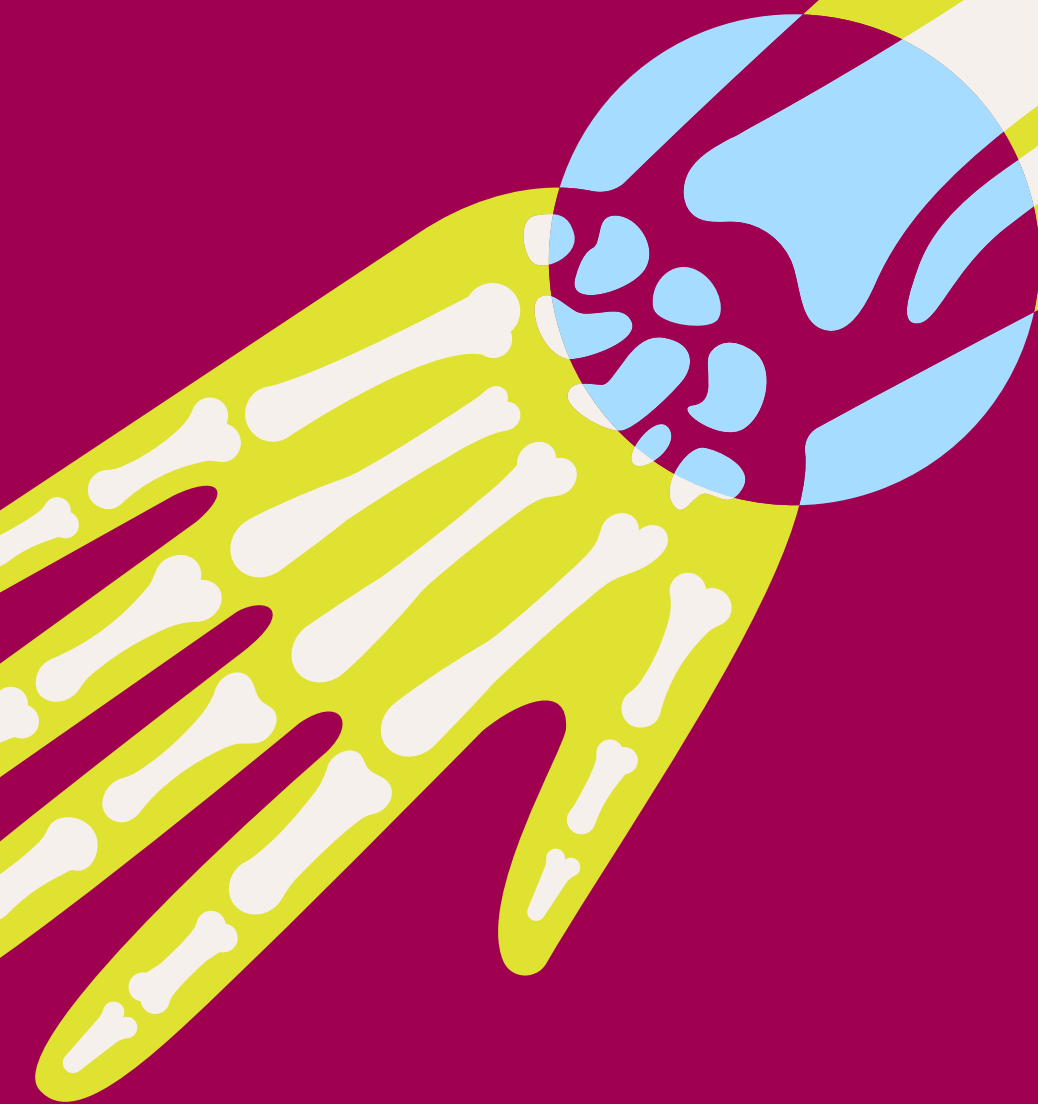


Musculoskeletal Clinical Assessment in Adults



Arthritis UK

Over 10 million adults, young people and children in the UK live with arthritis. That's one in six people living with the pain, fatigue, disability, mental and financial strain it can cause. The impact can be huge, affecting the ability to work, care for family, socialise and even live independently.

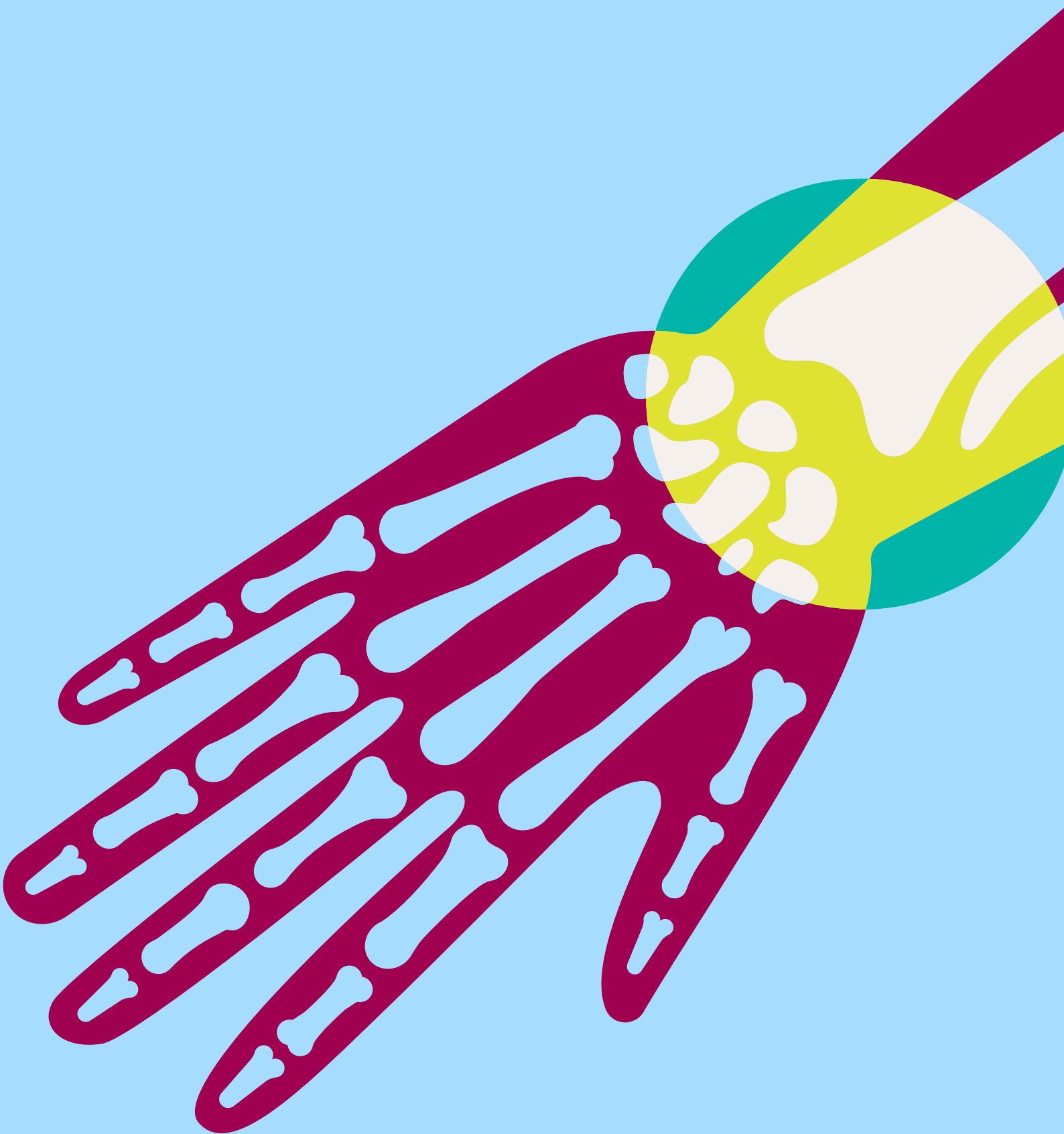
However, despite it affecting so many lives, people are not getting a diagnosis soon enough, and not everyone is receiving the care and support they urgently need to manage their condition effectively.

Drawing on over 90 years of experience, Arthritis UK is here to change this. We're determined to bring about positive and lasting change for everyone living with the challenges of arthritis in the UK. And while our focus is on arthritis, much of our work has the potential to help people with other musculoskeletal (MSK) conditions, such as low back pain and osteoporosis. Although these long-term conditions may be different in pathology, the impact they can have on people's lives is similar. For example, 74% and 68% of people with MSK conditions reported that their lives were impacted by pain and fatigue respectively.

MSK conditions are a costly and growing issue. Their prevalence is expected to continue to increase due to our ageing population, rising levels of obesity and physical inactivity. The role of health and care professionals in enabling people with arthritis to live well, understand their condition, and have access to the appropriate information and support to self-manage has never been more important.

Arthritis UK is here to help you. Our education and training resources for frontline health and care professionals are accessible, relevant and evidence-based. They are designed to support you in confidently diagnosing and managing a range of MSK conditions, as well as honing your skills in providing patient-centred, holistic care.

