



## Case Report

# Anterior avulsion fracture of the tibial tuberosity in adolescents – Two case reports<sup>☆</sup>

Aleilimar Teixeira da Silva Júnior, Leonardo Jorge da Silva, Ulbiramar Correia da Silva Filho, Edmundo Medeiros Teixeira, Helder Rocha Silva Araújo, Frederico Barra de Moraes\*

Universidade Federal de Goiás, Faculdade de Medicina, Goiânia, GO, Brazil

## ARTICLE INFO

### Article history:

Received 15 October 2015

Accepted 30 October 2015

Available online xxx

### Keywords:

Tibial fractures/surgery

Tibial fractures/radiography

X-ray computed tomography

Knee injuries

## ABSTRACT

The objective here was to report two rare cases of anterior avulsion fracture of the tibial tuberosity in adolescents. Case 1 was a 15-year-old male who became injured through landing on his left knee and presented limited extension. Case 2 was a 16-year-old basketball player who presented sudden pain in the right knee and functional incapacity, after a jump. Imaging examinations (radiographs and computed tomography) showed anterior avulsion fractures of the tibial tuberosity. Surgical fixation was performed using screws and anchors, while avoiding growth plate injury. The cases evolved without lower-limb deformities.

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## Fratura-avulsão tuberosidade anterior da tíbia em adolescente – Relato de dois casos

## RESUMO

O objetivo é relatar dois casos raros de fratura-avulsão da tuberosidade anterior da tíbia em adolescentes. Caso 1: 15 anos, masculino, apresentou trauma em aterrissagem em joelho esquerdo, com limitação da extensão. Caso 2: 16 anos, jogador de basquete com dor súbita joelho direito e incapacidade funcional após salto. Exames de imagem (radiografias e tomografias) evidenciaram as fraturas-avulsão da tuberosidade anterior da tíbia. Feita fixação cirúrgica com parafusos e âncoras que evitou a lesão fisária. Evoluíram sem deformidades em membros inferiores.

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### Palavras-chave:

Fraturas da tíbia/cirurgia

Fraturas da tíbia/radiografia

Tomografia computadorizada por raios X

Traumatismos do joelho

<sup>☆</sup> Study carried out at the Universidade Federal de Goiás, Faculdade de Medicina, Hospital das Clínicas, Departamento de Ortopedia e Traumatologia, Goiânia, GO, Brazil.

\* Corresponding author.

E-mail: [frederico.barra@yahoo.com.br](mailto:frederico.barra@yahoo.com.br) (F.B. Moraes).

<http://dx.doi.org/10.1016/j.rboe.2016.08.001>

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## Introduction

The anterior tibial tuberosity (ATT) develops from a secondary ossification center in the anterolateral aspect of the tibia in contrast to the ossification center of the proximal tibia. The ATT is an apophysis and develops under traction,<sup>1</sup> while the proximal tibial core is developed under compression. The development of ATT is divided into four stages: cartilaginous, apophyseal, epiphyseal and bony.<sup>2</sup>

ATT avulsion-fractures in children and adolescents are rare, with few cases described in the literature, corresponding to 1% of all growth plate injuries,<sup>3</sup> occurring predominantly in males (approximately 98%).<sup>4</sup> They are the result of two possible mechanisms: (1) abrupt knee flexion with quadriceps contraction, typical of jump landing; (2) violent quadriceps contraction with a fixed foot, as in jumping.<sup>5-7</sup>

The aim of this study is to report two rare cases of avulsion fracture of the anterior tibial tuberosity in adolescents treated surgically.

## Case reports

### Case 1

A 15-year-old male patient underwent trauma while landing on his left knee during soccer practice; he developed left leg

edema and extension limitation. During examination he presented bruising, pain on palpation of the ATT, edema 2+/4+ left leg extension impairment. Radiographies (Fig. 1) and CT scan (Fig. 2) of the knee disclosed avulsion fracture of the anterior tibial tuberosity with avulsion of the bone fragment.

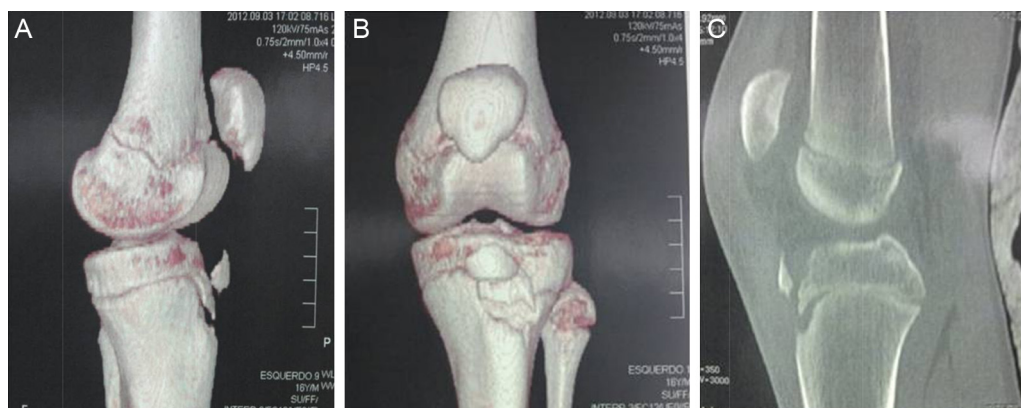
The patient underwent surgical treatment through fixation of the avulsed bone fragment with a malleolar screw and washer, and reinsertion of the patellar tendon with three anchors (Fig. 3). Early rehabilitation with full load and full range of motion was performed within two months. Sports practice resumed after six months postoperatively. The radiographic control showed normal growth without lower-limb discrepancy. The patient developed no recurvatum or ante-curvatum.

### Case 2

A 16-year-old patient, a varsity basketball player, had sudden-onset pain in the right knee and functional disability after jumping during a game. An avulsion fracture was diagnosed, with the ATT fragment extending into the joint (Fig. 4A and B). Immediate care was carried out with immobilization and surgical treatment was accomplished seven days after trauma due to significant edema. Fixation using screws and anchors was performed under fluoroscopy control to avoid growth plate lesion (Fig. 4C and D). Physical therapy rehabilitation started on the seventh postoperative day; the patient



**Fig. 1 – Clinical aspect of the left knee (A) compared with the contralateral one, showing severe edema in the anterior region; anteroposterior radiography of the left knee (B) demonstrating soft tissue edema; in profile (C) showing the ATT fragment avulsion.**



**Fig. 2 – Computed tomography of the left knee, 3D reconstruction in profile (A) and anteroposterior view (B) showing avulsion of ATT and sagittal view (C) with type 1 injury according to the Watson-Jones classification.**

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