An anatomical study of Calcaneal Spurs

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Abstract

Introduction: Calcaneal spur is the bony protrusion especially seen on the dorsal and plantar surface of the calcaneus bone. It was aimed to obtain the data about the incidence of calcaneal spur and few other observations.

Method: A total 50 (right side 22 and left side 28) dry adult human calcanei of unknown sex from Department of Anatomy, BGS GIMS were used. Naked eye examination of all the banes was performed and incidence of spurs was recorded.

Aim: The aim of the present study was to observe the calcaneal spur and lipping and vascular foramen in dry bones.

Results: The incidence of spur observed was 32%. The findings were been compared with other researchers. Following the classification of types of bone, type I is common. The medial tubercle was observed as the largest tubercle. An incidence of lipping of facets was observed in 34% and prominence of vascular foramina in 64%.

Conclusion: The study is helpful in understanding a possible clinical correlation with heel pain.

Key words: Calcaneus, heel spur, heel pain, dorsal spur, plantar spur, lipping, vascular foramina.

Introduction

Calcaneus is the largest and strongest tarsal bone. It forms the prominence of the heeland also plays an important role in weight transmission, gait and posture. When a foot is exposed to constant stress, long duration standing and obesity, calcium deposits build up on bottom of the heel bone.

A calcaneal spur, or commonly known as a heel spur, occurs when a bony outgrowth forms on the heel bone. Calcaneal spurs can be located at the back of the heel (dorsal heel spur) or under the sole (plantar heel spur). The dorsal spurs are often associated with Achilles Tendinopathy, while spurs under the sole are associated with plantar fasciitis.

Chronic plantar heel pain is a common and potentially debilitating condition, often caused by plantar fasciitis[1].

Plantar fasciitis is the result of collagen degeneration of the plantar fascia at the origin, the calcaneal tuberosity of the heel as well as the surrounding perifascial structures[2].

Despite the diagnosis containing the segment "itis," this condition is notably characterized by an absence of inflammatory cells[2,3]. Chronic inflammation and foot pain can be a result of calcification and is correlated with heel spur[4,5]

At the present time, the use of inappropriate shoes, such as high-heeled shoes, is one of the reasons for the increase in the presence of heel spurs in women[6] the most enthesophytes are encountered radiographically or clinically during surgical procedures.

The present study is unique in observing the incidence of enthesophytes, lipping and vascular foramina together in dry bones by naked eye examination. Further to this study may shed more light on a possible relation between three parameters. This study will benefit orthopaedic surgeons in the field of reconstruction of calcaneal derangements. As calcaneal spur is an important cause of heel pain, the morphological knowledge in this study would help in planning the management of heel pain.

Materials and Methods:

An observational descriptive study of calcanei was done. In this study total 50 (right side 22 and left side 28) dry adult human calcanei of unknown sex from department of anatomy of BGS GIMS were used. The calcanei were labelled from 1 to 50 with right and left. Specimen that showed signs of damaged were

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excluded from the study. The calcanei were classified based on facets on sustentaculum tali. Naked eye examination of all the calcanei was performed. The calcanei were observed for the presence of plantar and dorsal calcaneal spur and for the tubercles, facet lipping and vascular foramina.

Inclusion criteria: Dry bone: Adult human normal calcanei of unknown age and sex

Exclusion criteria: Dry bone: broken bones, bones with gross pathology, bones with erosion and bones with any malformation other than calcaneal spur.

Results :

The 50 calcaneus bones in the current study were examined for the type, presence of dorsal, plantar or dorsal/plantar heel spurs.

Figure 1: Total 22 right calcaneum

Figure 2: Total 28 dry left calcaneum

The incidence of spur in our study of 50 calcanei irrespective of side was 32%.

