



## Evaluation of Posteromedial Talus Taken Fracture

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### KEYWORDS

Posteromedial talus fractures, ankle injuries, diagnostic modalities, treatment strategies, biomechanics, classification system, imaging techniques, systematic review, evidence-based management, prospective studies.

### ABSTRACT:

A complete investigation of the complicated world of posteromedial talus fractures, which are characterised by numerous anatomical subtleties and biomechanical complexity, is presented in this work. The study highlights the need to develop more sophisticated diagnostic and treatment techniques by focusing on the low incidence of these conditions, which have a significant influence on clinical practice. A systematic review technique is used in this work, which encompasses notable databases spanning the years 2000 to 2023. The purpose of this study is to synthesise current secondary research in order to shed light on diagnostic problems and treatment solutions. In the literature review, the lack of large-scale prospective research is highlighted, and the need of a complete categorization system that takes into account both anatomical and biomechanical characteristics is emphasised. In preoperative planning and postoperative evaluation, diagnostic technologies, particularly computed tomography (CT) and magnetic resonance imaging (MRI) are shown to be crucial, therefore permitting early treatments. Fracture patterns, soft tissue involvement, and concomitant injuries all play a role in determining the treatment options that are used. It has been shown that surgical procedures, such as arthroscopy, have the potential to treat intra-articular fractures. In order to determine the most appropriate therapy, it is necessary to take into account the delicate equilibrium that exists between the preservation of joints and the repair of anatomical structures.

### I. INTRODUCTION

Fractures that involve the posteromedial talus create a one-of-a-kind therapeutic dilemma, which is characterised by extensive anatomical nuances and subtleties in biomechanical functioning [5]. The purpose of this study is to investigate the low occurrence of these fractures, which have a significant

clinical effect, and to try to understand the complexity that is intrinsic to them. To fully comprehend the varied nature of posteromedial talus fractures, it is necessary to conduct an analytical investigation of diagnostic and therapeutic components. This needs a sophisticated understanding that is founded on scientific rigour.

