# **Role Of Magnetic Resonance Imaging In Evaluation Of Ankle Lesions**

### **THESIS**

# Submitted for partial fulfillment of MD. Degree in Radiodiagnosis

By

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### **ABSTRACT**

MRI is the preferred modality for most types of musculoskeletal abnormalities. The strength of MRI in imaging physiologic processes is due to its combined strengths of high detail, multi-planar imaging capability, lack of ionizing radiation, and sensitivity to physiologic changes. The utility of MRI in the investigation of these patients with ankle trauma has rapidly expanded over the last decade, because the advent of MRI and its unsurpassed ability for soft tissue characterization. MRI has the unique capability to evaluate osseous, ligamentous, tendinous, and muscular injuries about the ankle, with a single imaging study.

Key word

MRI- Ankle- Ankle lesions- Ankle pathology

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# List of abbreviations

| GSV  | Greater saphenous vein                      |
|------|---|
| TA   | Tibialis anterior                           |
| EHL  | Extensor hallucis longus                    |
| ATV  | Anterior tibial vessels                     |
| DPN  | Deep peroneal nerves                        |
| EDL  | Extensor digitorum longus                   |
| PT   | Peroneus tertius                            |
| PL   | Peroneus longus                             |
| PB   | Peroneus brevis                             |
| LSV  | Lesser saphenous vein                       |
| PTT  | Posterior tibialis tendon                   |
| FDL  | Flexor digitorum longus                     |
| PTv  | Posterior tibial vessels                    |
| Tn   | Tibial nerve                                |
| FHL  | Flexor hallucis longus                      |
| PST  | Posterior subtalar joint                    |
| ADM  | Abductor digiti minimi                      |
| MM   | Medial malleolus                            |
| LM   | Lateral malleolus                           |
| SPR  | Superior peroneal retinaculum               |
| RMG  | Retromalleolar groove                       |
| EDB  | Extensor digitorum brevis                   |
| IER  | Inferior extensor retinaculum               |
| ATFL | Anterior talofibular ligament               |
| CFL  | Calcaneofibular ligament                    |
| MST  | Middle subtalar joint                       |
| FR   | Flexor retinaculum                          |
| SMSL | Superomedial portion of the spring ligament |
| TN   | Talonavicular                               |
| IOTC | Interosseous talocalcaneal                  |

# List of abbreviations (cont.)

| ST  | Sinus tarsi             |
|-----|-------------------------|
| CN  | Calcaneonavicular       |
| QP  | Quadratus plantae       |
| PA  | Plantar aponeurosis     |
| SN  | Saphenous nerve         |
| FDB | Flexor digitorum brevis |

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# Introduction & Aim of work

### **≈** INTRODUCTION **∞**

Nowadays, magnetic resonance imaging (MRI) is the preferred modality for most types of musculoskeletal abnormalities. The strength of MRI in imaging physiologic processes is due to its combined strengths of high detail, multiplanar imaging capability, lack of ionizing radiation, and sensitivity to physiologic changes. MRI also excels in the ability to distinguish various types of tissues on the basis of water and fat content. Because MRI provides a wide range of choices for imaging in the form of various pulse sequences and options, it allows for a very comprehensive evaluation of an injury in a fairly short period of time, (*Trovinger et al.*, 2012)

The utility of MRI in the investigation of these patients with ankle trauma has rapidly expanded over the last decade, because the advent of magnetic resonance imaging (MRI) and its unsurpassed ability for soft tissue characterization. MRI has the unique capability to evaluate osseous, ligamentous, tendinous, and muscular injuries about the ankle, with a single imaging study. MRI also allows for characterization of injury based on known biomechanical patterns, (*Kavanagh and Zoga*, 2006)

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Although CT is good at showing a displaced fragment and the size of the talar dome defect in osteochondral lesions of the talus, MRI is better at showing the integrity of the overlying articular hyaline cartilage and the underlying bone marrow. Edema-sensitive MRI is used to detect osteochondral lesions of the talus that are radiographically occult and also is used to stage known lesions to assess for healing potential or need for surgery, (*Schreibman and Bruce*, 2008)

MRI is very useful in establishing the diagnosis of posterior ankle impingement syndrome, the pathology associated with it as well as potential other pathology is well demonstrated with MRI. Identification of the offending structures via MRI provides a valuable roadmap in cases where operative intervention becomes necessary, (*Howell*, 2010)

In cases of rheumatoid arthritis, MRI is preferred to CT when cross sectional imaging is required. MRI after the administration of intravenous contrast well demonstrates abnormally vascularized synovium and thickened pannus as well as small cortical erosions before they become radiographically apparent.

MRI is extremely sensitive for marrow inflammation detection, but it is not specific for the inflammation caused by

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infection. The bone marrow edema caused by infection looks just like the bone marrow edema caused by a stress response as well as the edema caused by a non-healing fracture or even a healing fracture. For this reason, it is easier to rule out osteomyelitis by MRI than it is to confirm its presence. The diagnosis of osteomyelitis can be presumed when MRI shows not only marrow edema but also abscess in the adjacent soft tissues or a sinus tract communicating from the infected bone to the skin.

Ankle soft tissue tumors are common, and MRI is useful in determining the tissue type as well as demonstrating the relationship of the mass to the adjacent anatomic structures.

Ankle osseous tumors are much less common than soft tissue tumors. Like all bone lesions, these tumors should be initially evaluated radiographically. MRI, however, is useful in localizing tumors and staging their extent.

MRI is the best method to evaluate all of the ankle tendons at once for tears or tenosynovitis. It is the best way to evaluate masses arising from either the soft tissues or bones of the extremities. MRI is extremely sensitive for the detection of bone marrow and soft tissue edema/inflammation, and as such is it useful for the detection of conditions that may be radiographically occult, including stress fractures, osteochondral