Giant Cell Osteodystrophy of the Tibial Tuberosity with Secondary Detachment of the Patellar Tendon

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With 4 Figures in the Text

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We had the opportunity to observe two cases of spontaneous detachment of the patellar tendon. In the two cases, both x-ray and anatomic examination revealed an unusual remodelling process in the region of the tibial tuberosity and the bordering anterior tibial edge. The findings were so in agreement that we believe that a characteristic syndrome — which is to be differentiated from the Osgood-Schlatter Disease — is present. We suggest terming this syndrome giant cell osteodystrophy of the tibial tuberosity. The two observations are presented in detail:

Case 1. Th. Marc, born in 1922. In 1956, at 34 years of age, minor complaints in the left knee. The x-ray of June 22, 1956 (Fig. 1, Röntgenabteilung des Bürgerspitals Basel, Prof. Zdansky) showed a spongiosis in the region of the tibial tuberosity which reached a depth of 1 cm and extended distally onto the anterior edge of the tibia for a distance of 5 cm. The cortex could be recognized only at certain intervals as a fine, linear, edge-forming shadow. The bordering compact bone was laminally stratified and showed adequate calcium density. There was no periostal reaction. 1 1/2 years later, in January 1958, the tibial tuberosity was torn off in a fall while skiing. The torn off piece of bone was screwed on to the head of the tibia. Following this there was constant pain. The control x-ray from April 4, 1958, revealed a further increase, both in depth and length, of the osteolysis in the region of the anterior border of the tibia. At the same time, the cortex over the osteolytic area appeared again sharper. There was a slight osteosclerotic reaction around the edges of the screw head. In the meantime, the torn off tibia-apophysis fragment had healed, bone to bone, with the tibial head.

For classification of this unusual osteolytic process, a biopsy was taken on August 8, 1958, by Dr. Allgöwer (head of the Surgical Department of the Kantonsspital Chur). The biopsy measured 12.6:5 mm (MB Nr. 7611/58).

Histologically, it showed bizarrely formed, often antler-like branched or forked bone trabeculae whose contours were often indented. Over large areas, the bony trabeculae were covered with osteoblasts. In between these areas were deep Howship lacunae with multinuclear, strikingly large osteoclasts. In the plane of the cut, the latter often had ten or more nuclei. Osteoclasts were especially frequent as caps on the narrow sides of the bony trabeculae. Osteoclasts were also often joined together in groups. The interior bony trabeculae were adequately calcified, the lacunae were rounded, wide, and usually occupied by a single osteocyte. Almost all bone trabeculae, with the exception of those capped with osteoclasts, showed wide osteoid borders. The marrow spaces were filled with a fibrous marrow rich in spindle cells and capillaries in which conglomerations of round cells were occasionally dispersed (Fig. 2a and b).

Periostium and corticalis were, as such, maintained. The corticalis consisted of laminar osteone fragments which were joined together by indented cementing lines. The original laminar structure could also be recognized in the trabeculae at the periphery. They also consisted of
mosaic-like osteone fragments with indented cementing lines (Fig. 3). The periostium was free of any infiltration and relatively well vascularized. Nowhere were recent or older hemorrhage remnants in the form of hemosiderin deposits to be seen.

Case 2. L. Ralph, born in 1915. 33 year old white male admitted to the traumatic service of Charleston General Hospital (Dr. GEORGE MIYAKAWA) on July 20, 1948, with a history of having injured his left knee 16 days previously while carrying water to put out a fire. The injury was described as hitting the edge of a wooden stick and twisting backwards. The day after the injury the knee was swollen, tender and red. The knee "gave in" while walking.

Examination revealed a swollen tender left knee with limited active motion, a fixed patella and a contusion over the tibial tubercle. X-ray showed marked thickening of the left tibia with elevation of the periostium extending from the tibial tubercle downward for 7 cm. There was alternating sclerosis and rarefaction at the base of the tibial tubercle. The tibial tubercle was rarefied and lying free in the soft tissue anterior to the tibia. This had the appearance of an expanding cortical lesion with avulsion of the tibial tubercle. X-ray of the right knee and the skull were normal. Laboratory examination showed normal urine and blood findings and negative serology for syphilis. Postoperative blood chemistry showed inorganic phosphorus of 2.9 mg-%, alkaline phosphatase 3.9 Bodansky units, acid phosphatase 1.0 Bodansky units, and a urinary calcium excretion of 90 mg in 24 hours. At operation (Dr. GEORGE MIYAKAWA) the patellar tendon was found to be avulsed with the tibial tubercle. The subperiostal cortex of the tibia in this area was soft, red, and pumice-like in character to a depth of approximately 1 cm, with a layer of dense cortical bone underneath. The