Our Musculoskeletal Clinical Assessment in Adults guide has been developed as a study aid for medical, nursing and allied health professionals. It takes a step-by-step approach to assessing people with MSK conditions to help you become competent and confident in their care.



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Biographies



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Author

David Coady is a consultant rheumatologist at Sunderland Royal Hospital. He previously held an Educational Research Fellowship funded by Arthritis Research UK [now Arthritis UK]. This focused on identifying the core clinical skills of musculoskeletal examination for undergraduates. He produced the Regional Examinations of the Musculoskeletal System (REMS) videos which have been used for teaching since 2001. He maintains a keen interest in education, educational research and sailing.



Professor Mark Lillicrap

Medical editor

Mark Lillicrap is Professor of Medical Education Practice at the University of Cambridge and an honorary consultant rheumatologist at Addenbrooke's Hospital in Cambridge. Mark's main interests are in undergraduate medical education and teaching. He is the curriculum sub-dean and the director of the undergraduate clinical supervisor programme in Cambridge. He has also previously worked as the Director of Medical Education at Hinchingsbrook Hospital in Huntingdon and as a postgraduate educational supervisor for rheumatology specialist trainees.

Foreword

I'm delighted to introduce the Arthritis UK Musculoskeletal Clinical Assessment in Adults guide. I remember using this resource and the related videos during my training and finding it to be incredibly helpful. Now I find myself using both again when teaching medical students.

The videos that complement this guide are available on the Arthritis UK website and YouTube channel. We recommend using them in conjunction to familiarise yourself with and understand examination routines. There is of course no substitute for practice, take every opportunity to try out your skills, getting feedback whenever you can, and they will improve rapidly.

This recently updated guide brilliantly achieves its aim of demystifying examination of the musculoskeletal (MSK) system, an area which learners have previously reported finding difficult. The resource includes the 'GALS' (Gait, Arms, Legs, Spine) screening examination developed by Professors Paul Dieppe and Mike Doherty. For patients who report symptoms or have positive findings on the GALS screen it offers REMS. The core skills included in Regional Examination of the Musculoskeletal System (REMS) are based on a consensus reached across a broad spectrum of UK clinicians in a study led by



Dr David Coady. Regional examinations are all structured using the same look, feel, move, function approach, making them easy to recall and perform.

This edition focuses on examination but also includes tips on history taking and investigation requesting. It includes the paediatric versions pGALS and pREMS, incorporating work led by Professor Helen Foster. Based on the adult examinations, these have additions to improve the vitally important detection and identification of musculoskeletal problems in school-aged children.

I hope you will enjoy it and find it useful too. Over to you – time to get reading, watching and practising!

Dr Pippa Watson

Consultant Rheumatologist and Honorary Senior Lecturer
University Hospital of South Manchester



This recently updated guide brilliantly achieves its aim of demystifying examination of the musculoskeletal system, an area which learners have previously reported finding difficult.

Abbreviations

CMC(J)	Carpometacarpal (joint)
CT	Computerised tomography
DEXA	Dual-energy x-ray absorptiometry
DIP(J)	Distal interphalangeal (joint)
ESR	Erythrocyte sedimentation rate
GALS	Gait, arms, legs and spine
MCP(J)	Metacarpophalangeal (joint)
MRI	Magnetic resonance imaging
MSK	Musculoskeletal
MTP(J)	Metatarsophalangeal (joint)
NSAIDs	Non-steroidal anti-inflammatory drugs
OA	Osteoarthritis
PIP(J)	Proximal interphalangeal (joint)
RA	Rheumatoid arthritis
REMS	Regional examination of the musculoskeletal system

Terminology

It could be argued that the term 'arthritis' should only be used to describe inflammatory disorders of the joint, whilst 'arthropathy' should be used to describe non-inflammatory disorders of the joint. However, the term 'arthritis' is in such widespread use to describe any disorder of the joint that, for the purpose of this guide, it will be used in that sense.

Acknowledgements

We remain indebted to Professor Paul Dieppe whose earlier version of this guide has been widely referred to by medical students in the UK since 1991. His text remains influential in this new edition.

We would like to thank Dr David Coady and Professor Mark Lillicrap for their considerable time and commitment in updating the content, Dr Pippa Watson for her feedback and additional support during the filming of the video material, and all those who took the time to comment on the previous edition and early drafts of this new guide – Onebieni Ana, Ivan Cheuk Li, Nathan Ng, Jamie Nicholson, Sarah-Jane Ryan, Sophia Wakefield, Louise Warburton and Anita Williams.



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Introduction

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Initial approach

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Introduction to musculoskeletal assessment

Having arthritis or another musculoskeletal (MSK) condition is one of the biggest contributors to years lived with disability (YLDs). 21% of YLDs in the UK are accounted for by MSK conditions (Global Burden of Disease Collaborative Network, 2024).

It is estimated that MSK disorders account for approximately 1 in 7 GP consultations (Jordan et al. 2010) and every year 1 in 5 adults will consult their GP for an MSK condition. MSK conditions accounted for 1.2 million hospital admissions in England in 2023-24, 7% of the total number (NHS England, 2024).

Clinical assessment skills – history taking and examination – are the key to making an accurate diagnosis and appropriately managing any patient presenting with an MSK issue. This guide aims to introduce you to the methods you might use during the initial clinical assessment. It is not exhaustive or intended to replace direct clinical teaching and experience, but to be used as an aid to learning.

Initial approach

Before considering a diagnosis, it is useful to try to broadly categorise the symptoms and signs (from the patient's history and examination) by answering the following key questions:

- Are the symptoms from the joint itself or the soft tissues (for example, tendons and muscles)?
- Is the condition acute or chronic?
- Is the condition inflammatory or non-inflammatory?
- What is the pattern of affected areas/joints?
- What is the impact of the condition on the patient's life?
- Are other systems involved (for example, cardiovascular, gastrointestinal, skin, eyes)?

The answers to these questions should enable you to produce a succinct summary of the patient's condition and would lead you to a narrower differential diagnosis. An example of a patient summary produced using this method might be:

'This patient has a chronic symmetrical inflammatory polyarthritis, mainly affecting the small joints of the hands and feet, which is causing pain, difficulty with dressing and hygiene, and is limiting her mobility.'



