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Tendon Ossifications of Adductor longus and Gluteus Maximus muscles: A case report.

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ABSTRACT

Gluteus maximus is a hip extensor, originating from the posterior surface of ilium and inserting on the gluteal tuberosity and ilio-tibial tract. Adductor longus is a thigh adductor which inserts to the middle- 1/3 of linea aspera. Overuse, repetitive use as well as some pathological conditions may predispose to tendon ossification of these muscles.

We present a rare case of co- existing tendon ossifications of gluteus maximus and adductor longus observed as a bony spur (bony piece) attached to the gluteal tuberosity and middle-1/3 of Linea aspera respectively. The bony insertion tendon of gluteus maximus measured 61.77 mm in length, 10.63 mm in maximum breadth and 6.06 mm in height while that of adductor longus measured 29.46 mm in length, 10.13 mm in breadth and 7.86 mm in height. Both bony spurs had short grooves on their posterior surfaces.

Ossification of insertion tendon of gluteus maximus may exert pressure effect on left circumflex femoral artery while that of adductor longus may compress on the perforating arteries. Knowledge of these ossified tendons is required to prevent damage to neurovascular structures during orthopaedic procedures, misinterpretation of radiological films and misdiagnosis of malignant lesions.

Keywords: Tendon, Ossification, Adductor Longus, Gluteal Maximus, Muscles.

INTRODUCTION

Gluteus maximus, an extensor, abductor and lateral rotator of the hip joint, is the largest and most superficial muscle in the gluteal region. It demonstrates extensive bony attachments, originating from the posterior surface of ilium and dually inserting ¼ of its fibres on the gluteal tuberosity and and the remaining ¾ joins the Tensor fasciaer latae to form the iliotibial tract[1]. Gluteal tuberosity is an elongated ridge located on the posterior surface of the proximal femur that receives the deeper fibers of distal ½ of gluteus maximus and pubic fibers of adductor magnus[2]. On the way to its insertion, gluteus maximus overlies the sciatic nerve and lateral circumflex femoral artery. The linea aspera, a dual vertical ridge on the posterior surface of the femur, provides attachment for the thigh adductors. The middle 1/3 of linea aspera receives the insertion tendon of adductor longus. This part of linea aspera is intimately related to the perforating arteries which cross it laterally[2].

Ossified tendon of the limb muscles have been reported to be part of a wide spectrum of extra-skeletal calcification termed heterotopic ossification. This condition, also known as tendon ossification or myositisossificans, results from deposition of calcium pyrophosphate in the tendons[3]. Historically, tendon ossification of adductor longus has been described as "Riders' bone". It is encountered in activities involving repeated hip adduction such horse riding and cycling[4]. It may also be encountered as complication of paraplegia, prolonged immobilization and burns[5].

Heterotopic ossification (Myositis ossificans) is broadly divided into Myositis Ossificans Progressive (MOP) and Myositis Ossificans Traumatica (MOT)[6]. MOT is a localized condition that follows single or repetitive trauma while MOP is widespread with an autosomal dorminant inheritance. Brooker proposed a grading system[7] for heterotopic calcification in the hip and proximal femur region based on the extent of calcification.

Tendon ossification occurs pathologically in mammals with the exception of the tail of Kangaroos[8]. Tendon ossification is common in many dinosaurian clades, including birds and Ornthischian dinosaurs[9,10]. Their presence in dinosaurs is synapomorphic of the clade[10]. Literature reporting the co-existing insertion tendon ossification of gluteus maximus and adductor longus are scanty on the Nigerian femurs.

CASE REPORT

During routine bone demonstration for medical students in the Department of Anatomy, University of Ibadan, we observed ossified insertion tendons of adductor longus and gluteus maximus in a dried Nigerian right femur. The ossified tendon of gluteus maximus was observed as a linear piece of bone attached to the gluteal tuberosity of the femur. The bony piece (spur) measured 61.77 mm in length, 10.63 mm in maximum breadth and 6.06 mm in height. The maximum breath was taken as a transverse dimension of the bony piece at the junction between upper 1/3rd and lower 2/3rd. A 28.89 mm long groove was observed on the posterior surface of the bony piece. The ossified insertion tendon of adductor longus occurred as a bony piece attached to the postero-medial surface of the middle 1/3 of the linea aspera. The bony piece measured 29.46 mm in length, 10.13 mm in breath and 7.86 mm in height. This bony piece had a short inferiorly directed

oblique g roove, measuring 2.41 mm in length, on its posterior surface.

