

Original Article

ENTHESOPHYTES ON DRIED BONES OF LOWER LIMB OF PAKISTANI POPULATION

Aliya Zahid, Muhammad Wajahat Khan and Brishna Khan

Objective: An enthesophyte is a bony spur formed at a ligament or tendon insertion into bone. It may develop in the direction of pull of the relevant tendon/ligament or in response to repetitive strain. To find out the presence of enthesophytes on dried bones of lower limb in Pakistani population

Material and Methods: Present study was conducted on dried bones of lower limb in Pakistani population in the Anatomy Departments of Allama Iqbal Medical College, Lahore and Khawaja Muhammad Safdar Medical College, Sialkot. For this purpose, 40 pelvic bones, 103 femora, 98 tibiae, and 112 fibulae were included. They were closely observed for the presence of enthesophytes. The bones with enthesophytes were photographed.

Results: Enthesophytes were found on 1 out of 40 hip bones, 2 out of 103 femora, 1 out of 98 tibia and 1 out of 112 fibulae. Enthesophyte on hip bone was present on ilium at the medial border. One of the femur shows enthesophyte inferior to lesser trochanter and other femur has enthesophyte on medial aspect of greater trochanter. On tibia, one enthesophyte was at the lower end of tibial tuberosity and second was on the posterior surface below the lateral condyle. Only one out of 112 fibulae showed enthesophyte on head of fibula.

Conclusion: Finding of enthesophytes contributes to the data of anatomical variations and to raise awareness about formation of enthesophytes. The better understanding of the localisation of enthesophytosis important in the musculoskeletal pain diagnosis so the presence of enthesophyte should be kept in mind .

Keywords: Enthesophytes, hip bone, femur, tibia, fibula, pakistani population

Introduction

Enthesophytes are bony spurs that appear as irregular outgrowths of varying size that extend from the skeleton into the soft tissue of a tendon or ligament at its enthesis.¹ The term “enthesis” describes the site of insertion of a tendon, ligament, fascia, or articular capsule into bone.² Anatomically there are four distinct zones of enthesis that include tendon substance, enthesal fibrocartilage, mineralised fibrocartilage and bone substance. The enthesis is an important structure in the cause of pain and should be taken into consideration in musculoskeletal examination.^{3,4}

Fibrocartilaginous matrix in enthesis is rich in type II collagen that enables it to bend, while its mineralized portion consists primarily of type II collagen, type X collagen and aggrecan, which give them compressive strength. Thus fibrocartilage in an enthesis accommodates the distribution of forces between the musclebone and bonebone interfaces and has tensile strength. The enthesis also minimizes stress through this functional role of fibrocartilage and enables load transfer between two distinct types of tissue (muscle and bone).⁵

An enthesopathy is usually defined as a pathological change at an enthesis. The appendicular enthesopathies may be either proliferative (e.g. enthesophytes or bone spurs) or degenerative (e.g. lytic changes, such as pitting).⁶ Enthesophytes are widely assumed to be 'traction spurs', i.e. to develop in response to high tensile forces within a tendon or ligament. It is observed that enthesophytes develop in the direction of pull of the relevant tendon or ligament and may develop in response to repetitive strain.⁷ The formation of enthesophytes can occur in many conditions including the seronegative spondyloarthritides, various endocrine disorders such as diabetes mellitus, local trauma, and calcium pyrophosphate deposition disease. The frequency increased with age, independent of gender.⁸ In addition to the “aging process” in the normal adult population, the formation of enthesophytes has been attributed to cumulative effects of mechanical loading i.e. “overuse” enthesopathies are believed to develop in response to excessive or abnormal biomechanical forces. There could be an imbalance between the anabolic and catabolic processes of bone and cartilage regulation. The presence of

Fibrocartilage at the tip of many enthesophytes suggests that endochondral ossification could play a role in their formation. Enthesophytes can form in response to repetitive strain, as in the spiking of tibial spines seen in football players.^{9,10,11}

In psoriasis, entheses are the initial site of joint inflammation in spondyloarthropathy and enthesitis most commonly localises in the lower limbs.¹² Enthesopathy is also a frequent finding in untreated coeliac disease patients.¹³ Enthesophyte formation also occurs in the absence of any clear cause. Multiple idiopathic enthesophytes are characteristic of diffuse idiopathic skeletal hyperostosis (DISH).^{14,15}

Present study was aimed to find out the incidence of enthesophytes on hip bone and long bones of lower limb in Pakistani population so the concerned clinicians have been able to advance their understanding of enthesitis disease greatly. The enthesitis is an increasingly recognised important structure in the cause of pain and should form the basis of the musculoskeletal examination. In addition, normal anatomical variants like enthesophytes can have an imaging appearance that can mimic a bone tumor so the better understanding of the localisation of enthesophytes might prevent misdiagnosis and reduce patient anxiety.

