Localisation of Osteochondral Lesions of the Talar Dome: MRI Compared With Clinical Findings - Can The Site Of The Pain Predict The Site Of The Lesion?

Mark Davies

Osteochondral lesions (OCL) of the talar dome are defects of the cartilaginous surface and underlying bone\(^1\). The lesions range from a small defect in the talar articular surface, to lesions associated with a subchondral cyst, or a large detached osteochondral fragment\(^2\). Berndt and Harty\(^3\) proposed that such lesions are resultant on an intra-articular fracture, although others have suggested a possible genetic predisposition\(^1,4\).

Recently Computerised Tomography (CT) and Magnetic Resonance Imaging (MRI) have led to more accurate imaging of these lesions, which in turn has led to new classifications. The new classifications record subchondral cysts\(^9\) and acute bone marrow oedema\(^10\). Berndt and Harty described lesions as being antero-lateral or postero-medial, whilst MRI scanning localised 43% to the lateral and 57% to the medial sides of the talus. Lesions in the middle of the talus are rare, but have been reported\(^12\).

Acutely OCL’s occur in 6.5% of all ankle sprains\(^5,13\). Chronically they are found in 20.5% of ankle sprains and 57% of cases of ankle disability\(^4\). OCL’s are one of the most important causes of residual pain after ankle sprain\(^5\). The clinical diagnosis is regarded as difficult\(^11\), and delay in establishing the diagnosis is common\(^9\).

The pain associated with OCL’s has been noted to be generalised and non-specific\(^8\), similar to the symptoms of osteoarthritis. Localised tenderness is frequently lacking\(^12,15\), although localised tenderness has been described, usually postero-medially or antero-laterally in accordance with the site of the lesions\(^5,8\). Nevertheless, these studies are of poor scientific quality with anecdotal reporting of the sites of tenderness.

Other pathologies frequently coexist with OCL, and this can lead to confusion in diagnosis. The purpose of this study was to investigate the relationship between the site of perceived pain, physical findings on examination and the location of the OCL on MRI scanning.

Materials and Methods

Patients identified as having chronic talar dome OCL’s on MRI were asked to indicate the point of maximal pain in their ankle and a removable skin marker was positioned at this site. Chronic OCL was defined as the presence of pain for more than three months. The position was independently measured and the skin marker was then removed. The patient was then examined to elicit the point of maximal tenderness in the ankle joint. The position was again marked and measured. The examiner was blinded to the first location and the measurements recorded. The instrument readout was not visible whilst measurements were being made. The measurer and the examiner were both blind to the MRI findings, to eliminate bias.

An adapted technique of anthropometrics was used to obtain orthogonal dimensions of...
The locations\textsuperscript{16,17,18}. A frame with a moveable 90\textdegree angle bracket was constructed to use as a reference point for the measures. This base was level and marked with parallel lines for reference. Digital callipers were then positioned to take the measurements (Figure 1).

For the best comparison of the measurements with MRI, a standard position was used. The subject placed their foot in the frame in the same position as their foot was in for the MRI (Figure 1).

Measurements were made using digital callipers held at 90 degrees to the axis measured, using the bracket to ensure that the calliper was in the correct position. Trial measures were taken to test for reliability and repeatability. Measures were then taken in three axes, moving the 90 degree angle bracket into the correct position to measure from the landmarks below (Figure 2).

The MRI scan and reports were then reviewed for each patient. Digital measures were replicated from the same landmarks above, to the centre of the lesion. Reference lines were added between each view and between the slices of each view (Figure 3). Measures were taken from these reference lines on separate occasions to test reliability and repeatability. The orientation of the foot in each view was set with reference lines through each slice, using equivalent landmarks used in the direct measurements.

Agreement with respect to the localisation between quadrants in two planes, i.e. antero-lateral, postero-medial etc., the subject
and examiner agreed in 63% of cases, the subject’s location of pain agreed with the MRI in 42% of cases and the examiner’s location of tenderness agreed with the MRI in 37% of cases.

Figures 5, 6 and 7 show these location points as scatter plots with Pearson correlation coefficients. These plots in each plane demonstrate the degree of spread. Scatter plots of the locations between the subject and examiner show the best correlation with the highest correlation in the coronal plane (X axis, 0.87), whilst the lowest correlation was in the sagittal plane (Z axis, 0.38). The subjects’ localisation of pain and the location of the OCL on MRI were generally more poorly correlated with the lowest correlation also in the coronal plane (X axis, 0.49). Correlation between the maximum tenderness as assessed by the examiner and the location of the OCL on MRI was higher in all three planes compared to that localised by the subject correlated with the MRI.

The location assessed by the subject was, on average, 30mm away from the location found by the examiner. The subject generally localised pain further from the lesion on MRI than did the examiner on palpation.

**Discussion**

Different authors suggest symptoms differ between lesion sites and that pinpoint tenderness can be elicited. References to physical findings include tenderness in the antero-lateral corner of the tibio-talar joint for lateral lesions and in the antero medial corner for medial lesions. Fransom and Berlet found that with the addition of plantar flexion and dorsiflexion respectively, antero-lateral lesions can be palpated antero-laterally, and postero-medial lesions may be palpated posterior to the medial malleolus; however neither group provided supporting evidence for these claims.

Verhagen, in their prospective study on diagnostic strategies, did not evaluate the findings on physical examination in isolation. Although they specified the locations of lesions and endeavoured to determine the diagnostic value of clinical findings, they did not relate them to routine radiological examination.

The scale of the measures has to be taken into account when considering any relationship. The dimension of an average sized talus is approximately 50mm in both the sagittal and coronal planes, thus a separation between the subject’s localisation of pain and the examiner’s assessment of maximal tenderness of 50mm represents the whole width or depth of the articular surface of the talus. Thus, a medial lesion may present with lateral pain and tenderness and vice versa.

The source of pain when there is damage to articular cartilage and subchondral bone is unclear. Articular cartilage is not innervated and is therefore not the direct source of the pain. Associations between subarticular bone marrow changes and pain are strong and these are analogous to the changes seen in OCL, but whether this is a direct source of pain is unclear.

In this study, the pain experienced by the patient and the area of tenderness found, were as variable to each other as to the actual site of the lesion. We suggest that OCL of the talar dome result in pain that is poorly localised, with respect to the site of the lesion, and the area of maximum tenderness. As a result, vaguely located ankle pain with poor clinical localisation would warrant MRI to exclude an OCL. Care must be taken when attributing an OCL on an MRI to the subject’s pain.

Mark Davies is a Consultant Orthopaedic Surgeon at Northern General Hospital, Sheffield specialising in elective and trauma of the adult foot and ankle. He co-ordinates the research activity for the Sheffield Foot and Ankle Unit.

**Correspondence:**

Email: mark.davies@sth.nhs.uk

References can be found online at www.boa.ac.uk/publications/JTO or by scanning the QR Code.
References