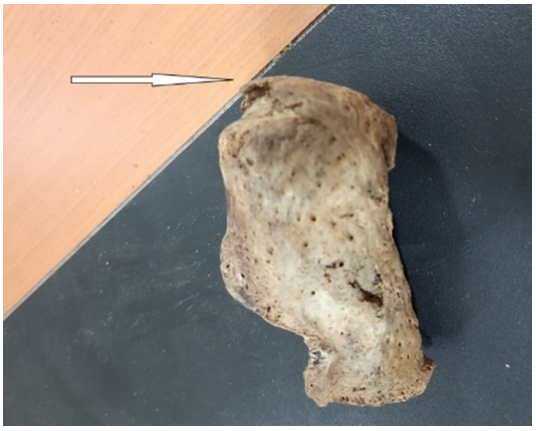

Figure 3. Lateral view specimen of calcaneum showing dorsal calcaneal spur

Figure 4: Specimen of calcaneum showing dorsal and plantar calcaneal spur

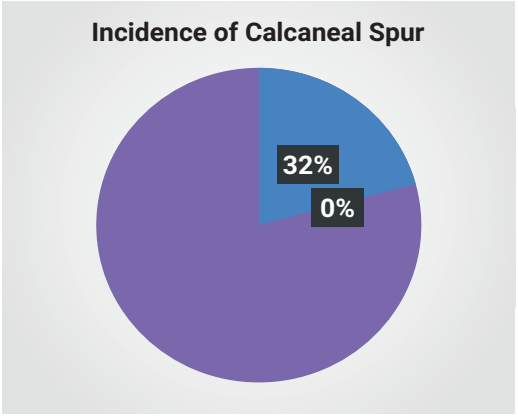

Figure 5: Chart depicting the incidence of calcaneal spur

Types of total calcaneum in the present study: The observations are detailed in the following table.

Table 1. Types of calcanei

Type of calcaneum	Number and percentage of calcaneum	Total
Type I	29	58%
Type II	17	34%
Type III	04	8%
Type IV	00	00

The Type I was the most common with an incidence of 58%.

Number of planter tubercles in the calcanei were studied. In each calcaneus, all three tubercles were observed. It was observed that the medial tubercle is the largest tubercle

On studying the incidence of facet lipping, it was found that the total presence of lipping was 34%. The prominence of vascular foramina on plantar and dorsal surface was also observed. It was observed to be prominent in the plantar surface of 64% of calcanei studied.

Discussion:

A calcaneal spur (also known as a heel spur) is a bony outgrowth from the calcaneal tuberosity (heel bone). Calcaneal spurs are typically detected by x-ray examination. It is a form of exostosis. When a foot is exposed to constant stress, calcium deposits build up on the bottom of the heel bone.

The painful heel is a relatively common foot problem. The peak age of incidence of PF in the general population is between 40 and 60 years[7,8]

Plantar heel pain can be caused by not only PF(plantar fasciitis) or FPA (fat pad atrophy), but various other causes as well. Patients with PF or FPA typically show different characteristics of clinical features about timing of pain, tender site, and bilaterally. Plantar heel pain requires differential diagnosis with consideration for appropriate management[9].

The bony bar extending from anterior tubercle in the present study might probably be a spur extending from anterior process of the calcaneal tuberosity within the plantar fascia. The plantar fascia is generally considered as the major structure in which the spur develops[16].

Relationship between heel spur and plantar heel pain has been controversial[10,11]. Though several explanations have been suggested, the inconsistent relation between heel spur and pain have not been sufficiently investigated[12].

Radiotheraphy is one of the fastest, cheapest and effective treatment modality for painful planter heel[13]. Plantar fasciitis due to calcaneal spur is one of the most common causes for inferior heel pain[14]. Recent studies have shown that cryoultrasound therapy has more beneficial effects in the treatment of chronic plantar fasciitis with heel spurs in comparison to cryotherapy alone[15].

Conclusion:

Calcaneus is the largest and strongest tarsal bone. It forms the prominence of the heel and also plays an important role in weight transmission, gait and posture. A calcaneal spur, or commonly known as a heel spur, occurs when a bony outgrowth forms on the heel bone. A knowledge of the incidence of these enthesophytes, lipping and distribution of vascular foramina in dry bone by naked eye examination may be helpful in understanding a possible correlation with heel pain.

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