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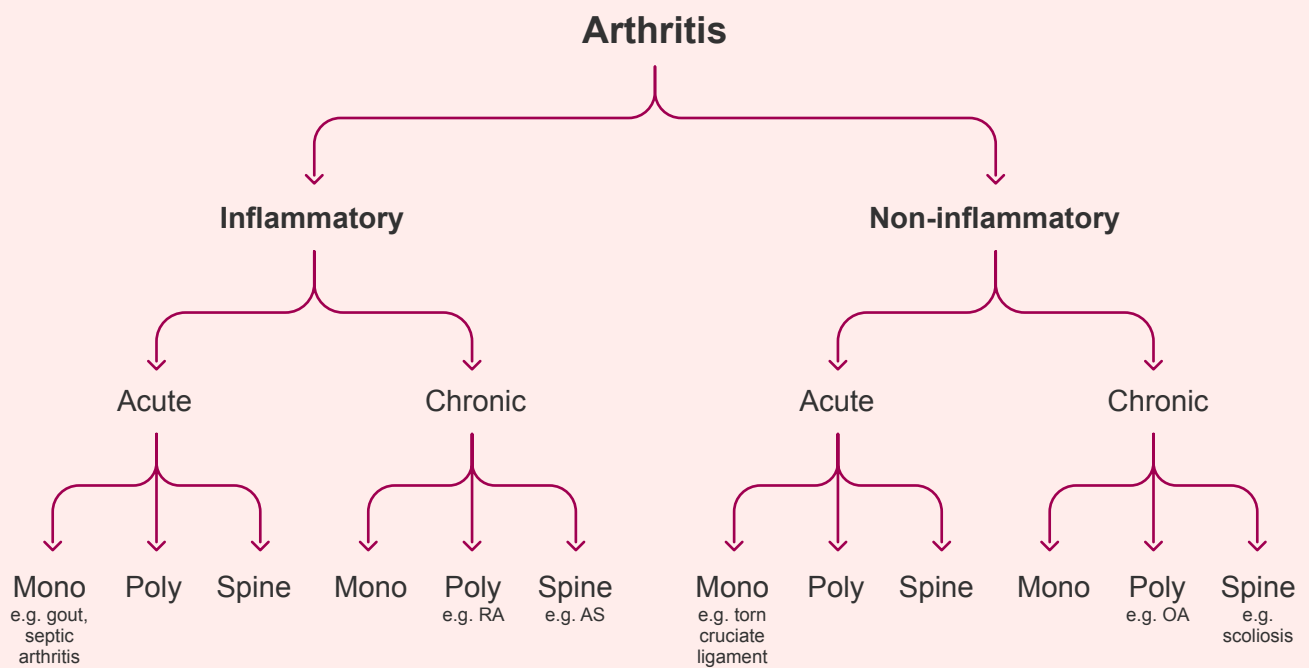
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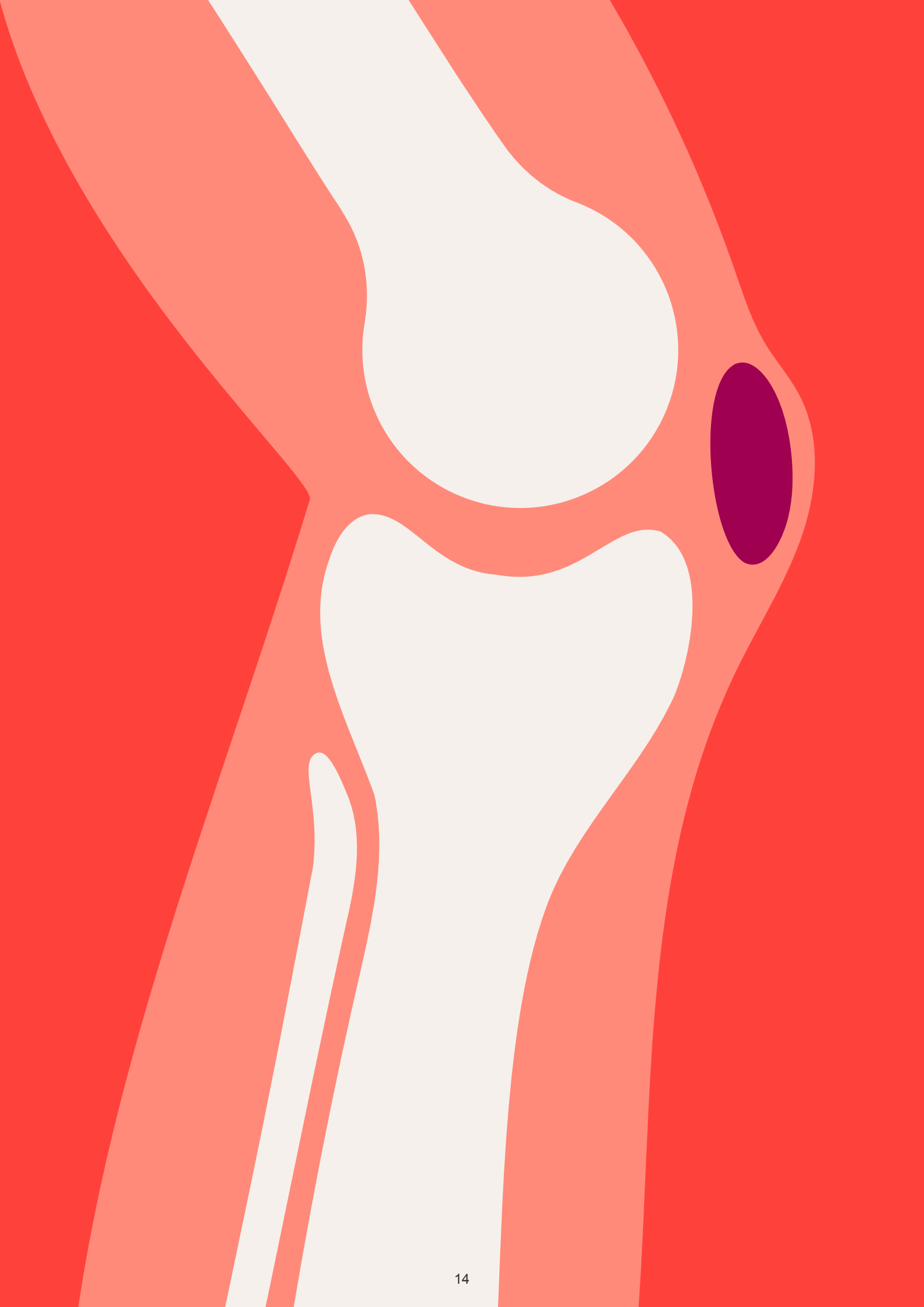
Figure 1

Classification of the arthritides:

Mono = monoarticular (one joint)

Poly = polyarticular (several joints)





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The musculoskeletal history

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The musculoskeletal history

Clinical communication skills (of which history taking is one part) are among the most important skills for any healthcare practitioner to acquire – this can only be achieved through regular practice. A good history backed up by clinical examination findings will lead you to a diagnosis. In this section we look more closely at the key questions that need to be addressed.

Are the symptoms from the joint itself or the soft tissues?

This guide is primarily concerned with problems arising from the joints – that is from the articular and periarticular structures. These structures are shown in **Figure 2**, while **Figures 3a** and **3b** represent diagrammatically the changes that occur in the two main types of arthritis. However, it is important to identify those cases where pain may appear to arise from the joint but is in fact referred pain – for example, where the patient describes pain in the left shoulder, which might in fact be referred pain from the diaphragm, the neck, or perhaps ischaemic cardiac pain.

In cases where examination reveals no abnormalities in the joint, other clues will be obtained by taking a thorough history. For example, a common cause of widespread pain with normal joint examination is fibromyalgia.

Figure 2

Cross-sectional diagram of a synovial joint and its periarticular structures

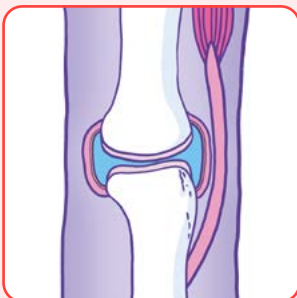


Figure 3a

X-ray and diagrammatic representation of a joint affected by rheumatoid arthritis (RA)

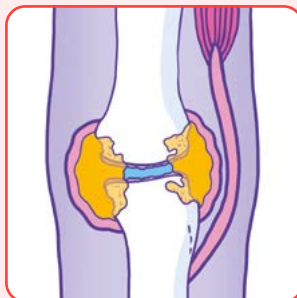
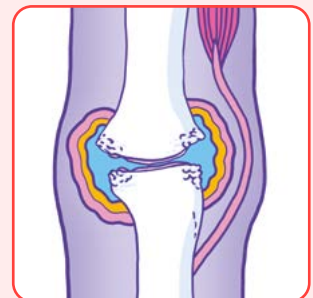


Figure 3b

X-ray and diagrammatic representation of a joint affected by osteoarthritis (OA)



Is the condition acute or chronic?

You will need to listen to the patient's history to find out:

- When did the symptoms start and how have they evolved? Was the onset sudden or gradual?
- Was the onset associated with a particular event – for example, trauma or infection?
- Which treatments has the condition responded to (if any)?

The way in which symptoms evolve and respond to treatment can be an important guide in making a diagnosis.

Gout, for example, is characterised by acute attacks – these often start in the middle of the night, become excruciatingly painful within a few hours, and respond well to non-steroidal anti-inflammatory drugs (NSAIDs).

MSK symptoms lasting more than six weeks are generally described as chronic. Chronic diseases may start gradually and may have a variable course with remissions and exacerbations influenced by therapy and other factors. It may be helpful to represent the chronology of a condition graphically (see **Figure 4**).

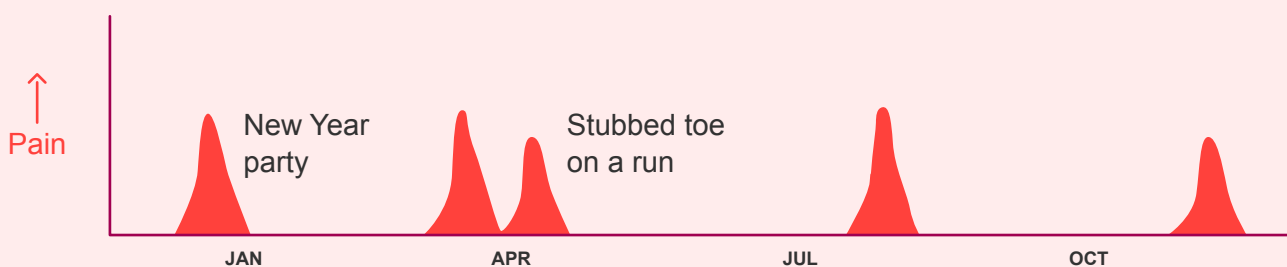
Figure 4

Graphs representing the chronology of a condition:

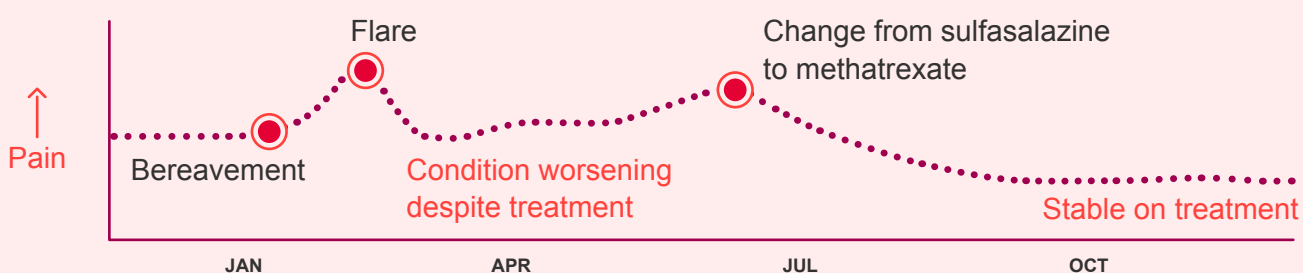
(a) for a patient with gout

(b) for a patient with rheumatoid arthritis.

