Case Study on the Pathology of the Greater Trochanter

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Abstract
Introduction: As part of a series of dissections geared towards an improved anatomical understanding of Greater Trochanteric Pain Syndrome (GTPS), several pathologies of the greater trochanter were observed. Case studies of two pathologies are presented. Method: The experiment was performed on two partially dissected, embalmed hips donated through the Willed Body Program at the University of North Texas Health Science Center. The gluteus maximus muscle belly was detached from the iliac crest. In addition, the iliotibial band was cut from the origin (ilium) and reflected to gain access to the gluteus maximus tendon. The tissue in the area around the greater trochanter was cleaned to expose the greater trochanter and the gluteus maximus tendon. Results: Of the two hips observed, both had discoloration of the greater trochanter. In case 1, the pathology of the greater trochanter was identified as hemosiderin. It presented as a yellowish color, possibly due to hemorrhage. Probing the area revealed the bone to be softer than the other areas of the greater trochanter. In case 2, the pathology was identified as exostosis. Multiple osteophytes were observed on the surface of the greater trochanter, and parts of the gluteus maximus tendon were calcified. This may be due to repetitive use of the hip while damaged. Conclusion: Multiple pathologies were observed in this study. Further studies will be conducted to determine which pathologies are linked to GTPS.

INTRODUCTION
Originally called “trochanteric bursitis” and defined as “tenderness over the greater trochanter with the patient in the side-lying position,” greater trochanteric pain syndrome (GTPS) has expanded to include a number of disorders of the lateral, peritrochanteric space of the hip: greater trochanteric bursitis, snap hip syndrome, and gluteus medius and gluteus minimus tendon tear [1-4]. Trochanteric bursitis is a commonly diagnosed inflammatory condition that presents with pain localizing to the region of the greater trochanter, often with radiation down the lateral aspect of the thigh or into the buttock. Due to the continuous rubbing of the iliotibial band (IT band) on the greater trochanter, the bursa sac surrounding the greater trochanter will swell and lead to tenderness and pain that travels down the thigh, causing GTPS. Typically, it is present in middle-aged patients, with females more commonly affected than males (4:1). In addition to chronic activity-related pain involving the greater trochanter, patients often report symptoms with prolonged standing, sitting with the affected leg crossed, and difficulty lying on the affected side secondary to the symptoms from the direct compression of the inflamed bursa.

As part of a series of dissections geared towards an improved anatomical understanding of Greater Trochanteric Pain Syndrome (GTPS), the IT band was reflected from the ilium. Pathologies were observed in on the greater trochanter in some of the cadavers. Two greater trochanters were collected for further studies. In this study, Case studies of two pathologies are presented.

METHODS
The experiment was done on 77 partially dissected, embalmed bodies that were donated through the Willed Body Program at the University of North Texas Health Science Center. The bodies were dissected by members of the 2015 and 2016 class of the Texas College of Osteopathic Medicine (TCOM). The skin in the thigh region of the cadavers was removed during the dissection. The adipose tissue and fascia surrounding the structures in the thigh region were fully removed.

The gluteus maximus muscle belly was detached from the iliac crest. In addition, the IT band was cut from the origin (ilium) and reflected to gain access to the gluteus maximus tendon. The adipose tissue in the area around the greater trochanter was removed so that the tendon of the gluteus maximus was revealed. Next, the tendons were examined for abnormal striations, and the number of tendon bands that inserted into the femur were documented.
Two cadaveric femurs were collected and further analyzed. The femurs were sawed at the distal shaft, keeping the proximal portion intact, and detached from the hip. The muscles were removed, except for the gluteus maximus, gluteus medius, and ITB. Pathological observation will be described based on the picture in Figure 1.

RESULTS

In case 1, the pathology of the greater trochanter was identified as hemosiderin deposition. Hemosiderin is a yellowish-brown granular intracellular pigment that is formed in some phagocytic cells, such as macrophages, by the breakdown of hemoglobin. Yellowish-brown discoloration was seen in the anterior facet, posterior facet, and superoposterior facet of the greater trochanter. There were no discolorations on the lateral facet. Probing the discolored area revealed the bone to be softer than the other areas of the greater trochanter.

In case 2, the pathology was identified as exostosis (Figure 2, 3). Exostosis is a spur or bony outgrowth known as osteophytes from bones. Multiple osteophytes were observed on the surface of the greater trochanter. Pink discoloration was observed on the anterior and superior part of the lateral facet, as well as, in the area where the gluteus maximus inserts into the IT band. In addition, calcification and callous was observed on the gluteus maximus tendon and muscle belly and IT band. Calcification may be due to bone erosion and calcium.

Recently, 46 hips were observed from 23 additional cadavers. Thirteen greater trochanters had pathologies. All of the pathologies observed were exostosis. Osteophytes were usually seen on the superior and posterior facets. Fraying of the IT band was also observed in two hips from separate cadavers. A right hip from a female cadaver had black discoloration on the greater trochanter and surrounding tissues. In addition, callous was observed in most of the hips that had exostosis.

DISCUSSION

Multiple pathologies may be due to repetitive trauma to the greater trochanter. This may have limited their movement sometime in their life. In both cases, bursa sac that surrounds the greater trochanter was not there. In case one, the bursa sac merged with the gluteus maximus and IT band, forming a tendon insertion into the gluteus medius. The bursa sac in case two was attached to surrounding structures. It was removed in order to observe the greater trochanter. Pathologies of the greater trochanter were observed in previous studies and case reports through MRIs. However, there are lacks of studies observing the pathologies on dissection level.

Dissection findings correlated with the findings seen in MRIs reported in previous studies. Calcified lesions and exostosis were observed in the same area of the greater trochanter that was seen in the dissection study. Hemosiderin was not explained (Figure 3). Bursitis was shown in MRIs, but it is unknown if the cadavers had bursitis when they were living. Further observation will be done.

REFERENCES


Figure 1 Map of the facets on the greater trochanter (3).

Figure 2 Exostosis: Osteophytes are seen on the greater trochanter, and it is most prominent on the anterior and lateral facet. The gluteus maximus tendon is calcified, and callous was observed at the point gluteus maximus inserts into the IT band. Pinkish color is in the same place callous, osteophytes, and calcification is observed.

Figure 3 Hemosiderin: Yellowish-brown discoloration was seen in the anterior facet, posterior facet, and superoposterior facet of the greater trochanter. The bursa sac fused with the gluteus maximus and IT band and made an insertion into the gluteus medius.