

Anatomical and demographic findings in symptomatic osteochondral lesions of the talus

Semptomatik talus osteokondral lezyonlarında anatomik ve demografik bulgular

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Abstract

Purpose: Talar osteochondral defects involve damage to both the chondral surface and the underlying subchondral bone tissue. The primary etiological factors are thought to be major trauma or repetitive microtrauma. Clinically, patients often report ankle pain, swelling, and restricted joint mobility, particularly after prolonged standing or physical activity. This study aims to examine the demographic characteristics of patients who were diagnosed and treated for talar osteochondral lesions presenting with symptoms at our medical center.

Materials and methods: A retrospective evaluation was conducted on patients diagnosed with osteochondral lesions of the talus, who had been examined and managed by a specialized foot and ankle surgeon within the orthopedic and traumatology department of an university hospital over the past five years. Key parameters recorded included the patients' age, sex, the laterality of the affected ankle (right or left), and the precise anatomical location of the osteochondral lesion, distinguishing between medial and lateral involvement of the talar dome.

Results: This study included a total of 42 patients, with 27 being female and 15 male. The age distribution of the study cohort spanned from 18 to 70 years, with an average age calculated at 46 years. In terms of lesion localization, 36 cases were located on the medial talus, while 6 were found on the lateral aspect. Statistical analysis revealed a significant tendency for osteochondral lesions to occur on the medial side of the talus ($p=1.87 \times 10^{-11}$). When assessing the affected ankle, 24 cases involved the left ankle, while 18 were in the right ankle. However, there was no statistically significant difference in laterality ($p=0.175$).

Conclusion: Talar osteochondral defect is a condition that affecting both chondral and subchondral tissue, appear to be more frequently located medially in symptomatic patients and tend to be more common in females.

Keywords: Talus, demographic, osteochondral.

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Öz

Amaç: Talusun osteokondral defektleri hem kıkırdak yüzeyin hem de alttaki subkondral kemik dokusunun hasarını içerir. Başlıca etiyolojik faktörlerin büyük travmalar veya tekrarlayan mikrotravmalar olduğu düşünülmektedir. Klinik olarak hastalar sıklıkla ayak bileği ağrısı, şişlik ve özellikle uzun süre ayakta durma veya fiziksel aktivite sonrasında eklem hareket kısıtlılığı bildirmektedir. Bu çalışma, tıp merkezimizde semptomlarla başvuran ve tanı konularak tedavi edilen talus osteokondral lezyonları bulunan hastaların demografik özelliklerini incelemeyi amaçlamaktadır.

Gereç ve yöntem: Son beş yıl içinde bir üniversite hastanesinin ortopedi ve travmatoloji bölümünde ayak ve ayak bileği cerrahisi konusunda uzmanlaşmış bir cerrah tarafından incelenen ve yönetilen, talusun osteokondral lezyonu tanısı almış hastalar retrospektif olarak değerlendirildi. Kayıt altına alınan temel parametreler arasında hastaların yaşı, cinsiyeti, lezyonun etkilenen ayak bileğinde (sağ veya sol) yerleşimi ve osteokondral lezyonun anatomik konumu (medial veya lateral talus kubbesi) yer aldı.

Bulgular: Çalışmaya toplamda 42 hasta dahil edildi; bunların 27'si kadın, 15'i erkekti. Çalışma grubunun yaş dağılımı 18 ile 70 yıl arasında değişmekte olup, ortalama yaş 46 olarak hesaplandı. Lezyon lokalizasyonu açısından 36 olgu medial talusta, 6 olgu ise lateral talusta bulundu. İstatistiksel analiz, osteokondral lezyonların medial talusta belirgin şekilde daha sık görüldüğünü ortaya koydu ($p=1,87 \times 10^{-11}$). Etkilenen ayak bileği açısından 24 olgu sol ayak bileğinde, 18 olgu ise sağ ayak bileğinde görüldü. Ancak laterallik açısından istatistiksel olarak anlamlı bir fark bulunmadı ($p=0,175$).

Sonuç: Talusun osteokondral defekti hem kıkırdak hem de subkondral dokuyu etkileyen bir durum olup, semptomatik hastalarda daha sık olarak medialde lokalize olduğu ve kadınlarda daha yaygın görüldüğü tespit edilmiştir.

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Anahtar kelimeler: Talus, demografik, osteokondral.

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Introduction

Talar osteochondral defects involve damage to both the chondral surface and the underlying subchondral bone tissue [1]. The primary etiological factors are thought to be major trauma or repetitive microtrauma [2]. Due to the limited regenerative capacity of chondral tissue, osteochondral lesions can develop progressively after trauma [3]. In addition to mechanical factors, some cases may have underlying conditions such as rheumatic diseases, prolonged systemic medication use, or infectious pathologies contributing to the lesion formation [4].