(a) Patient A.H. – acute gout



(b) Patient J.R. – inflammatory polyarthritis (RA)



Is the condition inflammatory or non-inflammatory?

The main symptoms of MSK conditions are **pain, stiffness** and **joint swelling**. Assessment of these symptoms and clinical assessment can allow differentiation to be made between inflammatory and non-inflammatory conditions.

Inflammatory joint conditions, such as RA, are frequently associated with prolonged early morning stiffness that eases with activity – while non-inflammatory conditions, such as OA are associated with pain more than stiffness, and the symptoms are usually exacerbated by activity.

Pain

As with all pain, it is important to record the site, character, radiation, and aggravating and relieving factors.

Patients may localise their pain accurately to the affected joint, or they may feel it radiating from the joint or even into an adjacent joint. In the shoulder, for example, pain from the acromioclavicular joint is usually felt in that joint, whereas pain from the glenohumeral joint or rotator cuff is usually felt in the upper arm. Pain from the knee may be felt in the knee but

can sometimes be felt in the hip or the ankle. Pain due to irritation of a nerve will be felt in the distribution of the nerve – as in sciatica, for example. The pain may localise to a structure near rather than in the joint – for example, the pain from tennis elbow will usually be felt on the outside of the elbow joint.

The character of the pain is sometimes helpful. Is it sharp, deep, achy, burning or stabbing? Pain due to pressure on nerves often has a combination of numbness and tingling associated with it.

Pain of a non-inflammatory origin is more directly related to use: the more you do, the worse it gets. It can be sharp and stabbing but may ache at times.

Pain caused by inflammation is often present at rest as well as on use and tends to vary from day to day and from week to week in an unpredictable fashion. It flares up and then it settles down and can be associated with tenderness to the touch. Severe bone pain (suggestive of underlying malignancy) is often unremitting and persists through the night, disturbing the patient's sleep.



Stiffness

In general, inflammatory arthritis is associated with prolonged morning stiffness which is generalised and may last for several hours. The duration of the morning stiffness is a rough guide to the activity of the inflammation.

Non-inflammatory arthritis, such as OA of the knee, tends to cause localised stiffness which may be short-lasting (less than 30 minutes) but can recur after sitting for short periods.

With inflammatory diseases such as RA, where joint destruction occurs over a prolonged period, the inflammatory component may eventually become less active and give way to secondary mechanical pain as a result of the damage. It is therefore sometimes difficult for patients to distinguish between pain and stiffness, so your questions will need to be specific.

Joint swelling

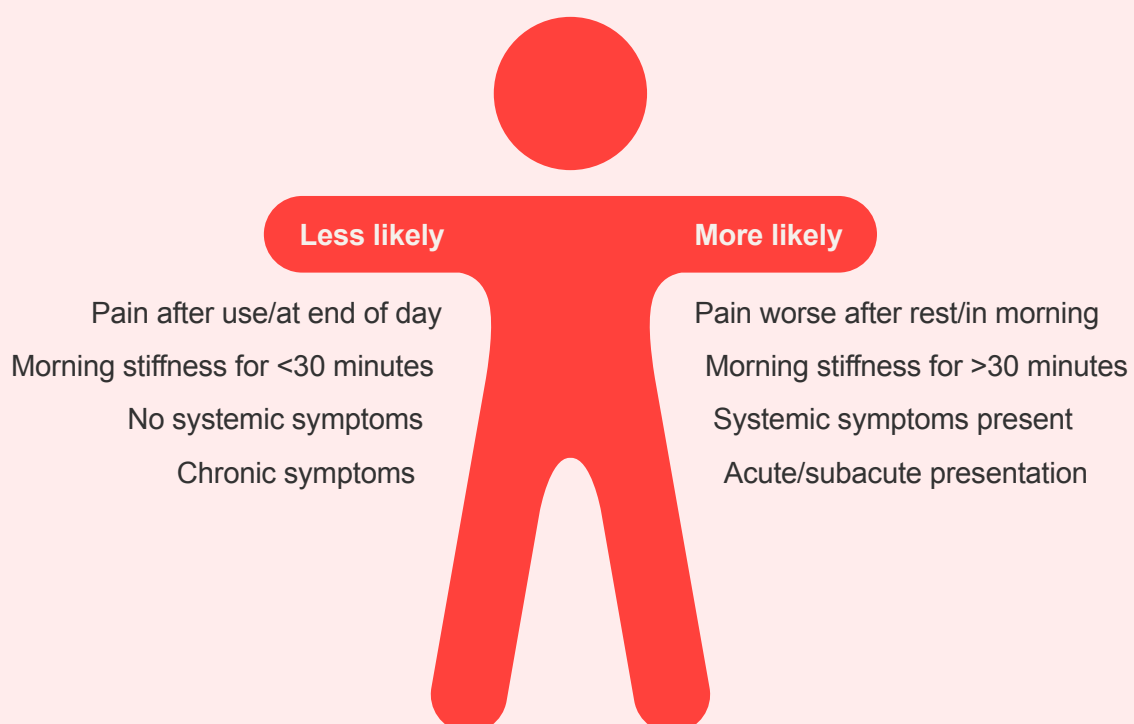
A history of joint swelling, especially if it is intermittent, is normally a good indication of an inflammatory disease process. Patients often describe rings becoming tight or a sensation of walking on pebbles.

There are exceptions however. Nodal OA, for example, causes bony, hard and non-tender swelling in the proximal interphalangeal (PIP) and distal interphalangeal (DIP) joints of the fingers. Swelling of the knee is also less suggestive of inflammatory disease as it can also occur with trauma and in OA. Ankle swelling is a common complaint, but this is more commonly due to oedema than to swelling of the joint.

Box 1

Features of inflammatory compared with degenerative symptoms

Inflammatory disease is



What is the pattern of affected areas/joints?

The pattern of joint involvement is very helpful in defining the type of arthritis, as different patterns are associated with different diseases.

Common patterns of joint involvement include:

Monoarticular – only one joint affected (for example, septic arthritis).

Pauciarticular (or oligoarticular) – only a few joints affected (for example, psoriatic arthritis).

Polyarticular – many joints affected (for example, RA).

Axial – the spine is predominantly affected (for example, axial spondyloarthritis).

As well as the **number of joints affected**, it is useful to consider whether the **large or small joints** are involved, and whether the pattern is **symmetrical or asymmetrical**.

RA, for example, is a polyarthritis (it affects lots of joints) that tends to be symmetrical (if it affects one joint, it will affect the same joint on the other side), and if it affects one of a group of joints it will often affect them all, for example, the metacarpophalangeal (MCP) joints.

Note, however, that this describes established disease and early RA can affect any pattern of joints.

Spondyloarthritides, such as psoriatic arthritis, are more likely to be asymmetrical and may be associated with inflammatory symptoms, such as early morning stiffness involving the spine.

OA tends to affect weight-bearing joints and the parts of the spine that move most (lumbar and cervical).

Table 1 provides a summary of typical features of some common MSK conditions.



Table 1

What to look for: diagnostic tips

	Common inflammatory conditions				Common non-inflammatory conditions	
	Rheumatoid arthritis (RA)	Seronegative arthritides (e.g. reactive and psoriatic arthritis)	Gout	Polymyalgia rheumatica (PMR)	Osteoarthritis (OA)	Fibromyalgia
Onset	Usually acute or subacute	Acute/subacute or chronic	Usually acute	Usually acute/subacute	Chronic	Chronic
Typical age and gender	Female: male 3:1 Any age	Any age	Female: male 1:3 Very rare in pre-menopausal women	Female: male 2:1	Hand OA more common in females Usually over age 45	Female: male 7:1 Age 30–50
Pattern of joint involvement	Usually symmetrical hands and feet	Can be monoarthritis or asymmetrical polyarthritis or spine	Monoarthritis most commonly – MTP, ankle, knee	Usually shoulder and pelvic girdle	Normally polyarticular Hands, knees, hip and feet most common	Widespread pain
Other clues	Raynaud's syndrome Dry eyes and mouth Systemic upset	Tendon insertion pain (enthesitis) Psoriasis Inflammatory bowel disease Uveitis	Risk factors: obesity, alcohol, diuretic treatment	Severe stiffness May have overlap with temporal arteritis	Heberden's or Bouchard's nodes Crepitus	Poor quality of sleep Tender soft tissue 'trigger points' on examination Multiple symptoms

What is the impact of the condition on the patient's life?

Understanding the impact of any condition on the patient is crucial to negotiating a suitable management plan.

Ask open-ended questions about functional issues and difficulty with day-to-day activities. It may be easiest to ask the patient to describe a typical day, from getting out of bed to washing, dressing, toileting and so on. Potentially sensitive areas – such as hygiene or sexual activity, mood, depression and anxiety – should be approached with simple, direct, open questions. The impact of the condition on the patient's employment will be crucial.

