



Overview: Clinical Aspects of Spondyloarthritis including Psoriatic Arthritis



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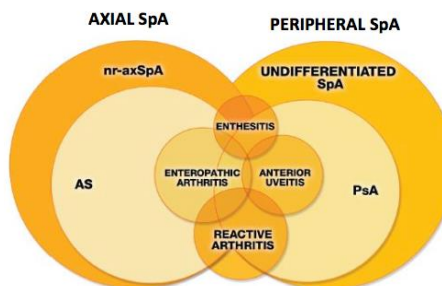
Disclosures

- **Consultant** for Biogen IDEC, AbbVie, Eli Lilly, Novartis, Pfizer, Janssen, UCB, Samumed, Science 37, Celgene, Sanofi-Genzyme / Regeneron and GSK.
- **Investigator** for Biogen IDEC, Pfizer, Sanofi Genzyme / Regeneron, Incyte, Novartis.
- **Licensed** outcome measure to Abbvie and Lilly
- **Medical Board:** National Psoriasis Foundation
- **Steering Committee:** GRAPPA
- **Board of Directors:** IDEOM (International Dermatology Outcome Measures), PPACMAN (Psoriasis and Psoriatic Arthritis Multicenter Advancement Network)
- **Expert Panel:** ACR PsA Guidelines

Slideset adapted from SPARTAN-GRAPPA Overview Set

Overview

- Axial vs. Peripheral SpA
- Prevalence
- Clinical Overview and Classification of AxSpA
 - nr-AxSpA consideration, disease progression over time
 - Focus on subsets = AS
- Clinical Overview and Classification of Peripheral SpA
 - Focus on subsets = PsA



Inflammatory Back Pain

Chronic back pain (3 months):

- Onset of back discomfort before the age of 40 years
- Insidious onset
- Improvement with exercise
- No improvement with rest
- Pain at night (with improvement upon arising)



4/5 = sensitivity and specificity of 80 and 74 percent for an inflammatory cause of the chronic back pain

- However, the prevalence of axSpA in the general population is low compared with that of other causes of back pain
- About 20 percent of individuals with other causes of low back pain complain of symptoms similar to those of IBP
- A considerable number of patients with axSpA will **not** have back pain which fulfills these IBP criteria; In one study only 5-6% of SpA patients had inflammatory back pain symptoms

Thus, the presence or absence of IBP alone is insufficient to determine the diagnosis, and this characteristic should be used together with other features of SpA in the diagnostic assessment

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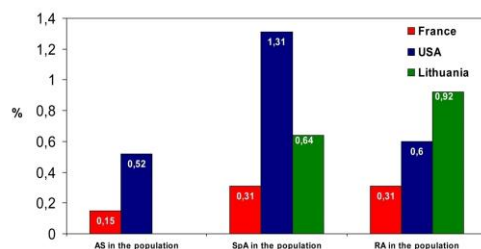
PREVALENCE AND EPIDEMIOLOGY

Prevalence Estimates

- In the US:
 - RA = 1.3 Million
 - SpA = 1.7-2.7 Million
 - (PsA + SpA + AS)

Helmick CG et al. *Arthritis Rheum.* 2008;58(1):15-25.
Reveille JD et al. *Arthritis Care Res.* 2012;64(6):905-910.

Prevalence of Ankylosing Spondylitis (AS) and Spondyloarthritis (SpA) vs. Rheumatoid Arthritis (RA)



France: Saraux A et al. *Ann Rheum Dis* 2005;64:1431-5. Guillemin F et al. *Ann Rheum Dis* 2005;64:1427-30
Lithuania: Adomaviciute D et al. *Scand J Rheumatol* 2008;37:113-9
USA: Helmick CG et al. *Arthritis Rheum* 2008;58:15-25

Challenges in the Epidemiology of Spondyloarthritis

- Disease heterogeneity
- Varied Criteria
 - ESSG
 - Amor
 - Axial SpA (ASAS)
- Transient nature of arthritis/enthesitis in those with peripheral involvement
- Lack of feasibility of diagnostic measures in large populations
 - MRI
 - Pelvic radiographs
- Lack of diagnostic biomarkers

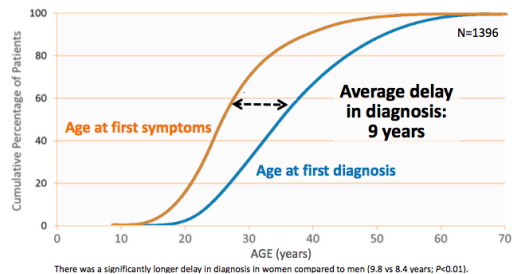
Demographics

- Male/Female 2:1 – 3:1; other studies *NO* sex difference
- White or Hispanic > Asian > African American
- HLA B27 present in 85-90%
- Family history in 20%
- B27 positive with younger onset, higher risk of iritis