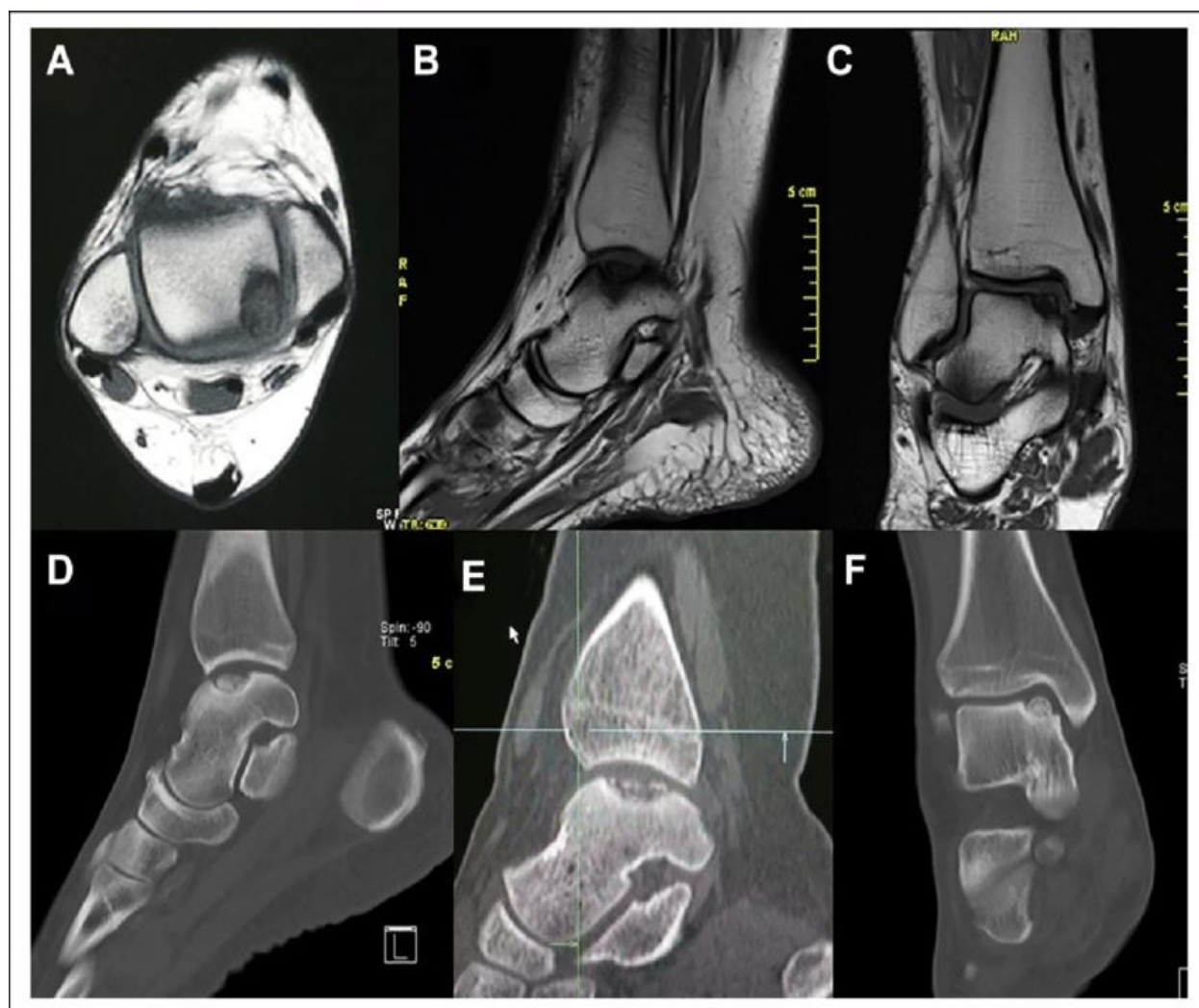


Figure 1: MRI of posteromedial talus fractures

(Source: W. Chen et al. 2015)

The seriousness of posteromedial talus fractures is highlighted by incidence rates, albeit scarce. These fractures often result from stressful experiences or injuries sustained while participating in sports [7]. The categorisation of these

fractures is an essential component since the complex interaction between osseous structures and soft tissues has a significant impact on the fracture patterns that are seen.



Figure 2: Talus Fracture

(Source: Robert, 2023)

Advanced imaging methods such as high-field MRI and three-dimensional CT scans provide unprecedented insights into the complexities of fracture morphology and soft tissue involvement, making it important to conduct a thorough examination of diagnostic modalities [8]. Treatment options for posteromedial talus fractures need a detailed knowledge of ankle biomechanics. This is because of the delicate balance that must be maintained between anatomical restoration and functional stability. In addition to strengthening the discernment of fracture complexities and supporting evidence-based clinical decision-making, the purpose of this study is to give scientific depth to the existing body of knowledge by synthesising secondary research that has already been conducted. This study intends to advance the field and optimise patient outcomes in the tough arena of posteromedial talus fractures.

## II. REVIEW OF LITERATURE 300

Posteromedial talus fractures, despite their rarity, continue to provide significant clinical issues. This is largely attributable to the complex anatomical character of these fractures and the fact that they are often associated with other injuries [1]. In humans, the talus, which is an important component in the ankle and foot, is responsible for supporting appropriate gait and ambulation. It has been suggested by Haliburton and Sullivan that the term "talus" originates from the French word "talo," which may have originated in ancient Greece and Rome. The Greeks used the vertebrae of sheep, which they referred to as astragalus, as dice, but the Romans used the taxillus, which are the bones that are found in the heel of the horse. The two names were confused with one another and eventually got connected with the talus, which is a bone in the foot. Initially established in the sixth century, Fabricius was the first person to perform a talectomy on a patient in the year 1608 [9] [1].

