Extensive post-traumatic ossification of the patellar tendon

A REPORT OF TWO CASES

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Two men, aged 21 and 50 years, were seen with ossification of the patellar tendon after injury to the knee in adolescence. They complained of pain and had patella alta. Large bony masses were excised from below the affected patellae. The patellar tendon was then reconstructed using a Leeds-Keio ligament. The results at six and ten years, respectively, were good, with neither patient having pain or an extension lag.

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We describe two cases of extensive ossification of nearly all of the patellar tendon after a knee injury and discuss the aetiology and operative treatment.

Case Reports

Case 1. A 56-year-old man had sustained a fracture of his left leg at the age of 15 years and had been immobilised in an above-knee cast for three months. Subsequently, a deformity was noted but the patient had no further treatment because he had little functional disability. After 40 years he began to develop increasing pain and loss of movement, which caused difficulty with driving.

A large bony mass was found in relation to the patellar tendon. There was atrophy of the quadriceps muscle of 3 cm and a mild extension lag. The left patella was 3 cm higher than the right. Pain in the region of the patellar tendon limited the range of movement from 10 to 110°.

Both plain radiography (Fig. 1a) and CT with three-dimensional reconstruction (Fig. 1b) confirmed that there was massive ectopic calcification along the entire length of the patellar tendon, an irregularity of the tibial tuberosity, and severe patella alta (Insall-Salvati index 1.9).

At operation the patellar tendon was found to have been almost completely replaced by bone. Little tendinous tissue remained. The bony mass, which was 5.5 x 6.0 x 2.0 cm in size, was removed and the patellar tendon reconstructed using a Leeds-Keio ligament.

Postoperatively, the joint was mobilised on a continuous-passive-motion machine. Full weight-bearing was allowed after six weeks. Six years later there was a pain-free range of movement from 10 to 130° with no extension lag. The patient had returned to work as a taxi-driver. Radiological examination (Fig. 1c) showed residual irregularity of the patellofemoral joint and improvement of the patella alta (Insall-Salvati index 1.4).

Case 2. A 21-year-old man had injured his right knee at the age of 15 years when playing volleyball. The knee had been immobilised in a cast for four weeks after which the right patella was found to be higher than the left. The patient sought no further treatment until six years later, when he developed pain and difficulty in descending stairs.

Examination showed that the right patella was 5 cm higher than the left. There was quadriceps atrophy of 6 cm and an extension lag of 10°. The range of movement was from 0 to 130° and was accompanied by anterior knee pain. Plain radiographs (Fig. 2a) showed ectopic calcification along almost all the patellar tendon and irregularity of the inferior pole. Severe patella alta was confirmed (Insall-Salvati index 2.2).

At operation two-thirds of the mass of the patellar tendon was found to have been replaced by bone. We removed the bony growth, advanced the point of the tibial insertion distally by 2.5 cm, and reinforced the tendon with a Leeds-Keio ligament.

Postoperatively, the knee was mobilised on a continuous-passive-motion machine. Full weight-bearing was allowed six weeks later. When reviewed after ten years there was a full range of movement. The patient had no symptoms and no extension lag. Radiography (Fig. 2b) showed the patella at a normal height (Insall-Salvati index 1.0).

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Fig. 1a

Fig. 1b

Fig. 1c

Figure 1a – Radiograph of the left knee of a 56-year-old man showing extensive ectopic calcification along the patellar tendon and marked patella alta. Figure 1b – Preoperative CT with three-dimensional reconstruction, showing (left) the normal right knee and (right) the abnormal left knee with ectopic calcification along the length of the patellar tendon and irregularity of the tibial tuberosity. Figure 1c – Postoperative radiograph showing residual irregularity of the patellofemoral joint and improvement of the patella alta.

Discussion

Ectopic calcification of the patellar tendon is often seen in Osgood-Schlatter's disease in which small 'ossicles' appear in areas close to the tibial tuberosity.¹ Similarly, in jumper's knee small areas of ectopic calcification may

appear distal to the inferior pole of the patella.^{2,3}

The aetiology in our cases is probably different from that of either Osgood-Schlatter's disease or jumper's knee: in both patients the ectopic calcification was more extensive and there was a history of knee injury. The presence of severe patella alta suggests that in case 1 there may origin-

Fig. 2a

Fig. 2b

Figure 2a – Radiograph of the right knee of a 21-year-old man showing ectopic calcification along the patellar tendon and severe patella alta. Figure 2b – Postoperative radiograph showing reduction of patella alta.

ally have been an avulsion fracture of the tibial tuberosity.⁴ Similarly, there may have been a sleeve fracture of the patella in case 2.⁵ The bony growths were too extensive to be fragments of fractured bone, and must have developed after the injuries. It is not clear why they became so large, but it is possible that repeated traction along the line of the patella may have accelerated calcification.

In both cases removal of the ectopic calcification was necessary because it had led to patellofemoral pain and patella alta. Little tendinous tissue remained and therefore the weakened patellar tendons required augmentation by a prosthetic ligament.⁶ At the same time, the position of the patella was corrected to improve patellofemoral alignment. Our results in both cases at a follow-up of six and ten years, respectively, were satisfactory. Neither patient had pain or an extension lag.

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References

1. Holstein A, Lewis GB, Schulze R. Heterotopic ossification of patellar tendon. *Bull Hosp Joint Dis* 1964;25:191-200.
2. Blazina ME, Kerlan RK, Jobe FW, Carter VS, Carlson GJ. Jumper's knee. *Orthop Clin North Am* 1973;4:665-78.
3. Grossfeld SL, Engebretsen L. Patellar tendinitis: a case report of elongation and ossification of the inferior pole of the patella. *Scand J Med Sci Sports* 1995;5:308-10.
4. Bowers KD Jr. Patellar tendon avulsion as a complication of Osgood-Schlatter's disease. *Am J Sports Med* 1981;9:356-9.
5. Bruijn JD, Sanders RJ, Jansen BR. Ossification in the patellar tendon and patella alta following sports injuries in children: complications of sleeve fractures after conservative treatment. *Arch Orthop Trauma Surg* 1993;112:157-8.
6. Fujikawa K, Ohtani T, Matsumoto H, Seedhom BB. Reconstruction of the extensor apparatus of the knee with the Leeds-Keio ligament. *J Bone Joint Surg [Br]* 1994;76-B:200-3.