Observed Differences between Men and Women with Axial SpA

- Women tend to have a delayed diagnosis
- Evidence for increased symptom severity scores in women as compared to men
- Women generally demonstrate less radiographic damage and slower progression of damage in the axial skeleton compared to men, even with comparable (or higher) symptom severity scores
- Women have lower inflammatory markers despite comparable (or higher) symptom severity scores
- Differences between men and women have also been observed in regards to treatment response, with poorer response to treatment noted in women
- Women with AxSpA may also have concomitant “fibromyalgia” (aka central pain) partially accounting for increased symptom severity

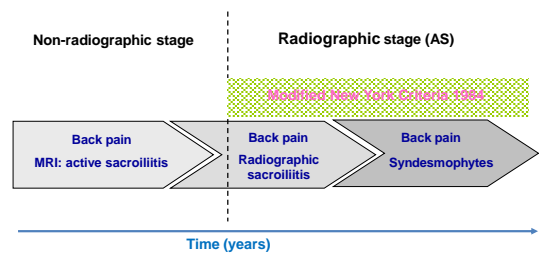
Van der Linden SM, et al. *Arthritis Rheum.* 1984;27:240-249; Fallis-Bellur E, et al. *Curr Opin Rheum.* 2005;13:398-41; Van W, et al. *Ann Rheum Dis.* 2007; 66:1018-1024; Ohya Y, et al. *Rheum Dis.* 2011; 9:222-225; Esdaile MJ, et al. *Arth Rheum.* 2008; 40:717-725; Tsuchiya A, et al. *Arth Care Res.* 2011; 63:1582-1589; Rosner G, Juhász S. *Clin Rheumatol* 2011; 31: 111-117; Wu Q. *Arthritis Rheum.* 2011; 63:1584-1591; Alshaykh Y, et al. *Rheumatology* 2009; 27:865-8; Walker G. *J Rheum.* 2011; 40:2038-2041; Van der Horst-Broeken L, et al. *Ann Rheum Dis.* 2011;72:1221-1224



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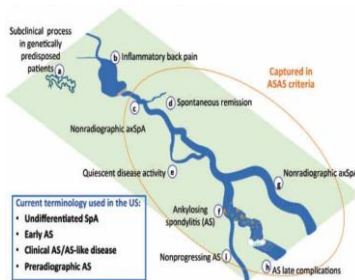
AXIAL SPONDYLOARTHRITIS

The Concept of Axial SpA



Rudwaleit M, Khan MA, Sieper J. *Arthritis Rheum* 2005; Apr;52(4):1000-8.
Khan MA et al. *Arthritis Rheum* 1985;28:40-3.

Distinguishing AS from nr-axSpA



- Inflammatory back pain occurs in 6% of the US population, but only a small percentage develop nr-axSpA
- Up to 12% of patients with nr-axSpA will develop AS within 2 years
- Up to 20% within 5 years

<http://www.the-rheumatologist.org/article/rheumatologists-make-progress-defining-spectrum-of-axial-spondyloarthritis/>

Radiographic Progression in the Spine

- Progression of nr-axSpA to AS occurs with rate of ~12% over 2 years
- Progression is strongly dependent on the presence of the following risk factors:
 - Syndesmophytes at baseline
 - Elevated CRP &/or ESR
 - Smoking
 - Hip joint arthritis is strongly associated with worse spinal involvement
- Radiographic progression in the spine has a strong impact on spinal mobility and functional status

Podubnyy D, Sieper J. Radiographic progression in ankylosing spondylitis/axial spondyloarthritis: how fast and how clinically meaningful? *Curr Opin Rheumatol*. 2012 Apr; 5. [Epub.]
Jang JH, et al. *Radiology*. 2011 Jan;258(1):192-8.