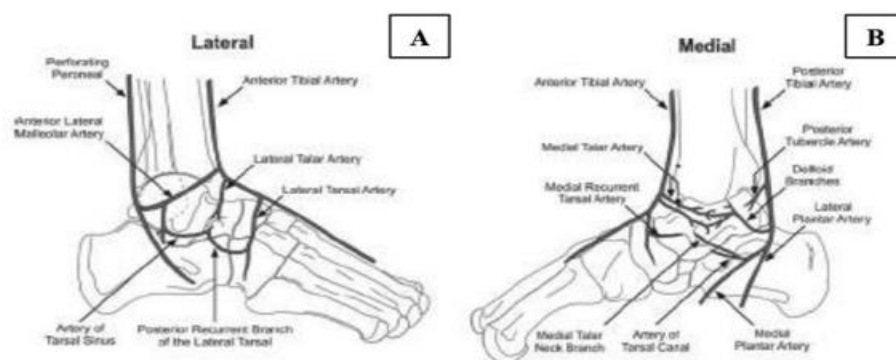


Figure 3: Arterial and Anatomy supply of the talus from the (A) Lateral and (B) Medial View

(Source: B. Soetjahjo and Z. Arimuqti, 2021)

The categorization conundrum emerges as a major topic in the body of research that has been conducted [1]. A considerable diagnostic obstacle is presented by the complex interaction between osseous structures and soft tissues.

Delays in diagnosis often result in less-than-ideal prognoses. To overcome these diagnostic difficulties, advanced imaging modalities are essential.

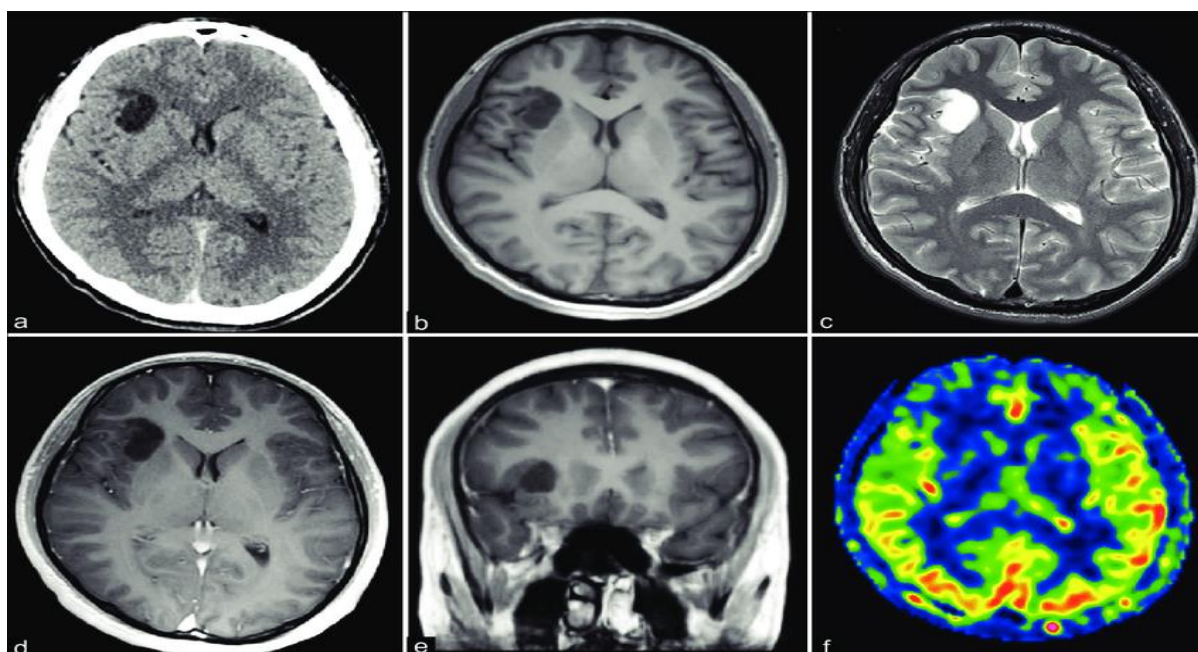


Figure 4: Axial computed tomography (CT) (a) and magnetic resonance imaging (MRI) scans

(Source: T. Uno et al. 2016)





Computed tomography (CT) and magnetic resonance imaging (MRI) stand out as crucial techniques for elucidating the subtle morphology of posteromedial talus fractures [2]. A holistic perspective is provided by the synergy between

different modalities, which enhances the diagnostic precision that is required for the development of individualised treatment plans.