A patient's needs and aspirations are equally an important part of the equation and will influence their ability to adapt to the condition. Questioning around the things a person would like to do, but is currently unable to, may pinpoint key issues. What are their ideas,

concerns and expectations? Later negotiations with the patient on balancing the risks and benefits of an intervention will be greatly affected by the patient's priorities.

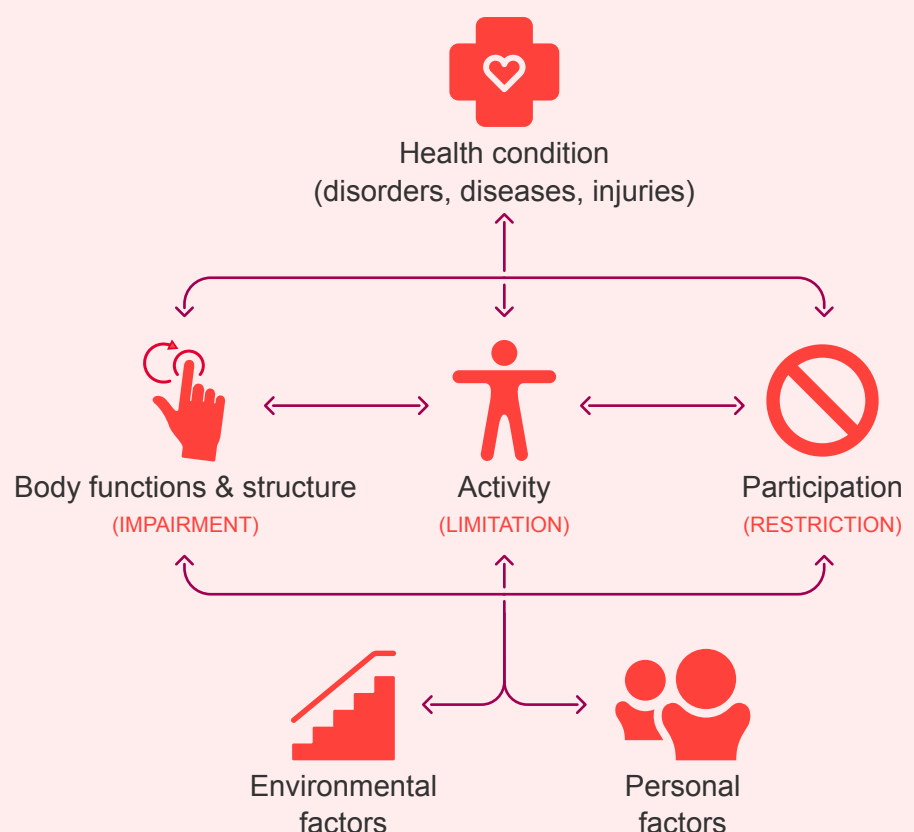
All healthcare practitioners should have an awareness of the relationship between functional loss, limitation of activity, and restriction of participation as indicated in the World Health Organization's International Classification of Functioning, Disability and Health (see **Figure 5**). Being unable to fully flex a finger (loss of function) might lead to difficulty, for example, with fastening buttons (activity) which might have a minor impact on general life (participation). The same loss of function, however, might prevent a pianist from playing (activity) which, for a professional musician, might have a significant impact on their way of life (participation). (See **Figure 5**.)

Figure 5

A model of disability – the relationship between loss of function, limitation of activity and restriction of participation.

Based on the World Health Organization's International Classification of Functioning, Disability and Health.

Disability and function are the result of the interactions between a health condition and contextual factors (environmental and personal factors).



Are other systems involved?

Inflammatory arthritis often involves other systems including the skin, eyes, lungs and kidneys. In addition, patients with inflammatory disease often suffer from general symptoms such as malaise, weight loss, mild fevers and night sweats. OA, in contrast, is limited to the MSK system and is not associated with immune activation. Systemic symptoms would therefore not be expected.

Fatigue and depression may be common in any arthritis where there is functional loss or chronic pain. A comprehensive history must include the usual screening questions for all systems as well as specific enquiries relating to known complications of specific MSK disorders.

Arthritis may occur on a background of other illnesses and it is important to consider other ongoing health issues, particularly with an increasingly ageing population. A combination of two problems will be worse than either one alone, and the impact on the patient will therefore be greater. In addition, other conditions may be affected by the treatments prescribed for the arthritis. For example, the presence of liver disease may limit the use of disease-modifying drugs for inflammatory arthritis, because most of these drugs can upset the liver.





4

The musculoskeletal examination

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Performing a regional examination of the musculoskeletal system (REMS)	34

The musculoskeletal screen: GALS questions and examination

So far, the discussions of history taking above have assumed that the patient has come to see you with joint-related pain. However, it is also important to make a routine assessment of any MSK problems irrespective of their presenting symptoms.



www.arthritis-uk.org/the-MSK-examination-GALS/

The **GALS** – **G**ait, **A**rms, **L**egs and **S**pine – screen consists of three simple questions and a brief examination developed to detect significant MSK abnormalities (Doherty et al. 1992). It can also be used as a screening tool prior to a more focused examination.

Routine screening questions

Screening questions that assess the MSK system should be incorporated into the routine systemic enquiry of every patient. As discussed, the main symptoms arising from disorders of the MSK system are **pain**, **stiffness**, **swelling** and associated **functional problems**. The screening questions we use to directly address these areas are:

Question	Rationale
Do you have any pain, swelling or stiffness in your muscles, joints or back?	Focuses on the common symptoms of an MSK problem.
Can you dress yourself completely without any difficulty?	Focuses on upper limb function.
Can you walk up and down stairs without any difficulty?	Focuses on lower limb function.

A patient who has no pain or stiffness, and no difficulty with dressing or with climbing stairs is unlikely to have any significant MSK disorder. If the patient does have pain or stiffness, or difficulty with either of these activities, then a more detailed history should be taken.



Watch the real time run through and step by step GALS examination videos.

www.arthritis-uk.org/the-MSK-examination-GALS/

The screening examination (GALS)

This examination was devised for use in routine clinical assessment and takes 1 to 2 minutes to perform. It involves inspecting carefully for joint swelling and abnormal posture, as well as assessing the joints for normal movement.

If an abnormality of an individual area is noted in the GALS screen, that area should be examined in more detail using the REMS. The GALS screen is not designed to tell you what the problem is, only that there is a problem that requires further assessment.

The sequence in which these four elements (**Gait, Arms, Legs** and **Spine**) are assessed can be varied – in practice, it is usually more convenient to complete the elements for which the patient is standing before asking the patient to lie onto the couch.

You can view the GALS videos as a complete real-time run-through:



www.arthritis-uk.org/the-MSK-examination-GALS/

Or with step-by-step commentary:



www.arthritis-uk.org/the-MSK-examination-GALS/

Introduction

It is important to introduce yourself, explain to the patient what you are going to do, gain verbal consent to examine, and ask the patient to let you know if you cause them any pain or discomfort at any time. In all cases it is important to make the patient feel comfortable about being examined and this extends to the clothing they wear and level of exposure.

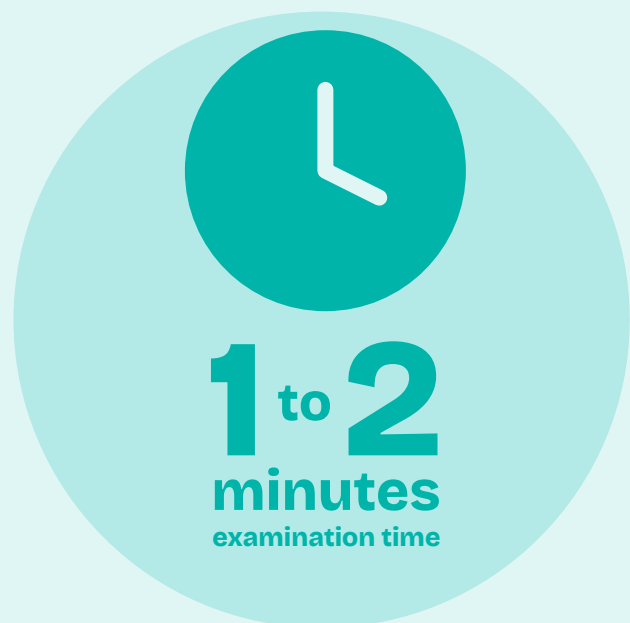
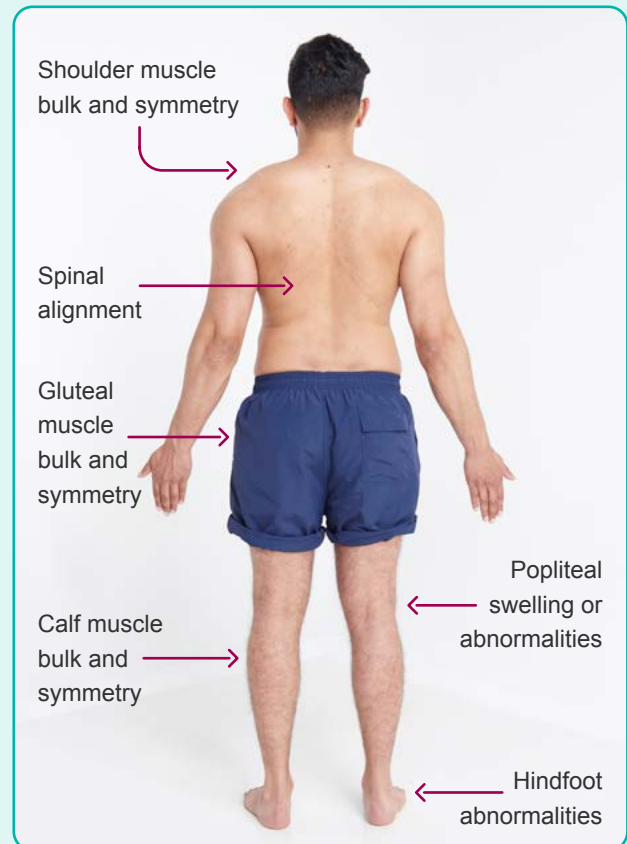
A good MSK examination relies on patient cooperation, in order for them to relax their muscles, but also the ability to view and compare joints and muscle groups if important clinical signs are not to be missed.