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CRITERIA

CLASSIFICATION CRITERIA FOR AS: 1984 MODIFIED NEW YORK CRITERIA

A: Diagnosis

Clinical criteria:

- Low back pain and stiffness for >3 months, which improve with exercise but are not relieved by rest
- Limitation of motion of the lumbar spine in both the sagittal and frontal planes
- Limitation of chest expansion relative to normal values correlated for age and sex

Radiologic criterion:

- Sacroiliitis (grade ≥ 2 bilaterally or grade 3-4 unilaterally)

B: Grading

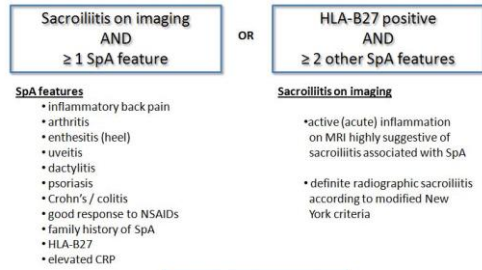
Definite AS = radiologic criterion present + ≥ 1 clinical criterion
Probable AS = 3 clinical criteria present or radiologic criterion present without any signs or symptoms satisfying the clinical criteria

Problems with the modified New York Criteria for AS

- Delay in development of radiographic changes (5 -10 years)
- Accuracy of readings
- Inter-reader agreement poor Grade 1, 2
- Clinical criteria emphasize chronicity
- MRI more sensitive to inflammation

ASAS Classification Criteria for Axial Spondyloarthritis (SpA)

In patients with ≥ 3 months back pain and age of onset < 45 years



Sensitivity 82.9% Specificity 84.4%

Rudwaleit M et al. Ann Rheum Dis 2009;68:777-783

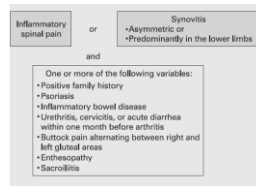
Criteria for SpA

Amor

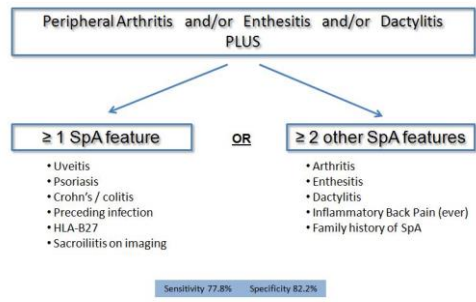
Criterion	Points
Clinical symptoms or past history:	
Lumbar or dorsal pain during the night, or morning stiffness of lumbar or dorsal spine	1
Asymmetric oligoarthritis	2
Buttock pain	1
if affecting alternately the right or the left buttock	2
Swelling like toe or digit (dactylitis)*	2
Heel pain or any other well defined enthesopathy (enthesitis)*	2
iritis	2
Non-gonococcal urethritis or cervicitis accompanying, or within 1 month before, the onset of arthritis	1
Acute diarrhoea accompanying, or within 1 month before, the onset of arthritis	1
Presence or history of psoriasis, balanitis, or inflammatory bowel disease (ulcerative colitis or Crohn disease)	2
Radiological finding:	
Sacroiliitis (grade ≥ 2 if bilateral, grade ≥ 3 if unilateral)	3
Genetic background:	
Presence of HLA-B27, or familial history of ankylosing spondylitis, Reiter syndrome, uveitis, psoriasis, or chronic enterocolopathies	2
Response to treatment:	
Good response to NSAIDs in less than 48 h, or relapse of the pain in less than 48 h if NSAIDs discontinued	2

6 or more points

ESSG



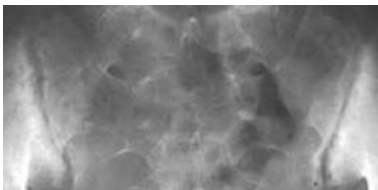
ASAS Classification Criteria for Peripheral Spondyloarthritis (SpA)



Sensitivity 77.8% Specificity 82.2%

Rudwaleit M et al. Ann Rheum Dis 2011;70:25-31

X-ray Evidence of Sacroiliitis

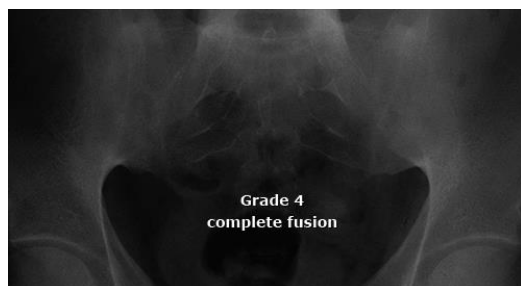


- Grade 0** normal
- Grade 1** suspicious changes
- Grade 2** minimal definite changes: circumscribed areas with erosions or sclerosis with no changes of the sacroiliac joint space.
- Grade 3** distinctive changes, sclerosis, change of joint space (decrease or widened), partial ankylosis
- Grade 4** ankylosis

Khan MA. SpA: Clinical features of AS. In: Hochberg M, et al., eds. RHEUMATOLOGY. 3rd ed. Mosby; 2003:1161-70.

