CASE REPORT

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Spontaneous or traumatic premature closure of the tibial tubercle

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Abstract A premature closure of the physis of the tibial tubercle in a young man has given rise to a shortening of the tibia, a patella alta and a reversed tibial slope of 20° with clinical genu recurvatum. After a proximal open wedge tibial osteotomy all three postural deformities could be restored. The etiology of this complex deformity is discussed.

Résumé Les auteurs rapportent un cas de traitement chirurgical de fermeture prématurée du cartilage de croissance de la tubérosité tibiale antérieure

Introduction

Partial closure of the physis after injury is well described especially in the proximal radius and distal tibia. Partial arrest of growth in the proximal tibial physis after trauma is very rare. We describe a salvage procedure for late deformity of the proximal tibia and discuss the aetiology of premature closure of the tibial tubercle.

Case report

A boy, aged 14.1 years injured his left leg in a fall, while skateboarding on 27 May 1992. He complained of severe pain in his left upper thigh and radiographs revealed a traumatic epiphysiolysis of the left hip. He underwent open reduction and internal fixation of this in a nearby district general hospital some days later, but it appears that no attention was given to his left knee. The hip problems resolved uneventfully and some weeks later he started walking again. One year later he noticed shortening of his left leg and a recurvatum deformity of the left knee. He was seen in the same hospital in March 1994 where posterior laxity of his left knee was diagnosed. An arthroscopy was performed in January 1995; the posterior cruciate ligament was found to be intact but there was doubt about the integrity of the anterior cruciate. There was no laxity of the collateral ligaments and no abnormality of the cartilage or the menisci. Anterior cruciate surgery was proposed.

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The boy visited our department in July 1995 for a second opinion. He complained of progressive instability in his left knee and had noticed that his left leg was shorter than the right. The normal prominence of the tibial tubercle was absent and the posterior cruciate ligament of the knee appeared lax. Clinical examination revealed that the knee was stable, with flexion but with hyperextension of 30°. Radiographs showed a normal hip with a relative shortening of 1.0 cm in the left femur and left tibia respectively. The right tibiaplateau had the normal posterior slope of 8°, the left tibiaplateau had an anterior slope of 12° with posterior displacement of the axis of the left tibia relative to the femur (Fig. 1). There was a mild degree of patella alta on the left side. The growth plates in the right knee were open, but were closed on the left side (Fig. 2).

An anterior open wedge osteotomy of the upper end of the left tibia was carried out. Two full thickness bone grafts were taken from the left ilium while the remaining space was filled with freeze dried bone allograft. A long leg plaster was applied in which partial weightbearing was allowed for 6 weeks followed by full-weight bearing for a further 3 weeks. The cast was then removed and full-weight bearing commenced. At follow-up 9 months later, there was no genu recurvatum and the tibial length was completely restored. Radiographs of his left knee showed complete integration of the grafts, a normal posterior tibial slope of 8° and restoration of the patella alta to its normal position (Fig. 3).

Discussion

Change of the normal posterior slope of the tibial plateau to an anterior slope due to premature closure of the epiphysis of the tuberosity has only been very recently mentioned in literature. Danielsson [2], compared this abnormality to the condition documented by Blount [1]. However, in the adolescent form of Blount's disease, adolescent tibia vara, Langenskiöld and Riska [4] demonstrated a traumatic origin in 4 of 11 patients, while in 2 the deformity was caused by infection. Only 5 patients in their series had no definitive aetiology, and no familial prevalence was mentioned. As repetitive microtrauma or chronic overloading at sport are dominant factors in the aetiology of anterior knee pain in adolescents [3], it seems reasonable to suppose that except for infection and other very rare causes [5], repetitive trauma may be the main factor in physal damage leading to growth ar-

Fig. 1 Left and right knee at age 17.3 years showing 20° difference in slope of the tibial plateau

Fig. 2 Standing anteroposterior view of the left and right knees with the left leg compensated for 2 cm of shortening. Growth plates are closed at the left knee

Fig. 3 Left knee 9 months after open wedge tibial osteotomy

rest. The symptoms of physal growth arrest of the tibial tubercle develop gradually and may not be attributed to the initial trauma, suggesting no relation with an already forgotten trauma.

The late treatment for deformity after disturbances of the growth plate following physal fractures or physal growth arrest is well described [5]. Gradual correction by callus distraction in an external frame can correct the tibial length and the posterior slope. Concurrent modification of the patella height is not possible with this procedure and in our patient corrective open wedge osteotomy was the method of choice. It was possible to restore the normal anatomy of the posterior slope, the tibial length, the genu recurvatum and the patella height in a single operation.

References

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