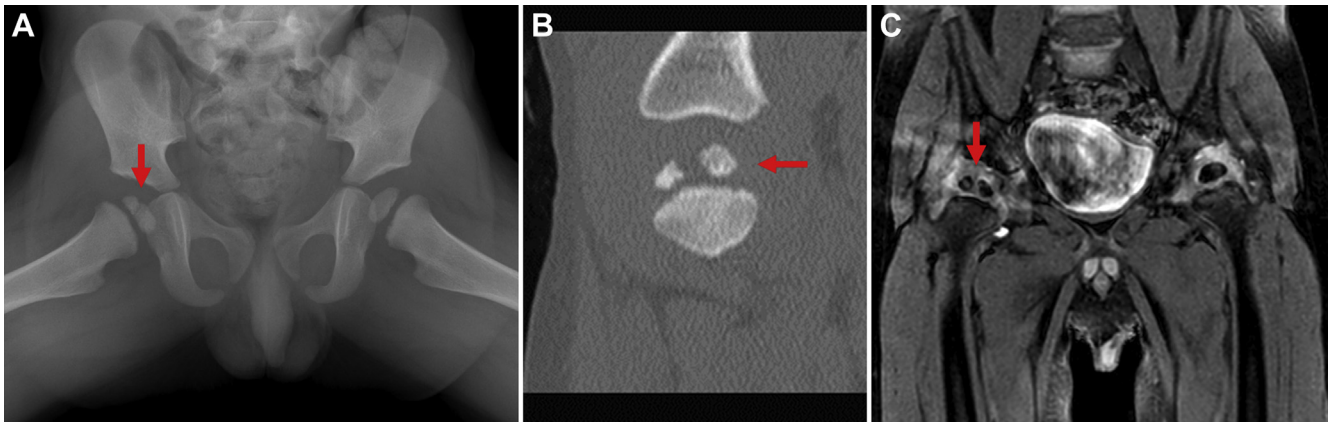

Figure 1. Epiphyseal cleft. **A,** On the hip radiograph, a radiolucent cleft (*red arrow*) divides into an irregular and flattened epiphyseal nucleus of the proximal femur. **B,** Computed tomography scan demonstrates a double epiphyseal nucleus (*red arrow*) without periosteal reaction, cortical disruption, or lytic lesion. **C,** Coronal MRI scan does not show any alteration of signal intensity (*red arrow*).

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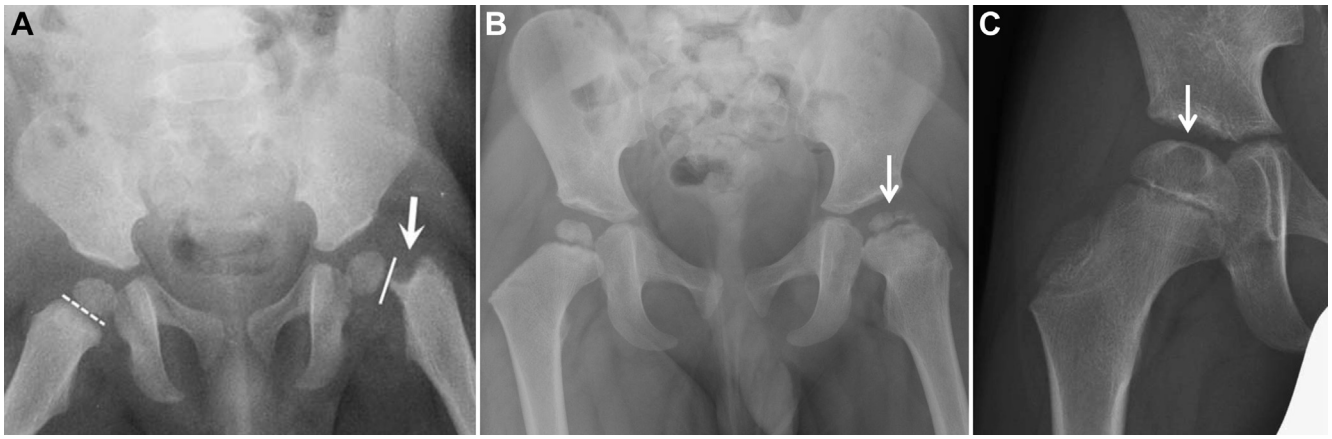

Figure 2. Hip radiographs are shown of the main differential diagnoses. **A,** Epiphyseal fracture: an anteroposterior radiograph of the pelvis demonstrates lateral displacement of the left proximal femur. In addition, the metaphysis is irregular with focal scalloping medially (*arrow*). Also present is medial rotation of the left femoral head (*solid line*); compare with the normal right femoral head (*dashed line*) (reprinted with permission from Shalaby-rana et al[2]). **B,** Legg–Calve–Perthes disease. **C,** Eosinophilic granuloma (Langerhans cell histiocytosis) (reprinted with permission from Goto et al[7]).

epiphyseal fractures of the proximal femur are usually related to major traumas or child abuse. Severe pain, hip limitation, and inability to bear weight are their typical clinical features, radiologically characterized by cortical disruption, periosteal reaction, or lateral displacement of the proximal femur.[2,3] Legg–Calve–Perthes disease is an idiopathic aseptic necrosis of the femoral head, mainly seen in children from 4 to 8 years of age. Affected patients complain about a variable limp with activity-related pain, usually triggered by acute trauma.[4,5] In early stages, MRI can show bone marrow edema and decreased enhancement in the femoral epiphysis, when radiographs are usually negative. Radiologic imaging can show fragmentation with mixed areas of radiolucency and calcifications of the physis.[4,6] Finally, up to 80% of Langerhans cell histiocytosis lesions are eosinophilic granulomas, mainly localized in the skull or long bones; these are usually asymptomatic and accidentally found. They can cause local pain, swelling, and soft-tissue mass.[7] Radiographs usually show round lytic lesions and periosteal reaction, with soft-tissue swelling on MRI. In summary, epiphyseal clefts are uncommon anatomical variants that may simulate some pathologic conditions in an otherwise-healthy child, and no further therapeutic measures are warranted.[7,8] ■

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