Clinically, patients often report ankle pain, swelling, and restricted joint mobility, particularly after prolonged standing or physical activity. A thorough examination is essential to assess potential ligamentous injury or joint instability, with specific tests such as the medial and lateral compression test and tenderness evaluation [5]. Various imaging techniques, such as X-rays, computed tomography (CT), and magnetic resonance imaging (MRI), are frequently employed to evaluate the anatomical structure of the ankle and detect the presence of osteochondral lesions [6].

This study aims to examine the demographic characteristics of patients who were diagnosed and treated for talar osteochondral lesions presenting with symptoms at our medical center.

Materials and methods

This study received ethical approval from the Pamukkale University Non-Interventional Clinical Research Ethics Committee (approval no: 01, date: 07.01.2025). A retrospective evaluation was conducted on patients diagnosed with osteochondral lesions of the talus, who had been examined and managed by a specialized foot and ankle surgeon within the orthopedic and traumatology department of our university hospital over the past five years.

The primary objective of this review was to collect and analyze demographic and clinical data related to these patients. Key parameters recorded included the patients' age, sex, the laterality of the affected ankle (right or left), and the precise anatomical location of the osteochondral lesion, distinguishing between medial and lateral involvement of the talar dome. By systematically reviewing these variables, we aimed to identify potential demographic trends and anatomical patterns that could contribute to a deeper understanding of the distribution and characteristics of talar osteochondral lesions. The study included individuals aged 18 and above who had a confirmed diagnosis of osteochondral lesions in the talus. Those with insufficient imaging records, a history of oncologic conditions, or systemic rheumatic diseases were excluded. Statistical significance was determined using the One-Sample Proportion Z-Test and Chi-Square Test.

Results

This study included a total of 42 patients, with 27 being female and 15 male. The collected demographic and clinical data are comprehensively presented in Table 1. Although there was a noticeable predominance of female participants compared to males, statistical evaluation revealed that this difference did not reach a level of significance ($p=0.053$). The age distribution of the study cohort spanned from 18 to 70 years, with an average age calculated at 46 years. This broad range highlights the diverse age profile of the affected individuals, suggesting that osteochondral lesions of the talus may develop across various stages of adulthood regardless of gender. Further evaluation of age distribution in relation to the presence of osteochondral lesions did not show any statistically meaningful correlation ($p=0.270$). These findings suggest that while there may be a slight tendency for osteochondral lesions to occur more frequently in females, this trend does not reach statistical significance.

Table 1. Patients' age, gender, right-left ankle, and medial-lateral locations of the talus

Patient No	Age	Side	Location	Gender
1	36	left	medial	female
2	62	left	medial	female
3	42	right	lateral	female
4	51	right	medial	female
5	51	left	medial	female
6	44	left	medial	female
7	26	left	medial	male
8	56	left	medial	male
9	48	left	lateral	female
10	38	right	medial	male
11	55	left	medial	female
12	60	right	lateral	female
13	20	right	lateral	male
14	57	right	medial	female
15	47	left	medial	female
16	42	right	medial	female
17	47	left	medial	female
18	48	left	medial	male
19	45	left	medial	female
20	41	right	medial	female
21	32	left	medial	male
22	59	right	medial	female
23	41	left	lateral	female
24	33	right	medial	male
25	38	left	medial	male
26	55	left	medial	female
27	58	right	medial	female
28	36	right	medial	female
29	67	right	medial	female
30	34	left	medial	male
31	42	right	medial	female
32	18	left	medial	female
33	41	right	medial	male
34	58	right	medial	female
35	40	left	medial	male
36	51	left	medial	male
37	50	left	medial	male
38	59	right	medial	female
39	48	right	medial	female
40	30	left	medial	male
41	68	left	lateral	male
42	70	left	medial	female

In terms of lesion localization, 36 cases were located on the medial talus, while 6 were found on the lateral aspect (Figures 1 and 2). Statistical analysis revealed a significant tendency for osteochondral lesions to occur

on the medial side of the talus ($p=1.87 \times 10^{-11}$). When assessing the affected ankle, 24 cases involved the left ankle, while 18 were in the right ankle. However, there was no statistically significant difference in laterality ($p=0.175$).



