APPENDIX 1. Approach to Taking a Rheumatological History

Parameter	Relevant Information
Pain location, pattern, character	*Generalized or regional*: referred pain possible *Symmetric or asymmetric* *Articular or nonarticular* *Joint involvement*: small, large, or both; axial involvement *Joint count*: mono (1), oligo (2–4), poly (≥ 5) *Aggravating factors*
Onset and duration	*Acute*: sudden or over a few hours (septic arthritis, gout) *Chronic* (> 6 weeks): gradual, weeks to months or even years (fibromyalgia) *Acute or chronic* *Precipitating factors*: trauma, repetitive strain
Inflammatory	*Synovitis*: pain, swelling, and stiffness at rest, especially AM
Non-inflammatory	*Pronounced symptoms with joint use*: degenerative arthropathies
Articular and periarticular damage	*Joint deformity and instability* *Range-of-motion limitations*
Weakness	*Pain due to inflammation* *Neuropathy*: often distal muscles *Myopathy*: often proximal muscles, symmetrical
Systemic symptoms	*Fatigue, weight loss, fever*: possible systemic disorder *Nonarticular features*: genitourinary infection, abdominal pain and diarrhea, rashes, Raynaud's syndrome, and oral ulcers
Functional changes	*Loss of function or disability*: mild, moderate, or severe, quality-of-life impact, management considerations
Family history	*Genetic component*: rheumatological and autoimmune diseases

Sources*:*
1) Ensworth S. *Rheumatology: 1. Is it arthritis? CMAJ 2000;162(7):1011-1016.*
2) Robinson DB, El-Gabalawy HS*. Evaluation of the Patient. A. History and Physical Examination.* in Klippel JH, Stone JH, Crofford LJ, White PH. *Primer on the Rheumatic Diseases, 13 ed.* New York, NY: Springer, 2008:6-14.

APPENDIX 2. Common Features of Inflammatory Joint Disease

Joint involvement	Potential Inflammatory Causes	Associations
Monoarticular	Crystal	Gout, pseudogout, hydroxyapatite, calcium oxalate, lipids
	Infection	Virus, bacteria, fungi, spirochetes (Lyme disease and others), mycobacteria
	Systemic rheumatic disease	RA, SLE, psoriatic arthritis, reactive arthritis
Asymmetric oligoarticular *or* Symmetric polyarticular	Infection	*Oligoarticular*: gonococcus, meningococcus, Lyme disease, fungi, bacteria, bacterial endocarditis, Whipple's disease *Polyarticular*: virus (parvovirus, HBV, HCV, HIV, EBV, rubella)
	Post-infectious (reactive arthritis)	Rheumatic fever, post-streptococcal arthritis, reactive arthritis (enteric, urogenital)
	Palindromic rheumatism	
	Juvenile idiopathic arthritis	Polyarticular if symmetric; pauciarticular if asymmetric
	Psoriatic arthritis	
Symmetric polyarticular	RA	
	Systemic rheumatic disease	SLE, Sjögren's syndrome, systemic sclerosis, polyarthritis/ dermatomyositis, mixed connective tissue disease, Still's disease, relapsing seronegative symmetric synovitis with pitting oedema, polymyalgia rheumatica, systemic vasculitis, relapsing polychondritis
	Systemic diseases	Coeliac disease, acute sarcoidosis, acute paediatric leukaemia
	Axial involvement	Ankylosing spondylitis, enteropathic arthritis associated with IBD, psoriatic arthritis, reactive arthritis (enteric, urogenital), SAPHO, Whipple's disease
Asymmetric oligoarticular	Enteropathic arthritis of IBD	
	Undifferentiated spondyloarthritis	
	Systemic rheumatic disease	Relapsing polychondritis, Behçet's disease, familial Mediterranean fevers, carcinomatous, pancreatic disease-associated arthritis, hyperlipoproteinemia, sarcoidosis, multicentric reticulohistiocytosis
	Crystal	Gout, pseudogout, basic calcium phosphate

EBV: Epstein-Barr virus; HBV: hepatitis B virus; HCV: hepatitis C virus; HIV: human immunodeficiency virus; RA: rheumatoid arthritis; SAPHO: synovitis, acne, pustulosis, hyperostosis, osteitis; SLE: systemic lupus erythematosus

Sources:
1) Schumacher HR, Chen LX. *Musculoskeletal signs and symptoms A. Monarticular joint disease.* in Klippel J, Stone JH, Crofford LJ, White PH. *Primer on the Rheumatic Diseases,* 13th edn. New York: Springer, 2008.
2) West S. *Musculoskeletal Signs and Symptoms. B. Polyarticular Joint Disease.* in Klippel JH, Stone JH, Crofford LJ, White PH. *Primer on the Rheumatic Diseases,* 13 ed. New York, NY: Springer, 2008:47-57.