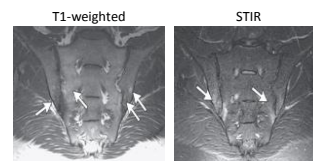


Grade 3



Imaging for nr-axSpA if X-ray is non-Diagnostic

- Semicoronal (coronal oblique) MRI of SI joints:
 - T1-weighted
 - Short tau inversion recovery (STIR) or T2-weighted with fat suppression



Tsai et al. Arthritis Rheum 2015

- Classification of active sacroiliitis by OMERACT¹

- Active inflammatory lesions of the SI joints
- Positive MRI: 2 BME* lesions on same slice or 1 lesion in the same quadrant on at least 2 consecutive slices

NOTE:

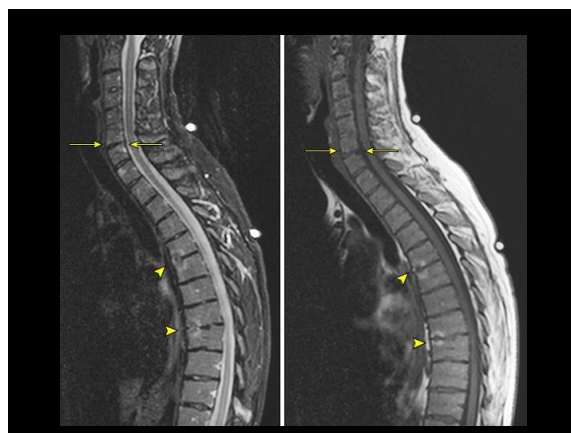
- * the presence of BME on MRI, even of high intensity, was observed in up to 23 percent of patients with mechanical back pain and 7 percent of healthy volunteers

1. Rudwaleit M, et al. Ann Rheum Dis. 2009;68(10):1520.

*BME=bone marrow edema

Spinal MRI

- A 2012 consensus of opinion on what spinal lesions on MRI are typical of spondylitis by the ASAS/OutcomeMeasures in Rheumatology (OMERACT) MRI working group:
 - A positive spinal MRI for inflammation can be defined as:
 - the presence of anterior or posterior spondylitis in at least three sites
 - (a single vertebral lesions is relatively nonspecific)
 - the presence on MRI of the spine of either at least five inflammatory lesions or at least five fatty lesions resulted in specificity of at least 95 percent



The Association of Ankylosing Spondylitis and HLA-B27 Prevalence

Group	Prevalence of AS %	Frequency of HLA-B27%
Haida Amerinds ¹	6.1	50
Norway ²	1.2-1.4	14
Germany ³	0.55	9.0
United States ⁴	0.52	6.1
Netherlands ⁵	0.1	8.0
China ⁶	0.1-0.5	3.6-5.7

¹Gotton JP et al. Ann Rheum Dis 1966;25:525

²Gran T et al. Ann Rheum Dis 1985;44:359

³Braun J et al. Arthritis Rheum 2005; 52: 4049

⁴Hauer K. Vital Health Stat 1979; 11:1.

⁵Van der Linden S. Arthritis Rheum 1985; 27: 241

⁶Zeng QY et al. Arthritis Res Ther 2008;10:R17.

HLA-B27 positive vs. HLA-B27 negative disease

HLA-B27 (+) patients with AS show:

- Younger age of onset
- Earlier age at diagnosis
- Greater familial occurrence
- More often acute anterior uveitis
- Less often associated Ps and IBD

Genetic associations are similar, but association with *ERAP1* is present only in HLA-B27 positive cases

Khan MA, et al. Comparison of clinical features of HLA-B27 positive and negative patients with AS. Arthritis Rheum 1977; 20:959-962.
Feldhaus E, et al. Age at disease onset and diagnosis delay in HLA-B27 negative vs. positive patients with AS. Rheumatol Int 2003;23:61-4.
Breen MA. Progress in the Genetics of AS. Best Pract Genomics. 2011 Sep;10(5):249-57.
Hanson R, et al. Ann Rheum Dis 2012; April 71(4):589-95.
Joshi R, et al. Arthritis Care Res (Hoboken). 2012 May;64(5):780-4.

Remains a clinical diagnosis...