Figure 1. An osteochondral lesion located laterally on the talus is seen in the coronal section of an ankle CT scan

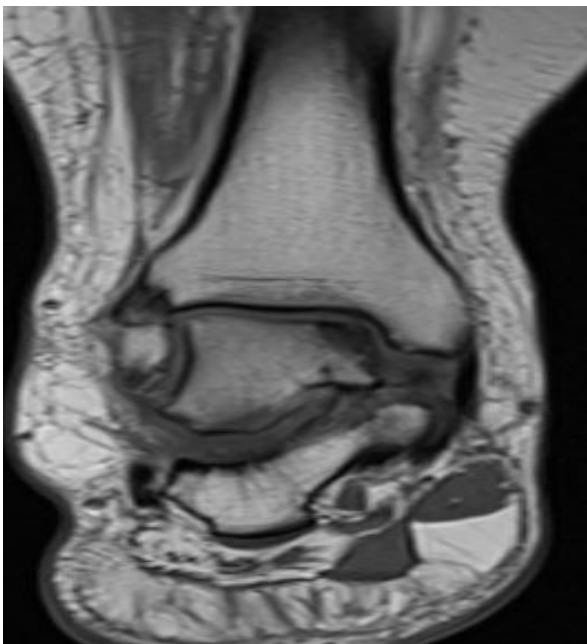


Figure 2. An osteochondral lesion located medially on the talus is seen in the coronal section of an ankle MRI in the T1 sequence

Discussion

This study evaluated the demographic characteristics of 42 patients with osteochondral lesions of the talus, assessed by a foot and ankle surgeon. No notable statistical association was detected between patient age and osteochondral lesion occurrence, indicating that the condition might be influenced by other demographic or biomechanical factors rather than age alone. A similar conclusion was reported in a retrospective study by Kim et al. [7], which analyzed 364 patients over a 10-year period and also failed to identify a significant correlation.

Although our findings suggest that osteochondral lesions were more common in female patients, this difference did not reach statistical significance. Kim et al. [7] also observed a higher prevalence of osteochondral lesions in females, but their study did not find a statistically meaningful relationship. Likewise, research conducted by Boz et al. [8] using MRI imaging found no significant association between gender and osteochondral lesion occurrence.

To classify lesion locations, we applied the Orr classification system [9]. In the Orr classification, the talus is divided into three regions: medial, lateral, and central. Our analysis demonstrated that osteochondral lesions were significantly more frequent on the medial talus. A retrospective study involving 90 patients similarly reported a predominance of medial lesions, though statistical significance was not observed [10]. Furthermore, Kim et al. [7] found that 87.9% of lesions in their study were located medially on the talus.

When evaluating the distribution of osteochondral lesions between the right and left ankles, our study did not reveal a statistically significant difference in laterality. The data suggest that the occurrence of lesions was relatively balanced between both sides, indicating that neither the right nor the left ankle is inherently more susceptible to developing these lesions. Consistent with our findings, Boz et al. [8] also reported no statistically meaningful variation in lesion prevalence between the right and left ankle in their study. These results imply that factors other than laterality, such as biomechanics, individual activity levels,

or underlying anatomical differences, may play a more critical role in the development of osteochondral lesions in the talus.

A large-scale retrospective study using data from the U.S. military reviewed records spanning ten years, covering approximately 14 million personnel. The incidence of osteochondral lesions of the talus was reported as 27 per 100,000 individuals [11]. The study also found a statistically significant increase in incidence among females and individuals of Caucasian descent. In our research, the proportion of female patients was also higher. However, our study did not aim to determine incidence rates, as it focused solely on patients diagnosed with talar osteochondral defects.

Certain constraints should be acknowledged in this research. The retrospective design inherently restricts the control over potential influencing factors on osteochondral lesion development. However, as all evaluations were performed by a single researcher specialized in foot and ankle surgery, this limitation was minimized. Additionally, one of the notable strengths of this research is that all symptomatic patients were included, regardless of the treatment approach. The inclusion of a diverse patient cohort, rather than focusing on a single treatment modality such as conservative management, ligament repair, mosaicplasty, or microfracture, adds robustness to our findings.

Talar osteochondral defect is a condition that affects both chondral and subchondral tissue, appears to be more frequently located medially in symptomatic patients and tends to be more common in females.

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Authors' contributions: The core concept and hypothesis of the study were formulated by A.N.A. The theory was formulated, and the materials and methods section was structured by M.Y. The data analysis in the results section was conducted by M.Y. The discussion section was written by A.N.A. and later reviewed, revised, and approved by M.Y. Additionally, all authors actively contributed to discussions throughout the study and approved the final version of the manuscript.

Conflict of interest: The authors have stated that they have no conflicts of interest to disclose.

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