Management Of Charcot Arthropathy Of The Ankle Joint

Essay for fulfillment of master degree in orthopaedic surgery

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Abstract

Charcot arthropathy is a destructive process, most commonly affecting joints of the foot and ankle in diabetics with peripheral neuropathy. Affected individuals present with swelling, warmth, and erythema, often without history of trauma. Bony fragmentation, fracture, and dislocation progress to foot deformity, bony prominence, and instability. This often causes ulceration and deep infection that may necessitate amputation. Instability or deformity may limit the ability to use standard footwear. Treatment is focused on providing a stable and plantigrade foot for functional ambulation with accommodative footwear and orthoses. Foot-specific patient education and continued periodic monitoring may reduce the morbidity and associated expense of treating the complications of this disorder and may improve the quality of life in this complex patient population.

Key Words:

Charcot arthropathy - Diabetes Mellitus –Deformity -Treatment.

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Abbreviations	Meaning
• **ACA :**	Acute Charcot Arthropathy.
• **SWM :**	Semmes-Weinstein Monofilament.
• **CROW :**	Charcot Restraint Orthotic Walker.
• **TCC :**	Total Contact Cast.
• **PPWB :**	Prefabricated Pneumatic Walking Brace.
• **EBG :**	Electric Bone Growth.
• **VPT :**	The Vibration Perception Threshold Meter.
• **ESR :**	Erythrocyte Sedimentation Rate.
• **OM :**	Osteomyelitis.

Aim of the Work:

This essay will include the following titles:

1-Introduction and Background of Charcot arthropathy.

2-Anatomy &Biomechanichcs

3-Etiology& Pathogenesis.

4-Classification and Diagnosis.

5- Treatment.

Introduction:

Charcot neuroarthropathy can be described as a non infective, destructive process activated by an isolated or accumulative neuro-traumatic stimulus that manifests as dislocation, peri-articular fracture or both in patients rendered insensate by peripheral neuropathy. [19]

The ankle has swelling, warmth, and erythema, and the syndrome may initially be difficult to distinguish from infection. The bones and joints develop fractures, ligamentous laxity, dislocations, cartilage damage, bone erosions, and hypertrophic repair. [20] The resulting bone and joint deformities may be associated with instability and may compromise the fitting of shoes or braces. Furthermore, ulceration may result from instability or bony prominence and may cause chronic or recurrent soft tissue infection and osteomyelitis. Amputation may be required for management of infection or instability. [20]

Peripheral neuropathy secondary to diabetes mellitus is the most common etiology of Charcot neuroarthropathy; however, peripheral neuropathy from leprosy, alcoholism, syringomyelia, rheumatoid arthritis, multiple sclerosis and traumatic injury also may be associated with Charcot neuroarthropathy. [21]

Anatomy Of The Ankle Joint

The ankle joint is a complex, three-bone joint (Fig. 1). It consists of the tibial plafond, including the posterior malleolus articulating with the body of the talus, the medial malleolus and the lateral malleolus. The joint is considered saddle-shaped, with a larger circumference of the talar dome laterally than medially. [1]