Clinical Utility of the Clinical Parameters of SpA

	Sensitivity	Specificity	+LR
Inflammatory back pain (updated information)	80%	72%	2.9
Enthesitis (heel pain)	37%	89%	3.4
Peripheral arthritis	40	90	4.0
Dactylitis	18	96	4.5
Acute anterior uveitis	22	97	7.3
Positive family history for AS, AAU, IBD, ReA	32	95	6.4
Psoriasis	10	96	2.5
Inflammatory bowel disease	4	99	4.0
Good response to NSAIDs	77	85	5.1
†acute phase reactants	50	80	2.5
HLA-B27 (updated information)	Variable	Variable	
MRI (STIR) sacroiliitis (updated information)	Variable	Variable	

Rudwaleit M, van der Heijde D, Khan MA, Braun J, Sieper J. Ann Rheum Dis 2004;63:535-543

ASSESS WHO IS AT RISK FOR PROGRESSION

FACTORS OBSERVED DURING THE FIRST 2 YEARS OF DISEASE

For SpA patients with:

- Hip arthritis (4 points)
- ESR >30 mm/h (3 points)
- Poor efficacy of NSAIDs[†] (3 points)
- Limitation of lumbar axis (3 points)
- Sausage-like fingers or toes (2 points)
- Oligoarthritis (1 point)
- Onset ≤16 years of age (1 point)

A SCORE OF ≥7 INDICATES RISK OF SEVERE OUTCOME
(sensitivity 50%; specificity 97.5%)

Of the 328 patients with SpA enrolled in the study, 151 patients had a disease duration of ≥10 years.

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ANKYLOSING SPONDYLITIS

AS: Clinical and Radiographic Characteristics



- Chronic inflammatory disease
- Sites affected
 - Axial skeleton
 - Peripheral joints
 - Extra-articular organs
- Clinical signs/symptoms
 - Chronic inflammatory back pain
 - Impaired spinal mobility
 - Chest expansion
 - Enthesitis
 - Uveitis, IBD, psoriasis
- Radiographic hallmark: sacroiliitis

AS Clinical Characteristics: Bamboo Spine



Ankylosing Spondylitis

AS: Multi-system disease

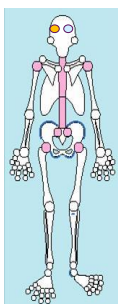
Axial Disease
Peripheral Arthritis
Enthesitis, Dactylitis

Eyes
(Acute Anterior Uveitis)
25 – 45 %

Skin
(Psoriasis & Nail Changes)
5 – 16 %

Gut
(IBD 5 – 8 %, Microscopic lesion 22 – 69 %)

Osteopenia/Osteoporosis
19 – 62 %



Lungs
(Apical Fibrocystic Disease & Pleural Thickening) 1 – 1.3 %

Heart
(Aortitis, aortic Insufficiency, Heart Block) 2 – 3 %

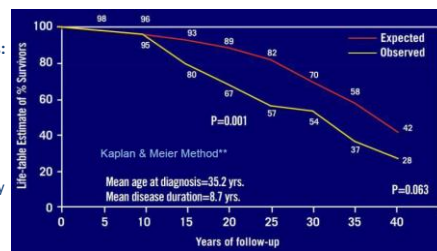
Kidneys
(IgA Nephropathy, Secondary Amyloidosis) 0.3 – 1.2 %

Cauda Equina Syndrome
0.5%

Spinal Fracture

Mortality in AS: 1.5 to 4 Fold Increase

- Possible causes:**
- Cardiovascular disease
 - Pulmonary diseases, smoking
 - Spinal fractures
 - Violence; alcohol related injury
 - Gastrointestinal bleeding
 - Miscellaneous: e.g., associated diseases, radiation related, amyloidosis, etc.



Khan MA et al. *J Rheumatol* 1981; 8:86-90
Myllykangas-Luosujarvi R et al. *Br J Rheumatol* 1998; 37:688
Lehtinen K. *Ann Rheum Dis* 1993; 52:174
Radford EP et al. *NEJM* 1977; 15:297

Khan MA. Spk. Clinical features of AS. In: Hochberg M, et al. eds. *Rheumatology* 3rd ed. Mosby 2003; pp. 1163-75. Khan MA. Ankylosing Spondylitis. Oxford University Press, New York, 2005; pp. 1-147. Khan MA. *Ann Intern Med* 2002; 136: 896-907. Rodriguez CE, et al. *Rev Dis Rheumatol* 2012; June 50(3):379-83.

How Does Ankylosis Develop from Inflammation? Can Ankylosis Be Retarded/Prevented?



