Wrist MR arthrography technique and common pathologies

Poster No.: P-0106
Congress: ESSR 2019
Type: Educational Poster
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Keywords: Trauma, Athletic injuries, Arthritis, Arthrography, MR, Musculoskeletal joint
DOI: 10.26044/essr2019/P-0106

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Learning objectives

Wrist arthrography, particularly when coupled with MR evaluation is an invaluable tool in the evaluation of ligamentous tears, allowing for the precise delineation of injury to the wrist \(^1\).

Several techniques for performing this procedure exist in the current literature. These include single, double and triple injection techniques \(^1\).

The purpose of this poster is to highlight the triple injection technique \(^1\).
Background

Triple compartment arthrography is considered the most specific technique for evaluating ligamentous injuries of the wrist. MR arthrogram can also guide to differentiate between traumatic and degenerate tears.

Levinsohn et al., (1991) highlighted a significantly improved diagnostic yield following the evaluation of 300 patients who had the triple compartment injection technique [2]. This involved a separate injection into all three wrist compartments, with the addition of the mid-carpal joint (MCJ) and distal radio-ulnar joint (DRUJ) injections to the standard radio-carpal joint (RCJ) injection.

We evaluated a publication by Moser et al., (2008) and summarised the articular injection technique using the triple compartment method.
**Imaging findings OR Procedure Details**

**Procedure Details:**

1. The patient is prepared for the procedure. This involves positioning, cleaning the injection site and draping.

   - Patient is positioned in the 'superman' position- lying prone with the arm flexed at the shoulder level and wrist flat on the bed.

   - Wrist is positioned horizontally directly under the fluoroscopy. The injection site is marked with a surgical pen.

   - Dorsal aspect of the wrist is then cleaned and draped. Local anaesthetic is used for analgesia.

2. First puncture is made with a 25 gauge needle. The target is the waist of the scaphoid just distal to the dorsal lip of the distal radius. (Fig. 1)

3. The second puncture is aimed at the MCJ (Fig. 2) targeting the recess between the lunate, capitate and hamate bones.

4. The third puncture involves the DRUJ (Fig. 3). The target is the lower edge of the DRUJ. This is usually done if a TFCC tear is suspected. It helps to delineate undersurface tears.

   Usually 0.5ml of Gadolinium in the DRUJ and 1-2ml in the RCJ and MCJ are sufficient to distend the joint capsule and delineate the anatomy.

   The patient is then immediately taken to the MR scanner to avoid delay leading to contrast absorption.

   Figures 1-3 are Fluoroscopic views demonstrating the landmarks for each puncture point.

A number of pathologies and injuries can be evaluated using this technique and these include Scapholunate Ligament (SLL) Tear (Fig. 5), which usually occurs as a result of
injury\textsuperscript{[3]} and the Triangular Fibrocartilage Complex (TFCC) perforation (Fig. 7), which can be traumatic or degenerative\textsuperscript{[4]}.

Other common injuries which can be evaluated using this technique are LTL tear and ulnomeniscal homologue injury.
**Fig. 1:** RCJ entry point - the third and final puncture site in this technique.

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Fig. 2: MCJ entry point - the first puncture site in this technique.

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Fig. 3: DRUJ entry point - the second puncture site in this technique.

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Fig. 4: Coronal MRI of normal SLL.

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Fig. 5: Coronal MRI of SLL demonstrating SLL tear.
**Fig. 6:** Coronal MRI of normal TFCC.

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**Fig. 7:** Coronal MRI of TFCC demonstrating a TFCC perforation.

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Conclusion

We describe the triple compartment wrist MR arthrogram technique and the commonly evaluated and diagnosed ligament injuries \(^{[1]}\). Arthrographic assessment of the wrist can be done using both CT and MR evaluation. The landmarks described and knowledge of anatomy helps perform the procedure smoothly.
References