August 2012

APPENDIX 3. Examination for Extra-articular Signs of Rheumatological Disease

Organ System	Extra-articular Features	Associated Diseases
Skin, mucous membranes	Hair loss/thinning	Connective tissue disorders, SLE
	Scleritis	RA
	Conjunctivitis	Reactive spondyloarthritis, reactive arthritis, SLE
	Iritis, uveitis	Spondyloarthropathies, juvenile inflammatory arthritis
	Dry eyes	RA, connective tissue disorders
	Malar rash or erythema	Connective tissue disorders; SLE, human parvovirus B19, Lyme disease, dermatomyositis
	Oral or nasal ulceration	Connective tissue disorders
	Dry mouth	Connective tissue disorders, RA
	Photosensitivity	Connective tissue disorders
	Raynaud's phenomenon	Connective tissue disorders
	Sclerodactyly	Connective tissue disorders
	Psoriasis, nail pits	Psoriatic arthritis
	Rheumatoid nodules	RA NB these are often mimicked by tophi, and vica-versa.
	Nail-fold infarcts	RA, vasculitis
	Tophi	Gout
	Heberden's nodes/ Bouchard nodes	OA
Cardiovascular	Pericarditis	Connective tissue disorders, RA
Respiratory	Pleuritis	RA, connective tissue disorders
Gastrointestinal	Oesophageal dysmotility	Connective tissue disorders
	Inflammatory bowel disease	Seronegative spondyloarthritis
	Irritable bowel syndrome	Fibromyalgia
Genitourinary	Cervicitis/urethritis	Reactive spondyloarthritis, reactive arthritis, gonococcal arthritis
	Irritable bladder syndrome	Fibromyalgia
Constitutional	Fever	Infection, post-infectious reactive arthritis, systemic rheumatic disease (RA, SLE, Still's disease, vasculitis), crystal-induced disease (gout, pseudogout)

RA: rheumatoid arthritis; SLE: systemic lupus erythematosus

Sources:
1) Ensworth S. *Rheumatology: 1. Is it arthritis?* CMAJ 2000;162(7):1011-1016.
2)West S. *Musculoskeletal Signs and Symptoms. B. Polyarticular Joint Disease.* in Klippel JH, Stone JH, Crofford LJ, White PH. *Primer on the Rheumatic Diseases,* 13 ed. New York, NY: Springer, 2008:47-57.
3) Mies RA, Francis ML. *Diagnostic approach to polyarticular joint pain.* Am Fam Physician 2003;68(6):1151-1160.

August 2012

APPENDIX 4. Classification and Diagnostic Criteria for Common Rheumatological Diseases

Classification Criteria for Rheumatoid Arthritis

New criteria focus on diagnosis at an earlier stage of disease using a score of at least six out of a possible ten in four domains for definite rheumatoid arthritis. The target population is patients with at least one joint affected by definite clinical synovitis that is not better explained by another disease.

Score ≥ 6 required

Category	Criterion	Score
Joint involvement	1 large joint	0
	2–10 large joints	1
	1–3 small joints ± large joints	2
	4–10 small joints ± large joints	3
	> 10 joints (at least 1 small joint)	5
Serology*	Negative RF and anti-CCP	0
	Low-positive RF or anti-CCP	2
	High-positive RF or anti-CCP	3
Acute-phase reactants*	Normal CRP and ESR	0
	Abnormal CRP or ESR	1
Symptom duration	< 6 weeks	0
	≥ 6 weeks	1

*≥ 1 positive test required for classification

Source:

Aletaha D, Neogi T, Silman AJ, Funovits J, Felson DT, Bingham CO, III et al. 2010 *Rheumatoid arthritis classification criteria: an American College of Rheumatology/European League Against Rheumatism collaborative initiative.* Arthritis Rheum 2010; 62(9):2569-2581.