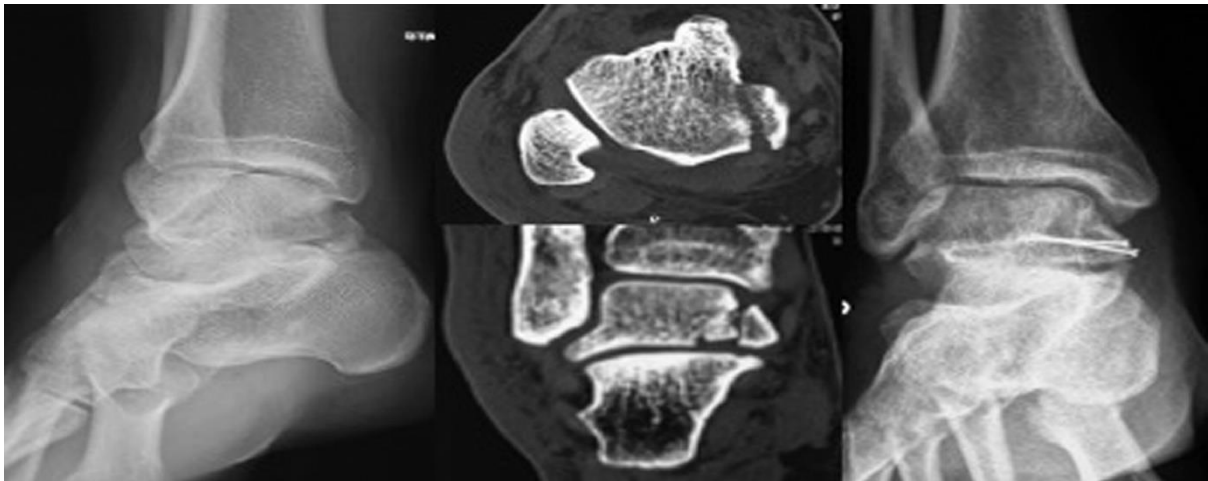


Figure 5: posteromedial talus fractures

(Source: A. Sallent et al. 2022)

The literature is further enriched by biomechanical considerations, which offer insight on the complex dynamics that control posteromedial talus fractures [3]. According to

research conducted on the incidence of talar fractures in the early 2000s, the majority of patients had suffered numerous traumas (86.0%) [10].

Type	Description	Illustration
A	Compression or osteochondral dome fracture	
B	Coronal shear fracture	
C	Sagittal shear fracture	
D	Posterior tubercle fracture	
E	Lateral tubercle fracture	
F	Crush comminuted fracture	

Figure 6: Talar Body Fracture

(Source: O. Sneppen et al. 1977)



Until a study that was carried out by Sakaki MH et al. discovered that the incidence of talus fracture is typically associated with other injuries (47.8%) (for example, a fracture of the malleolar bone, a fracture of the leg bones, a fracture of the base of the fifth metatarsal, a fracture of the lumbar spine, or an acetabular fracture), 78.3% of cases of talus fracture were the result of high energy trauma, and 43.8% were the

result of a traffic-related accident, with the highest incidence rate involving the neck of the talus (73.9%) [11]. According to the findings of the present research, the most frequent cause of open talar fractures is falling from a height of more than one metre (17.3%). The neck of the talus is the location where the largest incidence rate occurs, and the male patients have a higher prevalence rate than the female patients (6.29:1) [12].