There are no placebo-controlled trials of sufficient duration to show whether TNF inhibitors slow disease progression

DDx: AxSpA

- Acute or Chronic Mechanical Back Pain
- Fibromyalgia
- Diffuse idiopathic skeletal hyperostosis
- Vertebral compression fracture
- SI joint infection
- Osteitis condensans Ilii
- Erosive osteochondrosis and Schmorl's Nodes
- FMF

Psoriatic Arthritis

- 3.2% of Americans with psoriasis: 10%–30% develop PsA¹
- Age of onset for PsA is typically 30–50 years
- Male: Female Ratio is 1:1

Overview: Clinical Aspects of Spondyloarthritis including Psoriatic Arthritis

PSORIATIC ARTHRITIS

1. Rachakonda T, et al. J Am Acad Dermatol. 2014;70:512-6; Mease P, et al. J Am Acad Dermatol. 2013;69:729-735. 2. Nakada S, et al. J Rheumatol. 2001;28:654-659. 3. Casteros M, et al. Reumatismo. 2012; 64 (2): 66-70

PsA Presentation

- Skin disease typically precedes joint disease by up to 10 years
- 70-85% presents with skin before joint involvement
 - 10-15% present with joint disease first, skin later
- Nail findings associated with DIP joint disease and enthesitis (predictive of distal enthesitis on U/S)
- Can deform joints in 40-60%

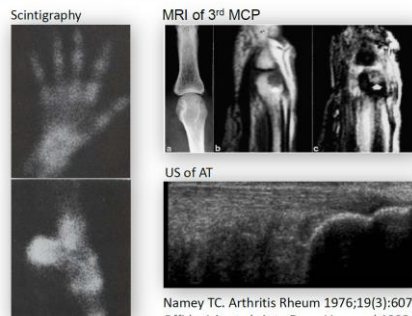
Clinical pattern on presentation	Percentage of patients
Asymmetrical oligoarthritis	50
Symmetrical polyarthritis	40
Distal interphalangeal arthritis	5
Arthritis mutilans	5
Spinal column involvement	40

Mull JM, Wright V. Semin Arthritis Rheum. 1973.¹⁰

PsA Clinical Features (cont.)

- Axial Spondylitis (~20%)
- Dactylitis (~40-50%)
- Enthesitis (~40-50%)
- Patients may exhibit any combination of manifestations
 - Vary over time
 - Overlap

Psoriasis Patients Have Sub-clinical Bone and Enthesial Inflammation

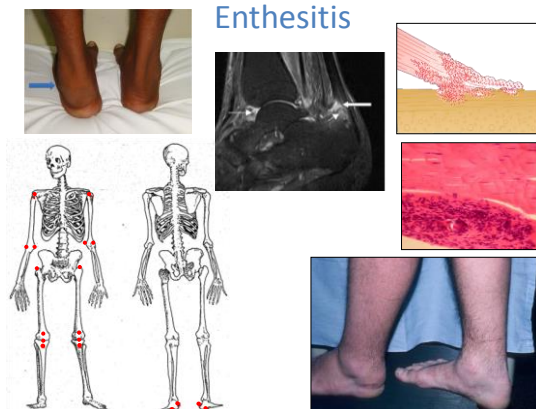


Namey TC. Arthritis Rheum 1976;19(3):607
Offidani A, et al. Acta Derm Venereol.1998;78:463
Gisoni et al. Ann Rheum Dis 2008;67:26–30

Dactylitis



Enthesitis



Enthesitis



Table 3. Clinical Features of Various Forms of Spondyloarthritis.⁹

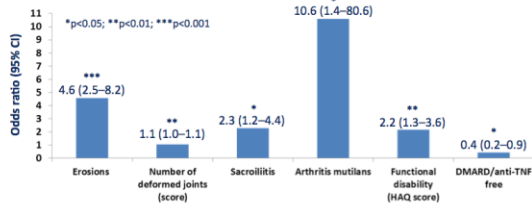
Feature	Psoriatic Arthritis	Ankylosing Spondylitis	Reactive Arthritis	IBD-Associated Arthritis
Age at onset (yr)	36	20	30	30
Male:female ratio	1:1	3:1	3:1	2:1
Peripheral joints affected (% of cases)	96	30	90	30
Axial joints affected (% of cases)	50	100	100	30
Dactylitis	Common	Absent	Uncommon	Absent
Enthesitis	Common	Common	Uncommon	Uncommon
Psoriasis (% of cases)	100	10	10	10
Nail lesions	87% of cases	Uncommon	Uncommon	Uncommon
HLA-B*27 (% of cases)	40-50	90	70	30

⁹ IBD denotes inflammatory bowel disease.