Gait

- Ask the patient to walk a few steps, turn and walk back. Observe the patient's gait for symmetry, smoothness and the ability to turn quickly.
- With the patient standing in the anatomical position, observe from behind, from the side, and from in front for:
 - bulk and symmetry of the shoulder, gluteal, quadriceps and calf muscles
 - limb alignment
 - alignment of the spine
 - equal level of the iliac crests
 - ability to fully extend the elbows and knees
 - popliteal swelling
 - abnormalities in the feet such as an excessively high or low arch profile, clawing/ retraction of the toes and/or presence of hallux valgus (see **Figure 6**).

Figure 6

With the patient in the anatomical position, observe from behind, from the side and from the front, checking for:



The screening examination (GALS) (continued)

Arms

- Ask the patient to put their hands behind their head. This assesses shoulder abduction (the first movement affected by rotator cuff problems) and external rotation (the first movement affected by glenohumeral problems). It also assesses elbow flexion.
- Ask the patient to straighten out their arms completely to assess full elbow extension (the first movement affected by elbow problems).
- With the patient's hands held out, palms down, fingers outstretched, observe the backs of the hands for joint swelling and deformity. Inspect the nails and skin at the same time.
- Ask the patient to turn their hands over (the movement of supination assesses both wrist and elbow movement).
- Look at the palms for muscle bulk and for any visual signs of abnormality.
- Ask the patient to make a fist. Visually assess power grip, hand and wrist function, and range of movement in the fingers.
- Ask the patient to squeeze your fingers. Assess grip strength.
- Ask the patient to bring each finger in turn to meet the thumb. Assess fine precision pinch (which is important functionally).
- Gently squeeze across the MCP joints to check for tenderness suggesting inflammation within the joints (see **Figure 7**). (Be sure to watch the patient's face for non-verbal signs of discomfort.)

Figure 7

MCP squeeze test. Gently squeeze across the metacarpophalangeal joints to check for tenderness suggesting inflammation within the joints.



Figure 8

Patellar tap test. Slide your hand down the patient's thigh, compressing the suprapatellar pouch. This forces any effusion behind the patellar. With two or three fingers of the other hand, push the patella down gently. In a positive test the patella will bounce and tap.



Legs

- With the patient lying on the couch, assess full flexion and extension of both knees, feeling over the tibiofemoral joint line for crepitus during the movements.
- With the hip and knee flexed to 90°, holding the knee and ankle to guide the movement, assess internal rotation of each hip in flexion (this is often the first movement affected by hip problems).
- Perform a check for a knee effusion using either a patellar tap or a sweep/bulge test:
 - For a patellar tap, slide your hand down the thigh, pushing down over the suprapatellar pouch so that any effusion is forced behind the patella. When you reach the upper pole of the patella, keep your hand there and maintain pressure. Use two or three fingers of the other hand to push the patella down gently (see **Figure 8**). Does it bounce and 'tap'? This indicates the presence of a relatively large effusion.
 - Small effusions may not be detected with the patella tap test and a sweep/bulge test may be useful. For a sweep/bulge test, stroke the medial side of the knee upwards (towards the suprapatellar pouch) to empty the medial compartment of fluid, then stroke the lateral side downwards (distally) (see **Figure 9**). The medial side may refill and produce a bulge of fluid indicating an effusion.
- From the end of the couch, inspect the feet for localised or general swelling, deformity such as hallux valgus, clawing of the toes, and callosities on the soles which typically occur under the metatarsophalangeal (MTP) joints.
- Squeeze across the MTP joints to check for tenderness suggesting inflammatory joint disease. (Be sure to watch the patient's face for signs of discomfort.)

Figure 9

Sweep/bulge test. Stroke the medial side of the knee upwards towards the suprapatellar pouch. This empties the medial compartment of fluid. The stroke the lateral side downwards (distally). The medial side may refill and produce a bulge of fluid, indicating the presence of an effusion.



The screening examination (GALS) (continued)

Spine

- With the patient standing, inspect the spine from behind for evidence of scoliosis, and from the side for abnormal lordosis or kyphosis. Note any obvious asymmetry by looking from behind, initially at the shoulders, then the pelvis, the backs of the knees and then the ankle.
- Ask the patient to tilt their head to each side, bringing the ear towards the shoulder. Assess lateral flexion of the neck (this is sensitive in the detection of early neck problems).
- Ask the patient to bend to touch their toes. This movement is the first movement affected by lumbar spinal problems and is important functionally (for dressing). However, it can be achieved by relying on good hip flexion, so it is important to palpate for normal movement of the vertebrae. Assess lumbar spine flexion by placing two or three fingers on the lumbar vertebrae. Your fingers should move apart on flexion and back together on extension (see **Figure 10**).

Recording the findings from the screening examination (GALS)

It is important to record both positive and negative findings in the notes. The presence or absence of changes – in appearance or movement – in the gait, arms, legs or spine should be recorded. For a normal result 'GALS: NAD' is sufficient. If there are abnormalities such as swelling or restriction of movement, these should be recorded with a brief descriptive note.

If you have been alerted to an MSK problem – by the screening questions, your examination or the spontaneous complaints of the patient – you will need to take a detailed history (as described above). You should also conduct a regional examination of relevant joints – this is described in the sections that follow.

Figure 10

Assessing lumbar spine flexion. Place two or three fingers on the lumbar vertebrae. Your fingers should move apart on flexion and back together on extension.



Performing a regional examination of the musculoskeletal system (REMS)

REMS refers to the more detailed examination that should be carried out once an abnormality has been detected either through the history or through the screening examination (GALS). REMS involves the examination of a group of joints that are linked by function, and may sometimes require a detailed neurological and vascular examination.

REMS was born out of a desire to standardise and simplify examination of the MSK system, allowing for more systematic teaching and learning for medical students. It is now being used more widely within medical practice and members of the wider MSK team. It was developed through a national consensus process involving UK consultants in rheumatology, orthopaedics and care of the elderly, and selected general practitioners (Coady et al. 2004). It led to an agreed set of 'core' skills (see **Appendix 2**).

There are some key stages which need to be completed during an examination of the joints in any part of the body:

- Introduce yourself.
- **Look** at the joint(s).
- **Feel** the joint(s).
- **Move** the joint(s).
- **Function** of the joint(s).
- Special tests.



Introduce yourself

As highlighted in the GALS screening assessment, it is important to introduce yourself, explain to the patient what you are going to do (and why), gain verbal consent to examine, and ask the patient to let you know if you cause them any pain or discomfort at any time.



Look

The examination should always start with a visual inspection of the exposed area at rest. Compare one side with the other, checking for symmetry. You should look specifically for skin changes, muscle bulk, and swelling in and around the joint. Look also for deformity in terms of alignment and posture of the joint.



Feel

Using the back of your hand, feel for skin temperature across the joint line and at relevant neighbouring sites. Any swellings should be assessed for fluctuance and mobility. The hard, bony swellings of OA should be distinguished from the soft, rubbery swellings of inflammatory joint disease. Tenderness is an important clinical sign to elicit – both in and around the joint. Identifying inflammation of a joint (synovitis) relies on detecting the triad of **warmth, swelling and tenderness**.



Move

The full range of movement of the joint should be assessed. Compare one side with the other. Generally, both active movements (where the patient moves the joint themselves) and passive movements (where the examiner moves the joint) should be performed. If there is a loss of active movement, but passive

movement is unaffected, this may suggest a problem with the muscles, tendons or nerves rather than the joints themselves, or it may be an effect of pain in the joints. In certain instances, joints may move further than expected – this is called hypermobility.