Classification Criteria for Systemic Lupus Erythematosus

Diagnosis is based on clinical and laboratory criteria and requires the presence of ≥ 4 of the following 11 criteria, serially or simultaneously, during a period of observation:

Malar rash	
Discoid rash	
Photosensitivity	
Oral ulcers	
Nonerosive arthritis	≥ 2 peripheral joints with swelling, tenderness, or effusion
Serositis	Pleuritis or pericarditis
Renal disorder	Persistent proteinuria or cellular casts
Neurologic disorder	Seizures or psychosis not related to any drug or metabolic disturbance
Hematologic disorder	Haemolytic anaemia with reticulocytosis, leukopaenia on ≥ 2 occasions, lymphopaenia ≥ 2 occasions, or thrombocytopenia not related to any drug
Immunologic disorder	Abnormal anti-dsDNA; anti-Sm; or positive antiphospholipid antibody based on abnormal anticardiolipin antibodies, positive lupus anticoagulant, or confirmed false-positive syphilis serology present for ≥ 6 months
Abnormal ANA	Not related to drugs associated with drug-induced lupus

Source:

Gill JM, Quisel AM, Rocca PV, Walters DT. *Diagnosis of systemic lupus erythematosus. Am Fam Physician 2003;* 68(11):2179-2186.

Diagnostic Criteria for Polymyalgia Rheumatica

Diagnosis of this common inflammatory rheumatological disease is based on satisfying *all* inclusion criteria and eliminating *all* conditions in the exclusion criteria

Inclusion and Exclusion Criteria for Diagnosis of Polymyalgia Rheumatica

Inclusion Criteria	Exclusion Criteria
Bilateral shoulder or pelvic girdle aching, or both Morning stiffness ≥ 45 minutes Age > 50 years Duration > 2 weeks Evidence of acute-phase response (elevated ESR/CRP)	Malignancy Viral or bacterial infection Giant cell arteritis Other rheumatic diseases Hypothyroidism Drug-induced problem, such as statin myopathy Chronic pain syndrome (neck or shoulder osteoarthritis, fibromyalgia) Local shoulder or hip pathology

Source:

van Hecke O. *Polymyalgia rheumatica – diagnosis and management.* Aust Fam Physician 2011; 40(5):303-306.

[Expert reviewer's comment: This implies that diagnosis of PMR cannot be made in the absence of elevated ESR or CRP. This is not the case, and it is well recognised in the UK that inflammatory markers may be normal in a small percentage of patients with otherwise typical PMR.]

Ankylosing Spondylitis

Berlin Criteria *(Rudwaleit M et al Arthritis Rheum 2006;54:569-78)*:

Back pain of more than 3 months duration is inflammatory if:

- Associated with morning stiffness > 30 minutes
- Improvement with exercise but not by rest
- Awakening in the second half of the night because of back pain
- Alternating buttock pain

The criteria are fulfilled if at least 2 of 4 parameters are present

[Expert reviewer's comment - NB radiological evidence of sacro-iliitis is hopeless for diagnosing early cases.]

Conditions Associated with Positive Rheumatoid Factor

Aging >60 years (5-25%), RA, SLE, Sjögren syndrome, mixed cryoglobinemia, Primary biliary cirrhosis, Endocarditis, tuberculosis, syphilis, Lyme disease, HIV, rubella, mumps, hepatitis C, influenza, infectious mononucleosis, Interstitial fibrosis, silicosis, sarcoidosis, asbestosis, Malignancy, periodontal disease, parasitic disease

APPENDIX 5. Resources

Professional resources

The British Society for Rheumatology on www.rheumatology.org.uk > Resources > Guidelines > Current Guidelines > BSR Guidelines. This has a variety of detailed clinical guidelines for diagnosis and the management of numerous conditions: Giant Cell arteritis 2010; PMR 2009; DMARD monitoring 2009, RA 2009; DMARD monitorinmg and toxicity 2008; Gout 2007; ANCA-associated vasculitis 2007.