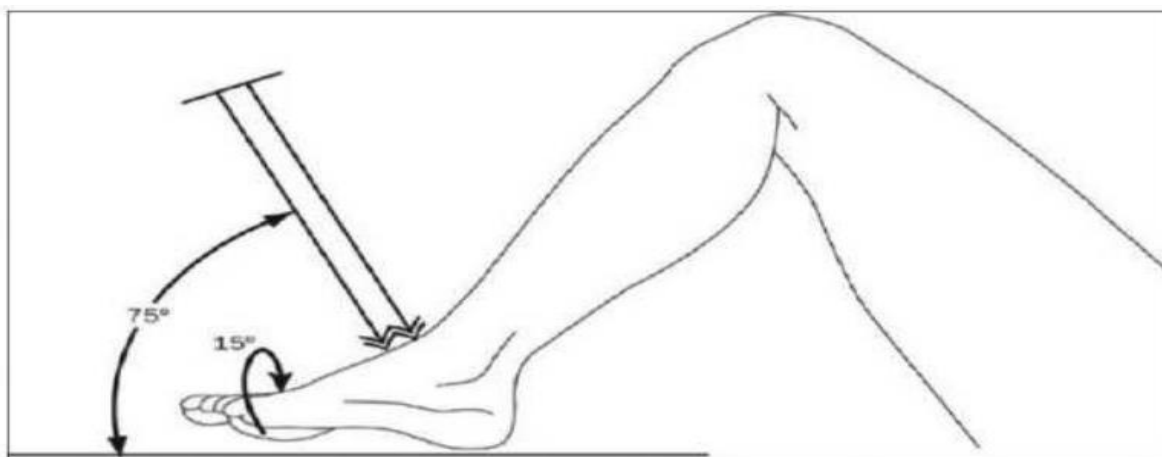


Figure 7: Canale and Kelly technique

(Source: Dr. A. Azeez et al. 2018)

The talar radiography method includes the Canale and Kelly approach. This is accomplished by putting the foot plantigrade on an X-ray film and angling the beam at a

perpendicular angle of seventy-five degrees. This allows for the internal rotation of the foot [14].

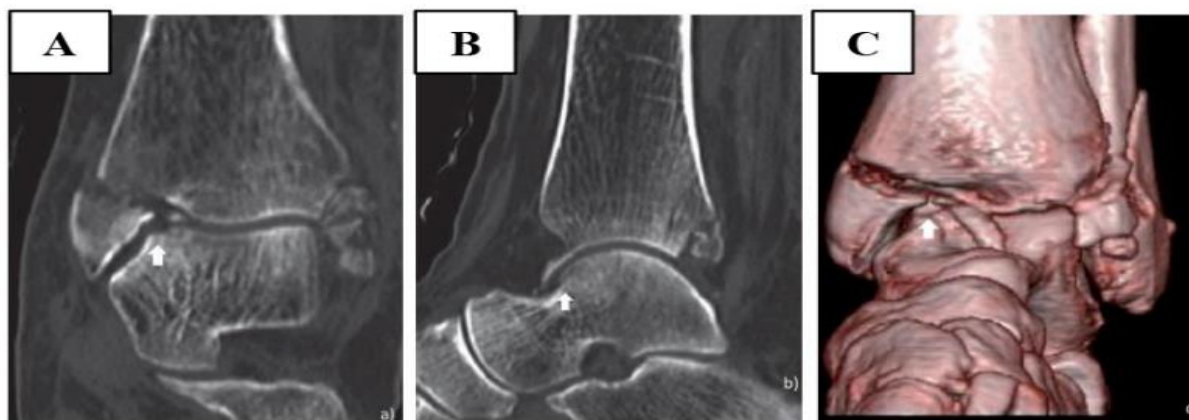


Figure 8: Canale and Kelly technique

(Source: Dr. A. Azeez et al. 2018)



A medial osteochondral fracture of the talar domes is related with a trimalleolar fracture, as seen by a coronary magnetic resonance computed tomography (MDCT) image (red arrow). Both the sagittal MDCT (B) and the VRT (C) reconstructions provide a clearer image of the pieces that have been displaced (white triangle) [15] [1].