It is important to elicit a loss of full flexion or a loss of full extension as either may affect function. A loss of movement should be recorded as mild, moderate or severe. Specialists may often document how many degrees of movement are restricted since this allows future comparison to be made. The quality of movement should also be recorded, with reference to abnormalities such as increased muscle tone or the presence of crepitus. With experience it is possible to assess the quality particularly at the extremes or 'end range' of movement. A degenerative joint often has a more solid 'end feel'.



Function

It is important to make a functional assessment of the joint – for example, in the case of limited elbow flexion, does this make it difficult for the patient to bring their hands to their mouth? In the case of the lower limbs, function mainly involves gait and the patient's ability to get out of a chair and walk.



Special tests

Several additional tests may be used by experienced MSK practitioners as an adjunct to the REMS examination. Known as 'special tests', these are often performed towards the end of the examination and would follow on from 'Move' and 'Function'.

Covering all possible tests, including their specificity and sensitivity in different scenarios, is beyond the scope of this guide. However, a small number of tests that may be appropriate for undergraduates have been included and highlighted in the sections that follow.



www.arthritis-uk.org/REMS-general-principles/



The REMS examination

For the purposes of this guide (and the accompanying videos) the REMS examination has been divided into seven areas, each of which is described in detail below. However, it should be remembered that this is an artificial division and that one group of joints may need to be examined in conjunction with another group (for example, the shoulder and cervical spine).

Examination of the hand and wrist



www.arthritis-uk.org/examination-of-the-hand-and-wrist/

This should normally take place with the patient's forearms exposed to above the elbows. The patient's hands should be resting on a pillow as it can be painful for patients with elbow or shoulder problems to hold their hands up for long periods.



Look

With the patient's hands palms down:

- Look at the posture and check for obvious swelling, deformity, muscle wasting and scars.
- Look at the skin for thinning and bruising (possible signs of long-term steroid use) or rashes.
- Look at the nails for psoriatic changes such as pitting or onycholysis (see **Figure 11**), and evidence of nailfold vasculitis.
- Decide whether the changes are symmetrical or asymmetrical.
- Do the changes mainly involve the small joints (PIPs and DIPs, MCPs etc) or the wrists?

Figure 11

Fingernails affected by psoriasis:

(a) pitting; (b) onycholysis



(a)



(b)

It is often helpful to structure the inspection from proximal to distal to ensure that all areas are systematically assessed.

Ask the patient to turn their hands over:

- Does the patient have problems with this due to proximal or distal radioulnar joint involvement?

With the patient's hands palms up:

- Look again for muscle wasting – if present, is it in both the thenar and hypothenar eminences? If it is only in the thenar eminence, then perhaps the patient has carpal tunnel syndrome. Look for signs of palmar erythema. Look at the wrist for a carpal tunnel release scar.
- Look at the elbow for rheumatoid nodules, psoriatic plaques and surgical scars.



Feel

With the patient's hands palms up:

- Feel for peripheral pulses (ischaemia could be causing pain).
- Feel for bulk of the thenar and hypothenar eminences and for tendon thickening.
- Assess median and ulnar nerve sensation by gently touching over both the thenar and hypothenar eminences, and the index and little fingers respectively – if not normal and equal, this may indicate an entrapment neuropathy.

Ask the patient to turn their hands back over, so their palms are face down:

- Assess radial nerve sensation by light touch over the thumb and index finger web space.
- Using the back of your hand, assess skin temperature at the patient's forearm, wrist and MCP joints. Are there differences?

- Gently squeeze across the row of MCP joints to assess for tenderness (watching the patient's face for signs of discomfort).
- Bimanually palpate any MCP joints and any PIP or DIP joints that appear swollen or painful. Is there evidence of active synovitis? (The joints will be warm, swollen and tender and may have a 'rubbery' feel, or you may even detect effusions).
- Are there hard, bony swellings? Check for squaring of the carpometacarpal (CMC) joint of the thumb and for Heberden's nodes on the DIPs. There may be evidence of previous synovitis (thickened, rubbery but non-tender joints).
- Compare one joint with another, or with your own, to decide whether the small joints are normal.
- Bimanually palpate the patient's wrists.
- Finally run your hand up the patient's arm along the ulnar border to the elbow. Feel and look for rheumatoid nodules or psoriatic plaques on the extensor surfaces.



Move

- Ask the patient to straighten their fingers fully (against gravity). If the patient is unable to do this it may be due to joint disease, extensor tendon rupture or neurological damage – this can be assessed by moving the fingers passively.
- Ask the patient to make a fist. If they have difficulty tucking the fingers into the palm, this may be an early sign of tendon or small joint involvement. Move the fingers passively to assess whether the problem is with the tendon or nerves, or in the joint.
- Assess wrist flexion and extension actively (for example by making the 'prayer' sign) and passively (see **Figure 12**).

Examination of the hand and wrist (continued)

Figure 12

The 'prayer sign' assesses wrist flexion and extension. If the patient's history and examination suggest carpal tunnel syndrome, Phalen's test (forced flexion of the wrist for 60 seconds) may reproduce the patient's symptoms.



- In patients where the history and examination suggest carpal tunnel syndrome, perform Phalen's test (forced flexion of the wrists for 60 seconds) – in a positive test this reproduces the patient's symptoms.
- Assess the median and ulnar nerves for power. This can be done by abduction of the thumb, and finger spread, respectively.



Function

- Ask the patient to grip your two fingers to assess power grip.
- Ask the patient to pinch your finger. This assesses pincer grip, which is very important functionally.
- Ask the patient to pick a small object such as a coin out of your hand or check their ability to undo buttons. This assesses pincer grip and function.



Examination of the elbow



www.arthritis-uk.org/examination-of-the-elbow/

Look

- Look from the front for the carrying angle, and from the side for flexion deformity.
- Look for scars, rashes, muscle wasting, rheumatoid nodules, psoriatic plaques, and swellings such as olecranon bursitis.

Feel

- Using the back of your hand, feel the temperature across the joint and the forearm.
- Hold the forearm with one hand and, with the elbow flexed to 90°, palpate the elbow, feeling the head of the radius and the joint line with your thumb. If there is swelling, is it fluctuant? Synovitis is usually felt as a fullness between the olecranon and the lateral epicondyle.
- Palpate the medial and lateral epicondyles (for golfer's and tennis elbow respectively) and the olecranon process for tenderness and evidence of bursitis.

Move

- Does the elbow extend fully and flex fully? Assess both actively and passively, and compare one side with the other. If there is limitation, note how severe it is.
- Assess pronation and supination, both actively and passively, feeling for crepitus.

Function

- An important function of the elbow is to allow the hand to reach the mouth. Other functionally important movements (such as hands behind head) will have been assessed during the screening examination.

Examination of the shoulder

Look

- With the shoulder fully exposed, inspect the patient in stance from the front, from the side and from behind, checking for symmetry, posture, muscle wasting and scars.

Feel

- Assess the temperature over the front of the shoulder (the glenohumeral joint).
- Palpate the bony landmarks for tenderness, starting at the sternoclavicular joint, then the clavicle, acromioclavicular joint, acromion process and around the scapula.
- Palpate the glenohumeral joint line – anterior and posterior.
- Palpate the muscle bulk of the supraspinatus, infraspinatus and deltoid muscles.



www.arthritis-uk.org/examination-of-the-shoulder/

Examination of the shoulder (continued)



Move

- Ask the patient to put their hands behind their head to assess external rotation, and then behind their back to assess internal rotation, comparing one side with the other. If there is a restriction in the latter movement, describe how far the patient can reach – for example, to the lumbar, lower thoracic or mid-thoracic level.
- With the elbow flexed at 90° and tucked into the patient's side, assess external rotation of the shoulder. Loss of external rotation may indicate adhesive capsulitis ('frozen shoulder') or other glenohumeral joint problems.
- Ask the patient to raise their arms behind them and to the front. Assess flexion and extension.

- Ask the patient to abduct the arm to assess for a painful arc (between 10° and 120°) (see **Figure 13**). Can you passively take the arm further? Be sure to assess abduction from behind the patient and observe scapular movement. Restricted glenohumeral movement can be compensated for by scapular/thoracic movements.



Function

- Function of the shoulder includes getting the hands behind the head and back. This is important in washing, toileting and other self-care. If this has not been assessed during the screening examination, it should be done now.

Figure 13

Abduction of the arm to assess for a painful arc.



Examination of the hip



Look

- With the patient standing, assess for muscle wasting (gluteal muscle bulk in particular).
- With the patient lying flat and face up, observe the legs, comparing one side with the other – is there an obvious flexion deformity of the hip suggesting OA?
- If there is a suggestion of leg length disparity, assess true leg lengths using a tape measure. Measurements are taken from the anterior superior iliac crest to the medial malleolus of the ankle on the same side. Compare the measurements. In a fractured neck of femur, the leg is shortened and externally rotated. There may also be an indication of this on the patient's footwear with excessive wear on one heel.
- Check for scars overlying the hip.



Feel

- Palpate over the greater trochanter for tenderness (suggestive of trochanteric bursitis) and in the groin for true hip joint problems.