N ENGL J MED 376:10 NEJM.ORG MARCH 9, 2017

Delayed diagnosis of PsA is associated with worse long-term outcomes

Association of clinical features^a with >6 month delay in diagnosis (univariate analysis model)



^aClinical features recorded as percent, unless otherwise stated
DMARD, disease-modifying antirheumatic drug;
HAQ, health assessment questionnaire; OR, odds ratio

Haroon M, et al. Ann Rheum Dis 2014 Feb 13. doi: 10.1136/annrheumdis-2013-204858 [Epub ahead of print]

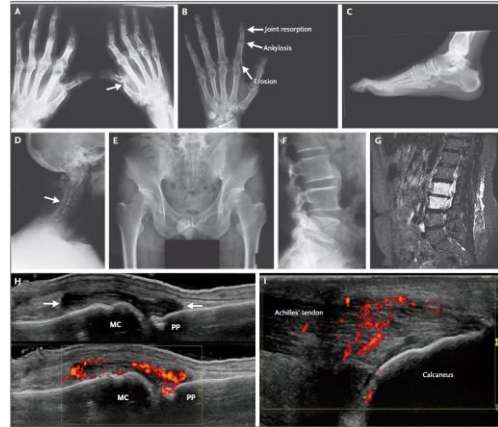
PsA Differential Diagnosis

- Osteoarthritis
 - Brief morning stiffness ("gelling")
 - Bony DIP and PIP growth without inflammation
 - Slowly progressive
- Rheumatoid arthritis
 - Symmetrical arthritis - doesn't involve DIPs in general
 - Rheumatoid factor, anti-CCP antibodies
 - Radiographic differences
- Crystal Arthropathy (Gout and Calcium Pyrophosphate Disease)*
 - Acute onset (although may be chronic)
 - Increased risk among patients with PsO/PsA
- Fibromyalgia
 - May have morning stiffness; No joint swelling
 - More soft tissue pain; pain is more widespread (all 4 limbs)
- Lyme arthritis

*Merola JF, Wu S, Choi HK, Qureshi AA. Psoriasis, psoriatic arthritis, and risk of gout in U.S. men and women. Annals of the Rheumatic Diseases 2014.

Testing

- **ESR, CRP**
 - Approx 40% elevated in PsA
 - Elevation correlates with disease severity / erosion / progression
- **RF (rheumatoid factor) / anti-CCP (anti-cyclic citrullinated peptide)**
- **Imaging considerations**
 - **Radiographs**
 - Hand/foot xrays (diagnostic / baseline)
 - SI-joint films (modified Ferguson view)
 - Additional (as appropriate)
 - MSK U/S with power doppler
 - MRI
- **Vaccinations, TB testing, baseline basic labs etc**



PsA: Radiographic Features

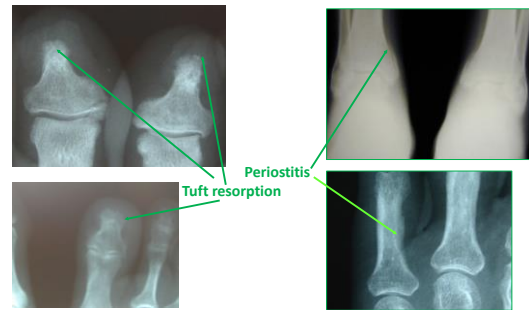
Juxta-articular periostitis & ankylosis



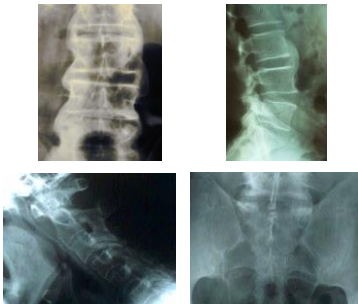
Joint osteolysis (pencil-in-cup)



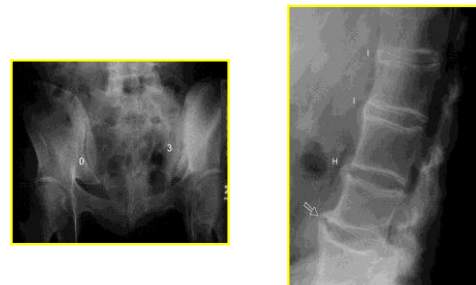
Other Radiological Features of PsA



Axial Psoriatic Arthritis



PsA: Axial Involvement



Mease P.J. van der Heijde D. Int J Adv Rheumatol 4(2):38-48, 2006

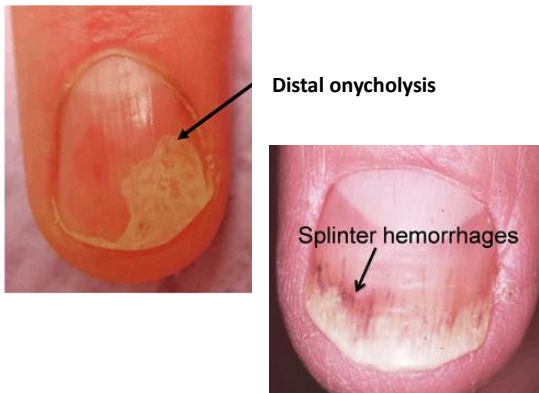
CASPAR Criteria For the Classification of PsA