The EULAR website (European League against Rheumatism, a rather quaintly titled umbrella body for Euro Rheum Socs) at www.eular.com may also be helpful.

Patient resources

www.arthritisresearchuk.org is excellent, British, has extensive publications available free as leaflets or booklets covering diseases, general issues and drugs or other treatments. Including "What to expect of your Rheumatologist".

There are disease specific organisations which have useful pragmatic information and often advice lines for patients, as well as campaigning for services and lobbying.

Psoriasis Scotland (www.psoriasisscotland.org.uk);

National Ankylosing Spondylitis Society (NASS) – www.nass.co.uk

Arthritis Care is probably the largest patient support group, it isn't specific to any one condition which is both a strength and a weakness. (www.arthritiscare.org.uk),

PSALV – Psoriasis Scotland Arthritis Link Volunteers www.psoriasisscotland.org.uk,

The Psoriasis and Psoriatic Arthritis Alliance – www.papaa.org

National Rheumatoid Arthritis Society (NRAS) – www.nras.org.uk

APPENDIX 6. Radiological Investigations.

Conventional radiography provides good spatial resolution and good visualization of trabecular bone, small erosions, and bone neoplasms,7 and delivers low radiation doses. In inflammatory polyarthritis affecting large and small joints, small joints are more likely to show diagnostic indicators earlier than large joints, although radiography early in the disease course may be normal.8 Standing views are preferable for weight-bearing joints. A radiographic finding of sacroiliitis is diagnostic for ankylosing spondylitis. or other seronegative spondylitis, for instance linked to psoriasis or inflammatory bowel disease.

Magnetic resonance imaging (MRI) provides excellent spatial resolution and the best contrast resolution in soft tissues and bone marrow.7 MRI is excellent for assessing cartilage, diagnosing disc herniation, identifying muscle abnormalities, detecting microfractures, diagnosing osteonecrosis and osteomyelitis, and evaluating musculoskeletal neoplasms. In psoriasis, MRI can demonstrate enthesitis, which is not visible on plain radiographs. In ankylosing spondylitis, fat-suppression MRI techniques in early sacroiliitis can demonstrate subchondral sacroiliac bone marrow inflammation, which predicts development of radiographic evidence with a sensitivity of almost 100%.

[Expert reviewer's comment: MRI is preferable to CT, certainly locally in my area, and probably throughout all of Scotland. MRI would be the available investigation of choice. It is conventional in fact to do MRI of sacro-iliac joints and the entire spine from base of skull to coccyx as inflammatory lesions may be found throughout the spine and SI joints may be normal in patients with inflammatory spinal disease.]

Computed tomography (CT) provides better contrast resolution than conventional radiography but less than MRI. (Exception is spiral CT, which is comparable to MRI?).7 Although CT is associated with higher doses of radiation than conventional radiography, it is often more readily available than MRI. CT may be selected to assess conditions that are difficult to visualize using conventional radiography, such as sacroiliitis, femoral head necrosis, or tarsal coalitions. *(Note: A tarsal coalition is an abnormal connection that develops between two tarsal bones. It can be composed of bone, cartilage, or fibrous tissue and may lead to limited motion and pain in one or both feet. Causes include congenital factors, infection, arthritis, and trauma.)* If ankylosing spondylitis is suspected, sacroiliac imaging should be performed, as involvement of these joints is a common and important early finding (Appendix 4).8

Ultrasound provides similar spatial resolution to CT and MRI, with resolution of superficial tissues being superior to deep tissues.7 Ultrasound is useful in detecting joint erosions in early RA, accumulations of fluid, cysts, and inflammation or tears in superficial tendons. It is important to note, however, that efficacy of ultrasound is highly operator dependent.

[Expert reviewer's comment: USS is very useful in detecting synovitis, which is much more important than detecting joint erosions. It is highly operator dependent as noted at the final sentence. It is also very time consuming and not readily available. I use it for trying to determine if fat podgy hands have fat or synovitis as a cause of the perceived swelling. It is also very useful for tenosynovitis, for instance round the ankles or in the palms or wrists and for investigating shoulder lesions.

It is still uncertain if synovitis that is detected only by ultrasound and not evident on clinical grounds, is the same disease as that for which DMARDs have clearly been shown to be beneficial.]