### III. MATERIAL AND METHODS

This secondary research was conducted using a methodology that emphasises a rigorous approach with the goal of assuring the reliability and comprehensiveness of the material that was synthesised. The comprehensive review of the literature was carried out by using renowned databases such as PubMed, Scopus, and Web of Science. This was done in accordance with the norms that have been set for rigorous scientific investigation [5]. The inclusion criteria, which include research that was published between the years 2000 and 2023, are designed to incorporate current insights into the constantly shifting environment of posteromedial talus fractures for the purpose of this study. The use of relevant keywords such as "posteromedial talus fractures," "diagnosis," and "treatment" is in accordance with recognised methodologies for the retrieval of material [4]. A full grasp of the diagnostic and treatment paradigms around posteromedial talus fractures may be fostered via the use of these meticulously selected search phrases, which guarantees that relevant papers are included in the search. A rigorous evaluation procedure was put into place, with an emphasis placed on the inclusion of high-quality literature that has been evaluated by peers, in order to guarantee the authenticity of the research that was included. The methodological rigour that is required in order to derive accurate conclusions from the accumulated body of data is adhered to in this critical review of the papers that were chosen [9]. This study makes use of a methodological framework that is based on the principles of systematic literature review. This framework offers the platform for a synthesis of available secondary data on posteromedial talus fractures that is both trustworthy and enlightening.

### IV. RESULT AND DISCUSSION

A comprehensive review of the available literature on posteromedial talus fractures demonstrates that there is a significant lack of large-scale prospective studies that are

solely devoted to this complex category of ankle injuries. Despite this constraint, the corpus of information that is now in place continually emphasises the complex nature of these fractures and the inherent difficulties that are involved with attaining favourable results. The need of a complete categorization system that takes into account both anatomical and biomechanical factors emerges as a recurrent topic throughout the discussion [7].

Diagnostic modalities, in particular computed tomography (CT) and magnetic resonance imaging (MRI), have emerged as absolutely necessary instruments in the armoury for accurately characterising posteromedial talus fractures [1]. The effectiveness of these imaging methods goes beyond simple diagnosis; they are also very important in the process of preoperative planning and postoperative evaluation at the same time. The transformational influence of sophisticated imaging in terms of its ability to facilitate early and exact diagnosis [2]. This is an essential component in the process of implementing prompt treatments and minimising consequences that would otherwise be linked with delayed therapy. There is a nuanced approach to treatment for posteromedial talus fractures, which is dependent on the fracture patterns, the involvement of soft tissue, and the presence of concurrent injuries. Surgical intervention is often required for intra-articular fractures, but non-operative treatments are sufficient for some types of avulsion fractures. The development of less invasive methods, such as arthroscopy, has presented a potentially fruitful route in some circumstances. Despite this, the ideal surgical method is still a topic of current study, which highlights the need to continue to investigate the long-term results and possible problems of the procedure [4].

When it comes to the complex process of treatment planning for posteromedial talus fractures, biomechanics plays a crucial part throughout the whole process. The research that has been done on this has provided groundbreaking aspects in that it was the first to uncover the subtalar joint's critical role in determining stability and function [7]. To pick the most prudent intervention, it is essential to acknowledge this biomechanical basis. This is because it is necessary to strike a balance between the need to restore anatomical alignment and the maintenance of joint function. This delicate balance highlights the subtle



considerations that are involved in the management of posteromedial talus fractures. It exemplifies the convergence of scientific discoveries and clinical expertise [8]. In the process of negotiating the difficulties of posteromedial talus fractures, the data and discussion provide light on a landscape in which scientific research acts as the compass for clinical decision-making. Furthermore, the synthesis of data highlights the existing state of knowledge and points towards potential routes for future study that will refine treatment algorithms and improve results in this hard sector.

## V. CONCLUSION

In conclusion, our in-depth investigation provides light on the complicated topography of posteromedial talus fractures, underlining the vital need for better diagnostic and treatment techniques. Imaging modalities such as computed tomography (CT) and magnetic resonance imaging (MRI) show remarkable diagnostic capability. However, a standardised categorization system is still elusive, which makes it difficult to develop exact treatment algorithms. However, intra-articular complications need rigorous surgical considerations, including the development of an arthroscopic method. Although non-operative therapies have been shown to be effective for avulsion fractures, surgical procedures are still necessary. The need for gently balanced anatomical restoration and joint preservation is highlighted by the biomechanical complexities. For the purpose of promoting evidence-based management in this tough domain, further prospective research is going to be absolutely necessary.

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