The femur length, taken as a distance from the most proximal end of the head to the inferior end of the medial condyle, was 50.5 cm. The bone had a double diaphyseal nutrient foramen on the proximal and distal ends of the linea aspera.

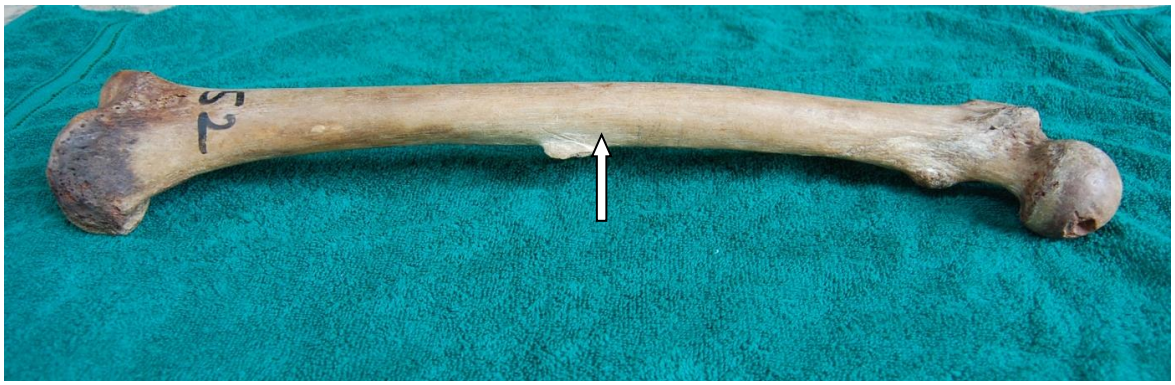

Figure 1: Anterior surface of the right femur showing ossified tendon of Adductor Longus (White Arrow)

Figure 2: Posterior surface of the femur showing ossified tendons of Adductor Longus (X) and Gluteus maximus (Y) and the associated grooves.

DISCUSSION

Historically, tendon ossification of muscles has been described as “rider’s bone” in adductor longus, “Shooter’s bone” in deltoid, and fencer’s bone in brachialis muscle. Tendon ossification has been reported to occur in Achille’s tendon[11], hip adductors[3,12] , quadriceps[13], rotator cuff muscles[14] , and biceps[4]. Previous reports on ossification in adductors were isolated cases localized on the origin of the muscle [3,13]. We are reporting ossification of the

insertion tendon of the adductor longus co-existing with that of gluteus maximus.

It can be hypothesized from the functional anatomy view point that the tendon ossification may be the result of microtrauma following repeated hip extension and thigh adduction. These movements are encountered in activities like sporting, cycling, riding and dancing. Baird and Kang suggested that microtrauma to muscle tendon results in inflammation and cell death which alters the tissue acidity[15]. This altered tissue acidity induces the release of the growth factor (Bone morphogenic protein) which stimulates bone mineralization and formation[15] .

Lateral circumflex femoral artery may be lodged in the groove behind the ossified gluteus maximus tendon and is liable to compression therein. This however may not lead to haemodynamic compromise as collateral flow is established through the trochanteric anastomosis. However in extensive tendon ossification, with a coexisting big gluteal tuberosity (third trochanter), the trochanteric anastomosis itself may be compressed resulting in impaired blood flow. Though gluteus maximus overlies the sciatic nerve, nerve compression by the ossified insertion tendon is unlikely as the nerve descends midway between the greater trochanter and ischial tuberosity, away from gluteal tuberosity. Sciatic nerve compression has however been reported in myositis ossificans of biceps femoris [4]. Ossified insertion tendon of adductor longus may compress the perforating arteries. The short groove behind this ossified tendon may serve as a passageway for the 3rd or 4th perforating artery. The groove is shallow and as a result constitutes a potential site of compression.

Even though ossified muscle tendons are benign, their appearance on plain X-ray may mimic malignant bone growths. Knowledge of these ossified tendons is required to prevent damage to neurovascular structures during orthopedic procedures, misinterpretation of radiographs and mis-diagnosis of malignant bone lesions.

A further study is recommended to determine the incidence of ossified tendons of gluteal maximus and adductor longus in the general population.

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