Materials and Methods

Present study was conducted in the Anatomy Departments of Allama Iqbal Medical College, Lahore and Khawaja Muhammad Safdar Medical College, Sialkot. For this purpose, 40 dried pelvic bones, 103 femora, 98 tibiae, and 112 fibulae were included irrespective of age and sex. They were closely observed for the presence of enthesophytes. The bones with enthesophytes were separated. The enthesophytes were identified and the bones were photographed.

Results

It was found that enthesophytes were found on 1 out of 40 hip bones, 2 out of 103 femora, 1 out of 98 tibia and 1 out of 112 fibulae.

Hip Bone: Enthesophyte on hip bone was present on ilium at the junction of sacropelvic surface and iliac fossa.

Femur: Two out of 103 femora showed the presence of enthesophyte. One of the femur shows enthesophyte just inferior to lesser trochanter and the other femur has enthesophyte on the inner aspect of greater trochanter.

Tibia: Two enthesophytes were present on the same

tibia, one was at the lower end of tibial tuberosity and the second was on posterior surface below the lateral condyle.

Fibula: Only one out of 112 fibulae showed enthesophyte on the head of fibula.



Fig-1: An enthesophyte projecting from the adjacent border between sacropelvic surface and iliac fossa.



Fig-2: Showing two femora with enthesophytes on greater and lesser trochanters.



Fig-3&4: Fibula showing an enthesophyte on the posterior surface of head and **Fig-4** two enthesophytes on tibia, one on tibial tuberosity and the other on posterior surface inferior to lateral condyle of tibia.

Discussion

Enthesophytes are bony outgrowths that extend from the skeleton into the soft tissue of a tendon or ligament. They become more common with increasing age and are more frequently found in males than females. Enthesophytes are comparable with the osteophytes which form around the articular surfaces

ial joints in patients with osteoarthritis. Indeed, osteophyte and enthesophyte formation are linked and that both are manifestations of skeletal response to stress. Bony spur development increases the surface area of the interface and thus could be an adaptive mechanism to increased mechanical traction¹. Since the enthesis is an increasingly recognised clinically important structure in the cause of pain, the study of enthesophytes may play an important role in diagnosing certain musculoskeletal painful conditions. Since no such study about enthesophytes is done previously in Pakistan, present study was aimed to find out presence of enthesophytes on dried bones of lower limb in Pakistani population. In a study it was found that enthesophytes were present at the greater trochanter (in gluteus tendons at their insertion) and at the tibial tuberosity (patellar tendon at its distal insertion)¹⁶, same as in present study. In another study, a survey of 39 patients with X Linked Hyperostosis (32.7 ± 19.5 years) showed the majority had evidence of enthesopathy. The predominant sites involved were the knees, ankles, pelvis, and thoracic spine. Involvement was usually bilateral for the shoulder, elbow, knee, ankle, and hand sites; and the number of sites involved increased with age.¹⁷ In a study on enthesophytes, hip joint showing enthesophyte on greater trochanter and lesser trochanter of femur,

same finding as in present study. In the same study, the iliac crest and the ischial tuberosity of hip bone have enthesophytes.¹ In present study, enthesophyte on hip bone was on the medial border between sacropelvic surface and iliac fossa. In another study, it was observed that enthesopathic abnormalities were more frequently found at the distal part of lower limbs (i.e. as patellar ligament, Achilles tendon etc) with respect to the proximal part of lower limbs (i.e. ischial tuberosity, great trochanter and insertion of adductor muscles) in 31 patients with spondylarthropathy (SpA).¹⁸

Conclusion

Finding of enthesophytes on dried bones of lower limb of Pakistani population contributes to the data of anatomical variations. Since the enthesis is an increasingly recognised clinically important structure in the cause of pain, the study of enthesophytes may play an important role in diagnosing certain musculoskeletal painful conditions. In addition, normal anatomical variants like enthesophytes can have an imaging appearance that can mimic a bone tumor so the better understanding of the localisation of enthesophytes might prevent misdiagnosis of such conditions.

Deptt. of Anatomy Allama Iqbal Medical College Lahore
www.esculapio.pk

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Answer: Picture Quiz

Atrial fibrillation with left bundle branch block