

A case of bilateral duplication of the patella

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A boy with bilateral duplication of his patellae was radiographically examined between 8 and 11 years of age. The duplication was probably caused by a disrupted fusion of two ossification centra.

Case report

A boy, aged 8 years, fell from a tree and sustained a fracture of the right distal tibia. Apart from the fracture, the radiographs revealed a partial transverse separation of the bipartite patella with the accessory growth center superolaterally (Figure 1). The boy had no pain or tenderness in his knee, and he had a full range of motion. He had no history of previous trauma to his knees. The fracture healed after treatment in a plaster cast. At 9 years of age, the boy, for some weeks, complained of pain in both knees. The radiographs now showed a complete separation of both patellae into one superior and one inferior part (Figures 1 and 2). ^{99m}Tc-MDP scintimetry showed a normal uptake in both knees. The pain declined spontaneously within weeks.

At 11 years of age, the boy was referred again after a period of pain in his right knee. He had a double contour of his patellae, about 10° loss of active extension, but no tenderness or joint effusion. The radiographs showed progress of the patellar separation in both knees. At magnetic resonance imaging (Figure 1), both parts of the patella had a normal bone signal, and the soft tissue connecting the bony parts of the patella had a low signal intensity, consistent with fibrous tissue.

Discussion

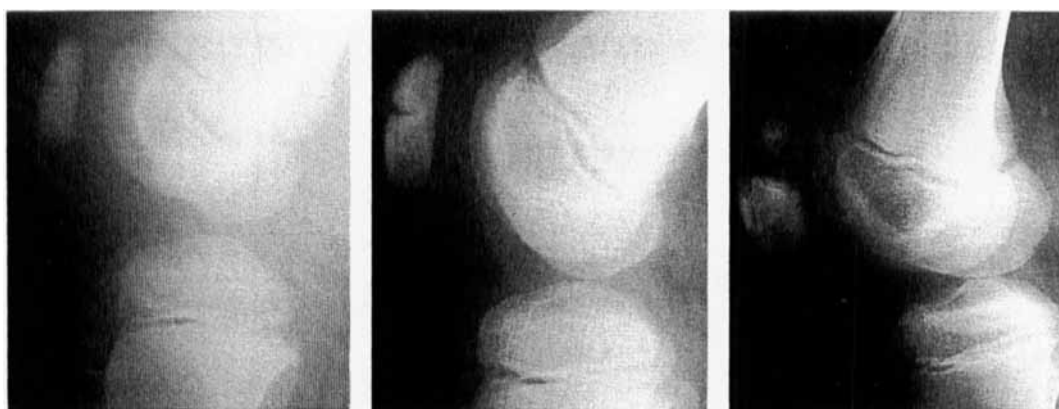
The cartilaginous center of the patella develops at about 3 months of fetal life. Patellar ossification is

not seen radiographically until 2–4 years of age (Ozonoff 1979). It normally develops from multiple small foci and then expands towards the margin of the patella.

Several variants of patellar ossification have been described. A bipartite patella is seen in about 5 percent of the population. The extra ossification center is usually situated superolaterally, but sometimes it is located laterally (Ozonoff 1979). Some authors also describe a bipartite patella with an extra center at the lower pole, while others do not distinguish this from the Sinding-Larsen-Johansson syndrome (Sinding-Larsen 1922).

Duplication of the patella has been described with the separation zone in the frontal plane, "double-layer patella" (Büttner 1925, Haenisch 1925, Hodgkinson 1962, Dahners et al. 1982), in the coronal plane (Gasco et al. 1987), or, as in our case, in the horizontal plane. The last-mentioned variant has been previously described four times. Petty (1924) presented a boy with bilateral duplication, known since early childhood. The boy had sustained an acute separation of the fragments in one knee after a fall. After operation with roughening of the patellar surfaces and wiring, the two fragments fused. Galmiche et al. (1967) described a bilateral duplication found accidentally in a 79-year-old woman; she had never had any knee problems. Wütschke (1953) and Weinberg (1981) each described a case with unilateral duplication. The first patient was a 25-year-old man with a history of pain—not associated with trauma—in his knee of 1 week's duration. The second case was a 20-year-old man who fell from his bicycle and sustained a contusion of the right thigh. He had no pain from his knees, but radiographs showed a duplication of the right patella. In both cases the apposing margins of the duplication were smoothly contoured and showed no signs of a fracture.