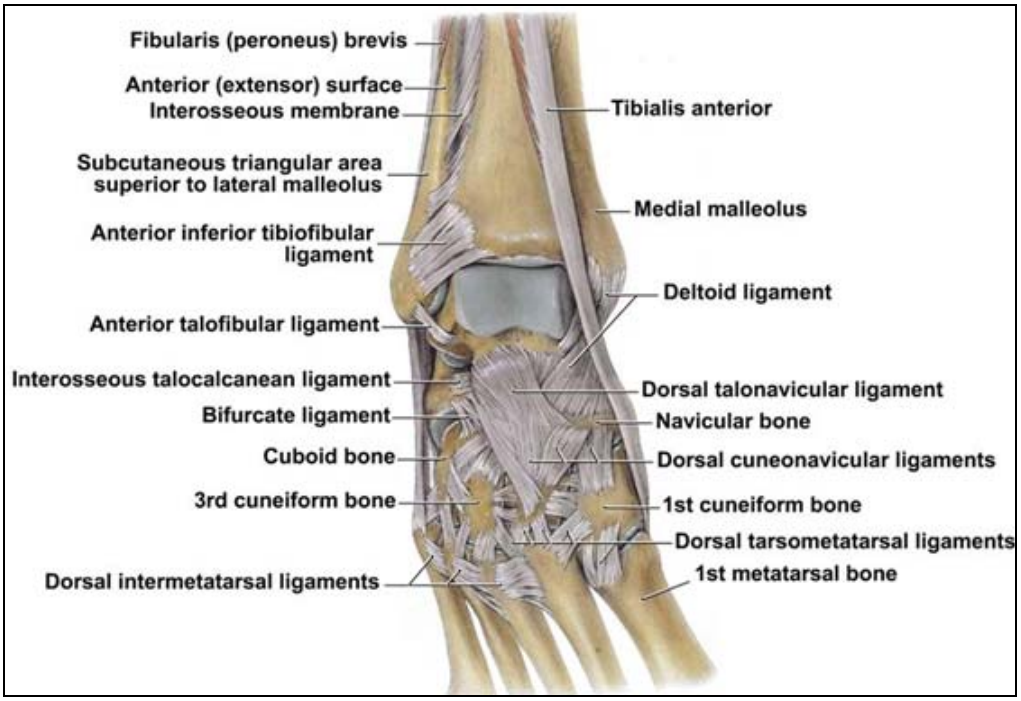

Fig. (1): Ankle joint [2]

The dome itself is wider anteriorly than posteriorly, and as the ankle dorsiflexed, the fibula rotates externally through the tibiofibular syndesmosis, to accommodate this widened anterior surface of the talar dome. [1]

Tibia:

The lower end of the tibia is formed by five surfaces: inferior, anterior, posterior, lateral, and medial. (1)

The inferior surface is articular, concave anteroposteriorly, and slightly convex transversely, dividing the surface into a wider lateral and narrower medial segment.

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The posterior border of the ankle joint is lower than the anterior border. The posterior border is in continuity with the posterior surface of the medial malleolus.

The distal lateral border of the tibia is concave, with anterior and posterior tubercles.

The medial surface of the distal tibia is prolonged distally by the medial malleolus. The medial malleolus is composed of two colliculi separated by the intercollicular groove. (1)

Fibula:

The lower end of the fibula is a complex bony structure, giving rise to multiple ligaments and housing the lateral articular surface of the ankle. The distal fibula has two major surfaces, lateral and medial, which

widen into the three-surfaced lateral malleolus at the level of the tibial plafond. [1]

Talus:

The talus is almost entirely covered by articular cartilage, with no musculotendinous attachments. The superior surface is convex from front to back, and it is slightly concave from side to side. The dome of the talus is trapezoidal, with its anterior surface wider than its posterior surface. [3](Fig. 2).

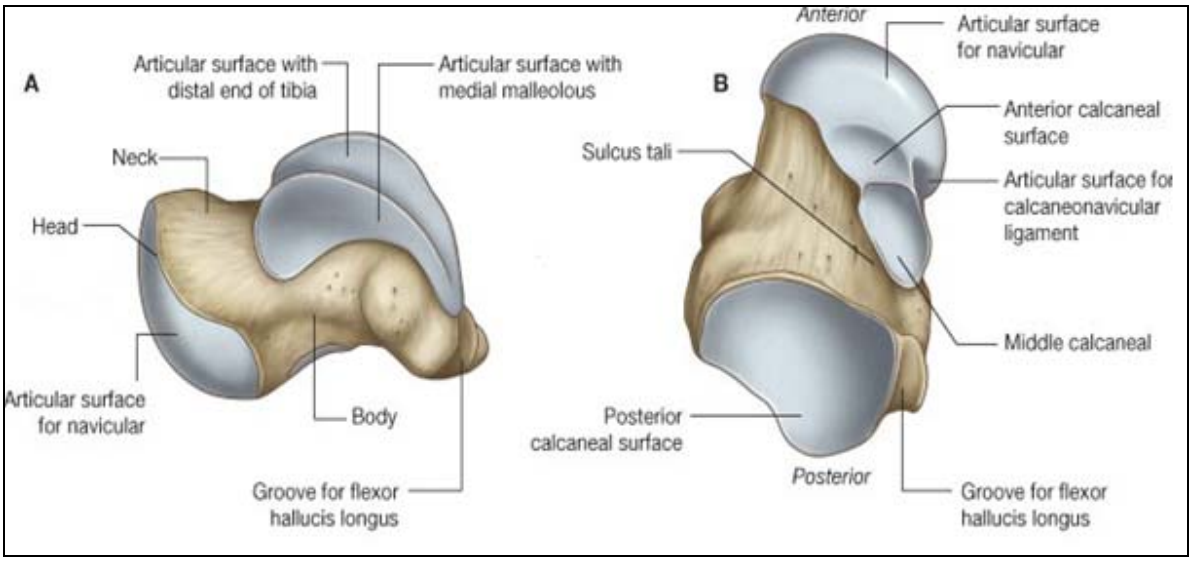

Fig. (2): Articular surface of ankle joint (talus) [2]

Ligaments:

There are three distinct groups of ligaments supporting the ankle joint:

(a) The syndesmotic ligaments,

(b) The lateral collateral ligaments, and

(c) The medial collateral ligament.

