

# Serial observations and correlation of combined sacroiliitis and apophyseal joint inflammation in patients with enthesitis related arthritis.

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## Target Audience

For clinical musculoskeletal and paediatric radiologists and MR technologists.

## Purpose

To observe changes in apophyseal joint inflammation on serial scans in patients with enthesitis related arthritis (ERA) a form of juvenile arthritis and to correlate this with sacroiliitis.

## Methods and Materials

We performed a retrospective review of serial MRI lumbar spine scans of ERA patients attending the adolescent rheumatology clinic at our institution. Scan protocol consisted of T1 sagittal, sagittal STIR and sagittal T1 contrast enhanced images of the lumbar spine along with contrast-enhanced coronal and axial imaging of the sacroiliac joints. Images were acquired on a Siemens Avanto 1.5T MR system. Images were reviewed independently by two expert MR readers who compared successive scans for each patient looking at inflammatory changes in the apophyseal joints of the lumbar spine and the sacroiliac joints. As there is no universally accepted grading criteria to assess apophyseal joint inflammation in adolescents, we adapted and modified a grading system used in adults<sup>(1)</sup>. Sacroiliitis was graded using a visual global assessment as either stable, improved, worse or as mixed response (some regions showed improvement with other parts of the joint showing worsening inflammation). We also used a numerical scoring method on STIR images as defined by the Spondyloarthritis research Consortium of Canada<sup>(2)</sup>.

## Results

29 patients had between 1 and 3 follow-up scans providing a total of 64 scans. The mean age of the patients was 17 years (range 13-21 years). There were 24 male patients and 5 female patients. All patients had at least two scans available for comparison. Five patients had 3 scans and 1 patient had 4 scans. The interval between the first and last scan ranged from 3 months to 3 years 6 months. At the time of the initial scan 6 patients were not taking medication, eight were taking non-steroidal anti-inflammatory drugs (NSAID), 1 patient was taking oral steroids, 10 were taking disease modifying anti-rheumatic drugs (DMARD), 1 patient was taking combined DMARDs and 2 patients were taking a combination of a DMARD and a biologic drug. There was no record for one patient. Between the first and second scans 15 patients were required to either start medication or move to a more aggressive therapy. The number of patients taking no medication dropped from 6 patients to 3 patients, the number of patients taking a DMARD increased from 10 to 17 patients and the number of patients commencing biological therapy increased from 10 to 17 patients. Apophyseal joint inflammation was present in 19 of the 29 patients on the initial scan and sacroiliitis was present in 26 of the 29 patients. Evaluation according to the visual global assessment revealed 16 out of 37 scans where apophyseal joint synovitis and sacroiliitis moved in the same direction i.e. either progressing, improving or remaining stable (see Tables 1 and 2). However in 21 scans the apophyseal joint synovitis and sacroiliitis behaved differently with either progression, improvement or disease stability irrespective of the other joint. In 4 out of 21 patients there was complete discordance with the apophyseal joints improving while the sacroiliac joints progressed or vice versa. Using the numerical method 13 out of 37 were concordant and 24 were non concordant. There were 12 scans that were completely discordant.

**Table 1 . Visual global assessment results**

SIJS	Apophyseal Joints				n=
	Worse	Mixed	Stable	Improved	
<b>Worse</b>	3	0	4	2	9
<b>Mixed</b>	1	0	0	0	1
<b>Stable</b>	4	0	7	4	14
<b>Improved</b>	2	1	3	6	12
<b>n=</b>	10	1	13	12	

**Table 2. Numerical scoring results**

SIJS	Apophyseal Joints			n=
	Worse	Stable	Improved	
<b>Worse</b>	3	5	6	14
<b>Stable</b>	0	2	1	3
<b>Improved</b>	6	6	8	19
<b>n=</b>	8	13	15	

## Conclusion

Concurrent sacroiliitis and apophyseal joint synovitis in patients with enthesitis related arthritis can respond differentially with therapy. This could account for a discrepancy between the images of the sacroiliac joints and symptoms as the pain is potentially derived from both. Full assessment should therefore include imaging of both the sacroiliac joints and apophyseal joints.

## References

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- Maksymowych WP, Inman RD, Salonen D, Dhillon SS, Williams M, Stone M, Conner-Spady B, Palsat J, Lambert RG. Spondyloarthritis research Consortium of Canada magnetic resonance imaging index for assessment of sacroiliac joint inflammation in ankylosing spondylitis. *Arthritis Rheum.* 2005 Oct 15;53(5):703-9.