DOUBLE PATELLA

A CASE OF DUPLICATION IN THE CORONAL PLANE

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A case of duplication of the patella in the coronal plane is reported. Previously reported cases of double patella have shown sagittal or vertical duplication, and some have been associated with multiple epiphyseal dysplasia.

In our case, excision of one patella and realignment of the extensor mechanism relieved symptoms of giving-way.

The patella is a sesamoid bone, and anomalies of development are relatively common; ossification from two or three centres, malposition and subluxation are often seen. Duplication of the patella is rare; since the first cases were described, less than 30 others have been reported, usually in association with multiple epiphyseal dysplasia (Büttner 1925; Haenisch 1925; Petty 1925; Paas 1931; Schwarz 1932; Gorzawski 1937; Marquardt 1938; Lodes 1949; Hodgkinson 1962; Ficat and Hungerford 1977; Weinberg 1981; Dahners, Francisco and Halleran 1982; Insall 1984).

We describe a case of duplication of the patella in the coronal plane which, as far as we know, has not previously been described in the literature.

CASE REPORT

A six-year-old boy was admitted to the Clinical Hospital of Valencia University in 1984 with a three-year record of progressive deformity of his left knee. There was no pain or limitation of movement, but the knee frequently gave way on running. There was no history of other developmental problems or of any injury.

The knee showed abnormal contours, with a lump 2.5 cm in diameter on its lateral aspect. Palpation revealed a double patella, between which there was a shallow groove, and a prominent lateral femoral condyle. When the quadriceps muscle was relaxed, both parts were independently mobile. The larger bone was situated on the lateral aspect of the knee, while the smaller medial bone lay in an intercondylar position. When the knee was fully flexed both patellae moved medially, the lateral one becoming intercondylar and the smaller medial bone

lying on the medial condyle. The contour and size of the quadriceps were normal, as was the contralateral knee.

An anteroposterior radiograph showed the smaller patella to be placed low between the femoral condyles, and the larger bone to lie on the external face of the lateral condyle (Fig. 1). The lateral projection showed the superimposed images of both patellae (Fig. 2). A skyline view taken in flexion confirmed the clinical shift noted above and showed the lateral condyle to have an almost flat articular surface (Fig. 3).

Computerised tomography in extension confirmed the positions of the patellae and showed them to be linked by aponeurotic expansions. The distal femur showed some dysplasia with 15° of medial rotation, and a poorly developed intercondylar fossa with anterior prominence of the lateral condyle (Fig. 4). In a lower cut independent patellar tendons were seen. The quadriceps muscle bellies were normal.

The patient was treated by excision of the smaller medial patella; its tendon was preserved, and the lateral patella was centred in its proximal part by the Insall technique (1984); its patellar tendon was transferred medially by the Roux-Goldthwaite technique. The patella, which was removed, was oval in shape with normal articular cartilage. Recovery was uneventful, and two years later function is normal; the patient has a complete range of movement and is capable of normal activity, including sports.

DISCUSSION

The patella first develops as a cartilaginous centre during the first months of fetal development and does not ossify until the age of three to four years. Variations of ossification may give rise to bipartite or tripartite patellae; these are relatively common. True duplication is, however, extremely rare and published descriptions tend to be rather confusing.

Ficat (1970) divided patellar duplication into two types: frontal (one anterior to the other) and horizontal (one superior to the other), which is an arrangement seen

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0301-620X/87/4085 \$2.00

Fig. 1

Fig. 2

Radiographs showing the double left patellae in anteroposterior, lateral and flexed skyline views.

◀ Fig. 3

Fig. 4

Transverse CT scan with the knee in extension. The dysplasia of the lower femur is apparent, as are the capsular attachments of the patella.

in certain small primates which are specialised for tree-climbing and jumping. Frontal duplication was first described by Haenisch and by Büttner, and horizontal duplication by Petty, all in 1925. Just over 20 cases have been reported to date. Hodkinson (1962) used the term "double-layered patellae" to describe these duplications, and believed that most were associated with multiple epiphyseal dysplasia.

Vertical duplications are less common. The first case was described by Petty (1925); this involved both knees and the upper patellae were larger than the lower. Galmiche et al. (1967) described bilateral duplication in a woman of 79, while Wütschke (1953) and Weinberg (1981) each report a similar case in which a traumatic origin cannot be excluded.

The case we report is the first we know of to show

patellar duplication in the coronal plane, without the doubts implied in some other reports: there was clear duplication, with a double patellar tendon. We assume that this is a congenital malformation involving two independent cartilaginous centres which each gave rise to a patella, complete with its own aponeurotic expansion and patellar tendon.

REFERENCES

- Büttner G. Etiology and pathogenesis of Perthes' disease; also case of tripartite patella. *Arch f Klin Chir* 1925;136:703-15.
- Dahners LE, Francisco WD, Halleran WJ. Findings at arthrotomy in a case of double layered patellae associated with multiple epiphyseal dysplasia. *J Pediatr Orthop* 1982;2(1):67-70.
- Ficat P. *Pathologie fémoro-patellaire*. Paris: Masson, 1970.
- Ficat RP, Hungerford DS. *Disorders of the patello-femoral joint*. Paris: Masson, 1977.
- Galmiche P, Pallardy G, Fournier J, et al. Rotules surnuméraires (quatre rotules et...une femme). *Rev Rhum* 1967;34:494-6.
- Gorzawski H. Beitrag zur Ätiologie und Pathogenese der Patella partita, insbesondere ihre Beziehungen zu den aseptischen Nekrosen. *Arch f Klin Chir* 1937;188:538-56.
- Haenisch F. Bisher nicht beschriebene Verdoppelungsform der Patella. *Fortschr Gebiete Röntgenstr* 1925;33:678-9.
- Hodkinson HM. Double patellae in multiple epiphyseal dysplasia. *J Bone Joint Surg [Br]* 1962;44-B:569-72.
- Insall JN. Total knee replacement. In: Insall JN, ed. *Surgery of the knee*. New York etc. Churchill Livingstone, 1984:229-30.
- Lodes R. Familiäres Vorkommen habitueller bilateraler Luxation zweigeteilter Knie-scheiben bei Chondrodystrophie. *Ztschr f Orthop* 1949;78:506-24.
- Marquardt W. Zur Klinik und Röntgenologie der atypischen chondrodystrophischen Wachstumsstörungen. *Arch f Orthop u Unfall Chir* 1938;38:711-25.
- Paas HR. Über eine seltene Form der Knie-scheibenteilung (Patella partita) und ihre Beziehungen zu anderen Erkrankungen des Skelettsystems. *Arch f klin Chir* 1931;165:322-35.
- Petty MJ. Two cases of abnormal patellae. *Br J Surg* 1925;12:799-800.
- Schwarz G. Generalisierte Knochen- und Gelenk-erkrankung. *Zentralbl Chir* 1932;59:1488.
- Weinberg S. Case report 177: duplication of the patella ('double patella'). *Skeletal Radiol* 1981;7:223-4.
- Wütschke J. Ein Fall von linksseitiger doppelter Patella. *Fortschr Roentgenstr* 1953;78:218-20.