

## Early Diagnosis of Rheumatoid Arthritis with Microscopic MR Imaging of the Fingers

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### Purpose

To investigate whether microscopic MR imaging would give detailed information about synovial thickening of metacarpophalangeal and interphalangeal joints of hand fingers.

### Introduction

Rheumatoid arthritis (RA) is a chronic systemic disease affecting approximately 0.5-1.0% of the adult population. The therapeutic strategy has been changing and the early diagnosis of RA is important to start treatment of patients with robust medical care as early as possible. However, it is difficult to accurately diagnose the early RA because of a broad spectrum of disease manifestation. Therefore, synovial MR imaging of hand joints could be useful for the early diagnosis of rheumatoid arthritis.

### Materials and methods

This study included 30 patients (21 female, 9 male) suspected of having early RA. Microscopic MR imaging was performed using 47mm-diameter-sized surface coil which was placed on fingers with arthralgia. Total 53 joints (45 PIP, 8 MP joints) were examined. Transaxial and coronal 3D T1-FFE, T2-TSE and contrast-enhanced 3D T1-FFE images were obtained with fat suppression. The MR criteria used for the early diagnosis were irregular and nodular thickening of synovia surrounding joints and tendon with heterogeneous T2-signal intensity and marked contrast enhancement.

### Results

With the diagnostic criteria of American College of Rheumatology, 21 patients were diagnosed as RA, and 9 patients included osteoarthritis, mixed connective tissue disease, juvenile RA and others. The sensitivity and specificity of MR findings of synovia for RA diagnosis included 100% and 23% for diffuse synovial thickening, 37% and 77% for irregular synovial thickening, 30% and 92.3% for irregular nodular synovial thickening with bone erosion as well, respectively.

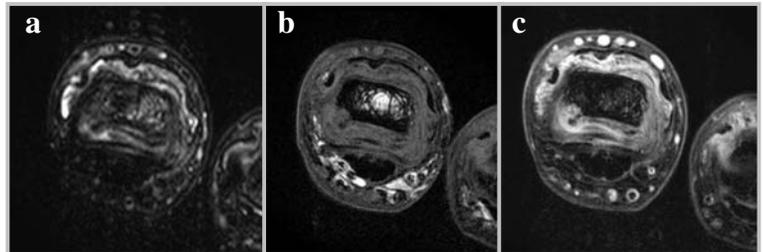
### Conclusion

Microscopic MR imaging gives detailed information about irregular synovial thickening and tiny bone erosion, which will allow for early diagnosis of RA.

#### **Figure 1 Early RA: 47 y. o. male**

a: FS-T2, b: 3D-T1, c: CE-T1

Irregular nodular thickening of synovia of 2<sup>nd</sup> PIP joint with small bone erosion. Note inhomogeneous signal intensity on FS-T2 and intense enhancement on contrast-enhanced 3D T1.



#### **Figure 2 Early RA: 33 y. o. female**

a: FS-T2, b: CE-T1

Irregular nodular thickening of synovia of 2<sup>nd</sup> PIP joint and even tenosynovial thickening of 3<sup>rd</sup> flexor tendon.

