ABSTRACT: The calcaneus, the more lower bone of the body, has the task of supporting the axial load from the weight of the body. Calcaneal fractures comprise 70% of all the tarsal bones fractures and 2% of all fractures. Diagnostic imaging plays a primary role in the diagnosis and classification of fractures. Conventional radiography is generally used in the evaluation of simple fractures. Computed tomography through the Sd and multi-planar reconstructions allows to classify these fractures, consenting a better visualization and characterization of fracture lines and the dislocation of bone fragments. Most of the complex calcaneal fractures are intra-articular. Sanders classification system was the most used to describe this type of fracture. The classification of extra-articular fractures, however, is based on tripartite division of the anatomic calcaneal surface: posterior, middle, and anterior areas. As Müller says, “a classification is useful only if it considers the severity of the bone lesion and serves as a basis for treatment and for evaluation of the results.” Soft-tissue involvement in this fractures, has been correlated with poor functional outcomes. The type of treatment (conservative or surgical) depends on the radiological classification of the fracture.

LEARNING OBJECTIVES: Evaluate calcaneal fracture with computed tomography (CT).

INTRODUCTION: Calcaneal fractures are 2% of all fractures and more of 70% of tarsal fractures. The mechanism of injury can range from high energy trauma (MCA, falls from height) or low energy trauma (spor). The most common cause of is an axial load generally caused by falling from a height with landing on the feet. Another cause of calcaneal fractures are vehicle accidents where the passenger's feet are pressed firmly against the vehicle floor. Some complex, intra and extra-articular fractures are also called “lateral fracture” or “Don Juan fracture.” These names originate from the fact that the sitar can jump from great heights to escape from the lover’s consort.

The calcaneus is also a common site of stress fractures, occurring in the posterio-superior aspect.

RADIOLOGIC ASSESSMENT: The first assessment of the calcaneus suspected fractures is performed with conventional radiography, performed with axial heel (Harris projection). The best-known classification system based on conventional radiography is the Essex-Loo Presti system. CT has changed the evaluation of calcaneal fractures because it allows better visualization of subarticular joint. Through Multiplanar Reconstruction (MPR) and Volume Rendering (VR) reconstruction is possible to assess accurately the fracture lines, dislocation, crushing, the morphology and the involvement of the articular surfaces, allowing to choose the appropriate treatment and have a better prognostic evaluation. The split between intra- and extra-articular fractures is based on the involvement of the subarticular joint.

EXTRA-ARTICULAR FRACTURES: The extra-articular fractures are fractures that do not involve the posterior facet of the subarticular (25%). These are divided:

- Type A: fracture involving the anterior process of the calcaneus;
- Type B: fracture involving the midsacral or body, including lateral process, sustentaculum tali or trochlear process;
- Type C: fracture involving the posterior calcaneus, including medial tubercle and posterior tuberosity (figure 4, red arrows, and figure 5).

INTRA-ARTICULAR FRACTURES: The intra-articular fractures of the calcaneus are 75% of calcaneal fractures. Sanders system is the most used fractures classification system. (figure 2 and figure 3).

The system is based on coronal CT images, number and location of the fracture fragments and the involvement of the posteriour aspect of the calcaneus bone.

This assessment has enabled the identification of fractures in four types, according to Sanders system:
- Type 1: Non-displaced fractures (displacement < 2 mm);
- Type 2: Two part fracture with one fracture line and is divided into three subtypes based on the side of the fracture line: lateral (IIA, central (IIB), or medial (IIC);
- Type 3: Three part fractures from two lines of fracture, divided into subtypes IIIA (with two primary lines, one lateral and one central relative to the posterior facet and subarticular joint), IIIB (two primary fracture lines, one to the posterior facet and subarticular joint), IIIC (two primary fracture lines, one central and one medial relative to the posterior facet and subarticular joint);
- Type 4: Four part ore more than three lines of fracture.

CONCLUSION: CT allows better visualization of the calcaneal fracture lines. The involvement of the posterior facet of the subarticular joint is used for recognizing the intra-articular fractures according to Sanders classification system. This classification system correlates with the management and prognosis, without significant interobserver variability. Extra-articular fractures do not involve the posterior facet and are classified based on the location. The involvement of soft tissue is an important question because it has been associated with poor functional outcomes.