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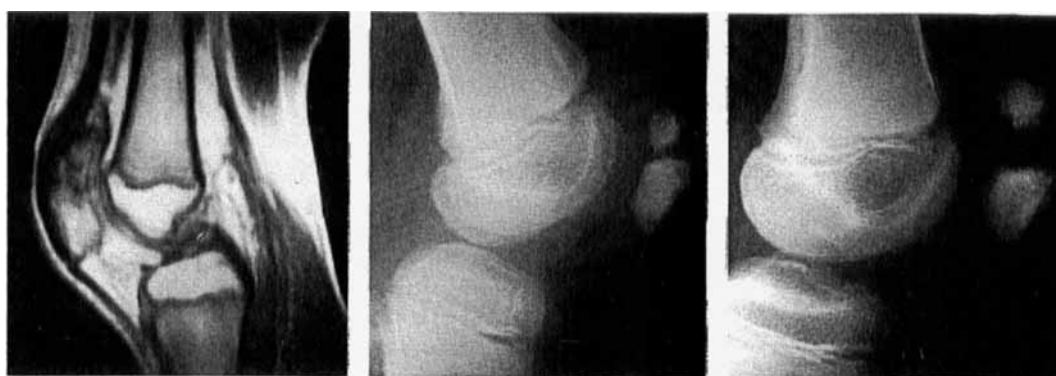


A. 8 years of age. There is a partial separation of the patella caused by a transverse, thin nonossified zone anteriorly (arrow).

B. 9 years of age. The nonossified zone is wider anteriorly, while there is still skeletal continuity posteriorly.

C. 11 years of age. There is a total separation of the superior and inferior poles, with small intermediate fragments. See MRI below

Figure 1. Right knee.



D. The signal from both parts of the patella is normal (the lower signal intensity from the upper part being consistent with relatively more cortical bone in this part). The low signal intensity from the tissue connecting the part is consistent with fibrous connective tissue.

A. 9 years of age. There is a total separation in the upper and lower parts.

B. 11 years of age. There is still a separation; the upper part is divided into several fragments.

Figure 2. Left knee.

Our case adds information to those on record in suggesting a pathogenetic pathway; radiographs at 7 years of age revealed a thin bony connection between the two fragments, but with time, a total separation occurred. Thus, the boy's patellae probably have been derived from several ossification centra, and because of traction force from the quadriceps muscle or from unrecognized trauma, the fusion be-

tween the superior and inferior poles has been disrupted. The fragments have then continued to separate, and a so-called double patella formed.

Because the symptoms have been mild and because the 3 earlier reported cases without acute separation did not require surgery, no operation has been undertaken in our case to reduce the separation.

References

- Büttner G. Etiology and pathogenesis of Perthes' disease; also case of tripartite patella. *Arch Klin Chir* 1925; 136:703-715.
- Dahners L E, Francisco W D, Halleran W J. Findings at arthrotomy in a case of double layered patellae associated with multiple epiphyseal dysplasia. *J Pediatr Orthop* 1982;2(1):67-70.
- Galmiche P, Pallardy G, Fournier J, Sabatier J, Gintzburger S. (Supernumerary patellae (4 patellae in 1 woman)). *Rev Rhum Mal Osteoartic* 1967;34(9):494-6.
- Gasco J, Del Pino J M, Gomar Sancho F. Double patella. A case of duplication in the coronal plane. *J Bone Joint Surg (Br)* 1987;69(4):602-3.
- Haenisch F. Bisher nicht beschriebene Verdoppelungsform der Patella. *Fortschr Gebiete Röntgenstr* 1925;33: 678-679.
- Hodkinson H M. Double patellae in multiple epiphyseal dysplasia. *J Bone Joint Surg (Br)* 1962;44:569-572.
- Ozonoff M B. *Pediatric orthopedic radiology*. W.B. Saunders Co, Philadelphia 1979:258-261.
- Petty M J. Two cases of abnormal patellae. *Br J Surg* 1924;12:799.
- Sinding-Larsen C M F. A hitherto unknown affection of the patella in children. *Acta Radiol* 1922;1:171-173.
- Weinberg S. Case report 177: duplication of the patella ("double" patella). *Skeletal Radiol* 1981;7(3):223-4.
- Wütschke J. Ein Fall von linkseitiger doppelter Patella. *Fortschr Röntgenstr* 1953;78:218-220.