The syndesmotic ligaments are composed of three distinct portions.

Anteriorly, the **anterior inferior tibiofibular ligament** originates on the anterior tubercle and the anterolateral surface of the tibia and it runs obliquely to the anterior fibula. [4] (Fig.3).

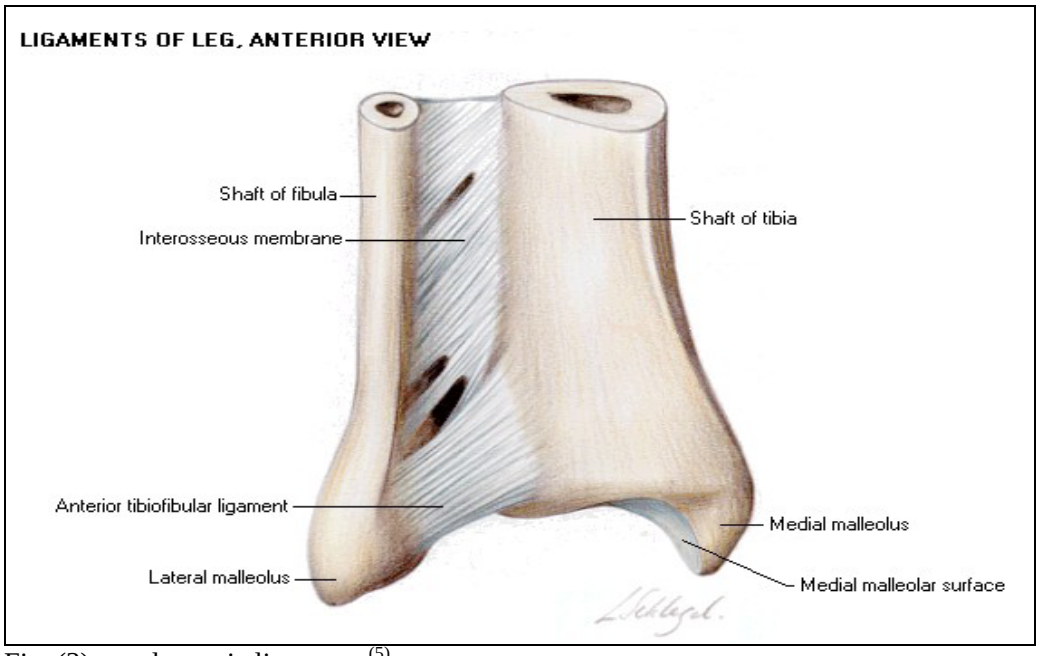

Fig. (3): syndesmotic ligament. [5]

The **posterior tibiofibular ligament** is composed of superficial and deep components. The superficial component has broad attachment across the posterior tibia. The thick, strong, deep component inserts on the lower part of the posterior border of the tibial articular surface and constitutes a true posterior labrum of the ankle joint. [4] (Fig. 4).

The third component is the **stout interosseous ligament**, which extends upward and blends in continuity with the interosseous membrane. [4]

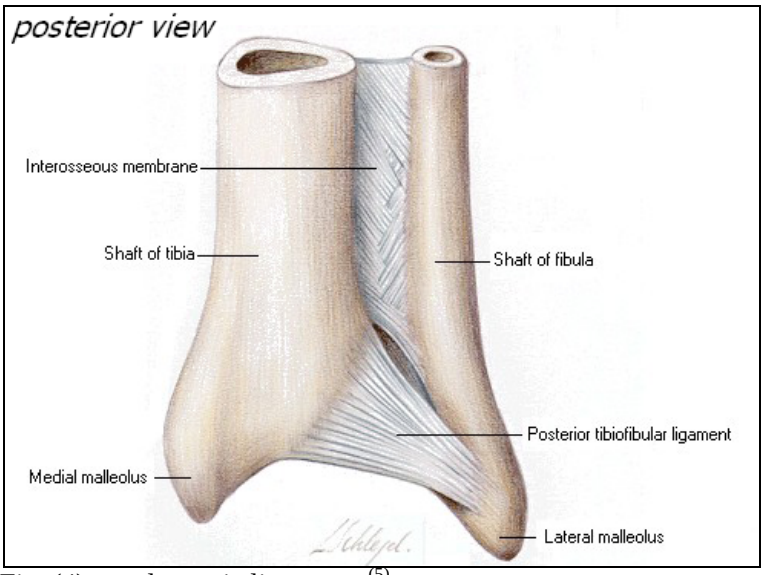

Fig. (4): syndesmotic ligaments [5]

The **lateral collateral ligaments** are the anterior talofibular ligament, the calcaneofibular ligament, and the posterior talofibular ligaments. (Fig. 5).