PsA is diagnosed when ≥3 points below are assigned in the presence of inflammatory articular disease (joint, spine, or enthesal)		
Category	Description	Points
Current psoriasis, or, personal or family history of psoriasis	Psoriatic skin or scalp disease confirmed by dermatologist or rheumatologist; history of psoriasis from patient, family physician, dermatologist, rheumatologist, or other qualified practitioner; patient-reported history of psoriasis in first- or second-degree relative	2
Psoriatic nail dystrophy on current physical exam	Includes onycholysis, pitting, and hyperkeratosis	1
Negative for rheumatoid factor (RF)	Enzyme-linked immunosorbent assay or nephelometry preferred (no latex) using local laboratory reference range.	1
Current dactylitis or history of dactylitis documented by a rheumatologist	Swelling of entire digit	1
Radiographic evidence of juxtaarticular new bone formation	Ill-defined ossification near joint margins excluding osteophyte formation, on plain x-rays of hand or foot	1

*CASPAR=CASification Criteria for Psoriatic ARthritis
 *Taylor W et al. *Arthritis Rheum.* 2006;54:2665-2673.



Nail plate crumbling



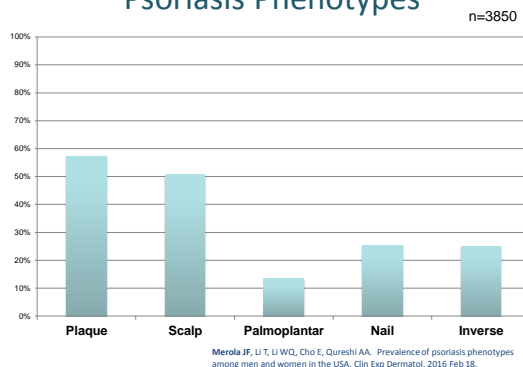
Distal onycholysis

Splinter hemorrhages





Psoriasis Phenotypes



Psoriasis Phenotypes

- plaque
- **Nail**
- **Scalp**
- **Inverse / Intertriginous**
- genital
- guttate
- palmo-plantar
- pustular

→ Increased PsA Risk

Scalp	HR 3.89 (95% CI 2.18-6.94)
Nail	HR 2.93 (95% CI 1.68-5.12)
Inverse**	HR 1.82 (95% CI 1.29,2.58)

Wilson FC et al. Arthritis Rheum. 2009 Feb 15; 61(2):233-9

**Lin J, Merola JF, Li T, Han J, Qureshi AA. The association between inverse psoriasis and risk of psoriatic arthritis. Submitted

Negative Effects of Psoriasis by Age

Activities of Daily Living Affected (%)	Respondents by Age Group (%)		
	18-34 Yr (n=1916)	35-54 Yr (n=6625)	≥55 Yr (n=8891)
Sleeping	20	22	22
Sexual activity	27	27	13
Using hands	8	16	19
Walking	7	11	14
Performing job duties	10	12	9
Psychosocial Activities Affected			
Contemplating suicide	10	7	3

Krueger G, et al. Arch Dermatol. 2001;137:280-284.

Slide courtesy of A. VanVoorhees

Co-morbidities / Co-Prevalent Disease in Psoriatic Disease

- Psoriatic arthritis
- Inflammatory bowel disease
- Uveitis
- Renal disease
- Hepatosteatorosis
- COPD
- Sleep apnea
- Depression
- Alcoholism
- Smoking
- Diabetes
- Dyslipidemia
- Obesity
- Peripheral vascular disease
- Myocardial infarction
- Stroke
- Cardiovascular death
- Gout

Jamnitski A, et al. Ann Rheum Dis 2013, Yeung H, et al. JAMA Dermatol. 2013

Spondyloarthritis and PsA Summary

- Inflammatory arthritis involving the axial skeleton, peripheral joints and entheses
- Common clinical features
 - But key differences
- Common extra-articular features
 - With varying frequencies
- Common co-morbidities

Thank You

- Dr. Joerg Ermann