Move

- With the knee flexed at 90°, assess full hip flexion, comparing one side with the other and watching the patient's face for signs of pain.
- Assess for a fixed flexion deformity of the hip by performing the Thomas test. Keep one hand under the patient's back to ensure that normal lumbar lordosis is removed. Fully flex one hip and observe the opposite leg (see **Figure 14**). If it lifts off the couch, then there

Figure 14

Thomas test for fixed flexion deformity of the hip. Keep one hand under the patient's back to ensure that there is no lumbar lordosis. Fully flex one hip. If the opposite leg lifts off the couch, there is a fixed flexion deformity. (As the pelvis tilts a normal hip would extend allowing the leg to remain on the couch.)



is a fixed flexion deformity in that hip (as the pelvis is forced to tilt, a normal hip would extend allowing the leg to remain on the couch).

- With the hip and knee flexed at 90°, assess internal and external rotation of both hips. This is often limited in hip disease and internal rotation is frequently the first movement affected (see GALS screen).
- Assess the hip and proximal (gluteal) muscle strength by performing the Trendelenburg test. This involves the patient alternately standing on each leg alone. In a negative test, the pelvis remains level or even rises. In an abnormal test, the pelvis will dip on the contralateral side. (See **Figure 15**.)



Function

- Ask the patient to walk – look for an antalgic or Trendelenburg gait. An antalgic gait simply means a painful gait, normally resulting in a limp. A Trendelenburg gait results from proximal muscle weakness and commonly results in a ‘waddling’ walk.



www.arthritis-uk.org/examination-of-the-hip/

Figure 15

The Trendelenburg test assesses hip and gluteal muscle strength. In a normal test, the pelvis remains level. In an abnormal test, the pelvis dips on the contralateral side.



Examination of the knee



www.arthritis-uk.org/examination-of-the-knee/

Look

- From the end of the couch and with the patient's legs straight, observe the knees, comparing one with the other for symmetry and alignment.
- Is the posture of the knee normal? Look for valgus deformity – where the leg below the knee is deviated laterally (knock-kneed) – and for varus deformity – where the leg below the knee is deviated medially (bow-legged).
- Check for a knee flexion deformity (distinguishing this from hip flexion deformity by examining hip movements as above).
- Check for muscle wasting of the quadriceps or scars.

- Look for redness suggesting inflammation or infection.
- Look for obvious swelling.
- Check for a rash suggesting psoriasis (usually on the extensor surface of the knee).

NOTE: Popliteal swellings, varus and valgus deformities may be more apparent with the patient weight-bearing.



Feel

- Using the back of your hand, feel the skin temperature, starting with the mid-thigh and comparing it to the temperature over the knee. Compare one knee to the other.
- Palpate for tenderness along the borders of the patella.
- With the knee flexed to 90°, palpate for tenderness and swelling along the joint line from the femoral condyles to the inferior pole of the patella, then down the inferior patella tendon to the tibial tuberosity.
- Feel behind the knee for a popliteal (Baker's) cyst.
- Assess for an effusion by performing either a sweep/bulge test or a patellar tap, as described in the section on the GALS screening examination (see **Figures 8 and 9** on pp.30,31).

Figure 16

Anterior draw test. Place both hands around the upper tibia, with your thumbs over the tibial tuberosity and your index fingers tucked under the hamstrings to make sure these are relaxed. Stabilise the lower tibia with your forearm and gently pull the upper tibia forward. There should normally be a small degree of movement; more substantial movement suggests laxity of the anterior cruciate ligaments.





Move

- Ask the patient to flex the knee as far as possible to assess active movement. Making sure the patient is fully relaxed, assess passive movement. This is done by placing one hand on the knee (feeling for crepitus) and flexing the knee as far as possible, noting the range of movement. Assess full flexion and extension of the knees, comparing one to the other.
- With the knee flexed to 90°, check the stability of the knee ligaments. Look initially from the side of the knee, checking for a posterior sag or step-back of the tibia, suggesting posterior cruciate ligament damage.
- Perform an anterior draw test. Place both hands round the upper tibia, with your thumbs over the tibial tuberosity and index fingers tucked under the hamstrings to make sure these are relaxed. Stabilise the lower tibia with your forearm and gently pull the

upper tibia forward (see **Figure 16**). In a relaxed, normal patient there is normally a small degree of movement. More significant movement suggests anterior cruciate ligament laxity.

- Assess medial and lateral collateral ligament stability by flexing the knee to 15° and alternately stressing the joint line on each side. Place one hand on the opposite side of the joint line to that which you are testing and apply force to the lower tibia (see **Figure 17**). This may be done with the leg on the couch or with the lower tibia supported on the side of the examiner's hip.



Function

- Ask the patient to stand and then walk a few steps, looking again for a varus or valgus deformity (see **Figure 18**).

Figure 17

Assessing medial and lateral collateral ligament stability. With the patient's leg on the couch or supported on your pelvis, place one hand on the opposite side of the joint line to that which you are testing and alternately stress the joint line on each side by applying gentle force on the tibia.



Figure 18

With the patient standing, assess for a varus or valgus deformity.



Examination of the foot and ankle



www.arthritis-uk.org/examination-of-the-foot-and-ankle/



Look

With the patient sitting on the couch, their feet overhanging the end of it:

- Observe the feet, comparing one with the other for symmetry.
- Look specifically at the forefoot for nail changes or skin rashes, such as psoriasis.
- Look for alignment of the toes, evidence of hallux valgus of the big toe or subluxation (partial dislocation) of the joints.
- Look for clawing of the toes, joint swelling and callus formation which typically occurs over the metatarsophalangeal joints on the plantar aspect and over the dorsum and/or apex of the toes.
- Look at the underside or plantar surface for callus formation.
- Look at the patient's footwear. Check for abnormal or asymmetrical wearing of the sole or upper, for evidence of poor fit or the presence of special insoles.

With the patient weight-bearing:

- Look again at the forefoot for toe alignment and whether they are in contact with the ground.
- Look at the midfoot for foot arch position (a low arch profile in a patient with normal joint movement should resolve when standing on tip toes).

- From behind, look at the hindfoot for Achilles tendon thickening or swelling.
- Look for normal alignment of the hindfoot (see **Figure 18**). Disease of the ankle or subtalar joint may lead to a varus or valgus deformity.



Feel

- Assess the temperature over the forefoot, midfoot and ankle.
- Check for the presence of a peripheral pulse palpating the dorsalis pedis on the dorsum of the foot.
- Gently squeeze across the MTP joints, watching the patient's face for signs of pain or discomfort.
- Palpate the midfoot, the ankle and subtalar joints for tenderness.



Move

- Assess, both actively and passively, movements of inversion and eversion at the subtalar joint, plus dorsi- and plantar flexion at the big toe and ankle joint checking for any restrictions and/or crepitus.
- Movement of the mid-tarsal joints can also be performed by fixing the heel with one hand and, with the other hand, passively inverting and evert the forefoot.



Function

- If not already done, assess the patient's gait, watching for the normal cycle of heel strike, stance, and toe-off, speed of walking and turning.

Examination of the spine



www.arthritis-uk.org/examination-of-the-spine/

Look

- Observe the patient standing. Look initially from behind the patient for any obvious muscle wasting, asymmetry, or scoliosis of the spine.
- Look from the side for normal cervical lordosis, thoracic kyphosis, and lumbar lordosis.

Feel

- Feel down the spinal processes from the top of the neck to the sacrum and over the sacroiliac joints for alignment and tenderness.
- Palpate the paraspinal muscles for tenderness.

Move

- Assess lumbar flexion and extension by placing two or three fingers over the lumbar spine. Ask the patient to bend to touch their toes. Your fingers should move apart during flexion and back together during extension (see **Figure 10** on p.32).
- Ask the patient to run each hand in turn down the outside of the adjacent leg to assess lateral flexion of the spine.
- Next, assess the cervical spine movements. Ask the patient to: tilt their head to each side, bringing the ear towards the adjacent shoulder (lateral flexion); turn their head to look over each shoulder (rotation); bring their chin towards their chest (flexion); and tilt their head backwards (extension). As highlighted

in the GALS screen, lateral flexion is usually the first movement to be restricted.

- With the patient sitting on the edge of the couch to fix their pelvis, and their arms crossed in front of them, assess thoracic rotation (with your hands on the patient's shoulders to guide the movement) (see **Figure 19**).
- With the patient lying as flat as possible, perform straight leg raising (see **Figure 20**). Dorsiflexion of the foot with the leg raised may exacerbate the pain from a nerve root entrapment or irritation such as that caused by a prolapsed intervertebral disc.

A brief neurovascular examination should be carried out including assessment of upper and lower limb reflexes, dorsiflexion of the big toe, and assessment of peripheral pulses. If there has been any indication from the history of a relevant abnormality, a full neurological and vascular assessment – including sensation, tone and power – should also be made.

Figure 19

With the patient seated on the couch to fix the pelvis, assess thoracic rotation.



Figure 20

Dorsiflexion of the foot with the leg straight and raised may exacerbate pain from a nerve root entrapment or prolapsed disc.



Recording the findings from the regional examination

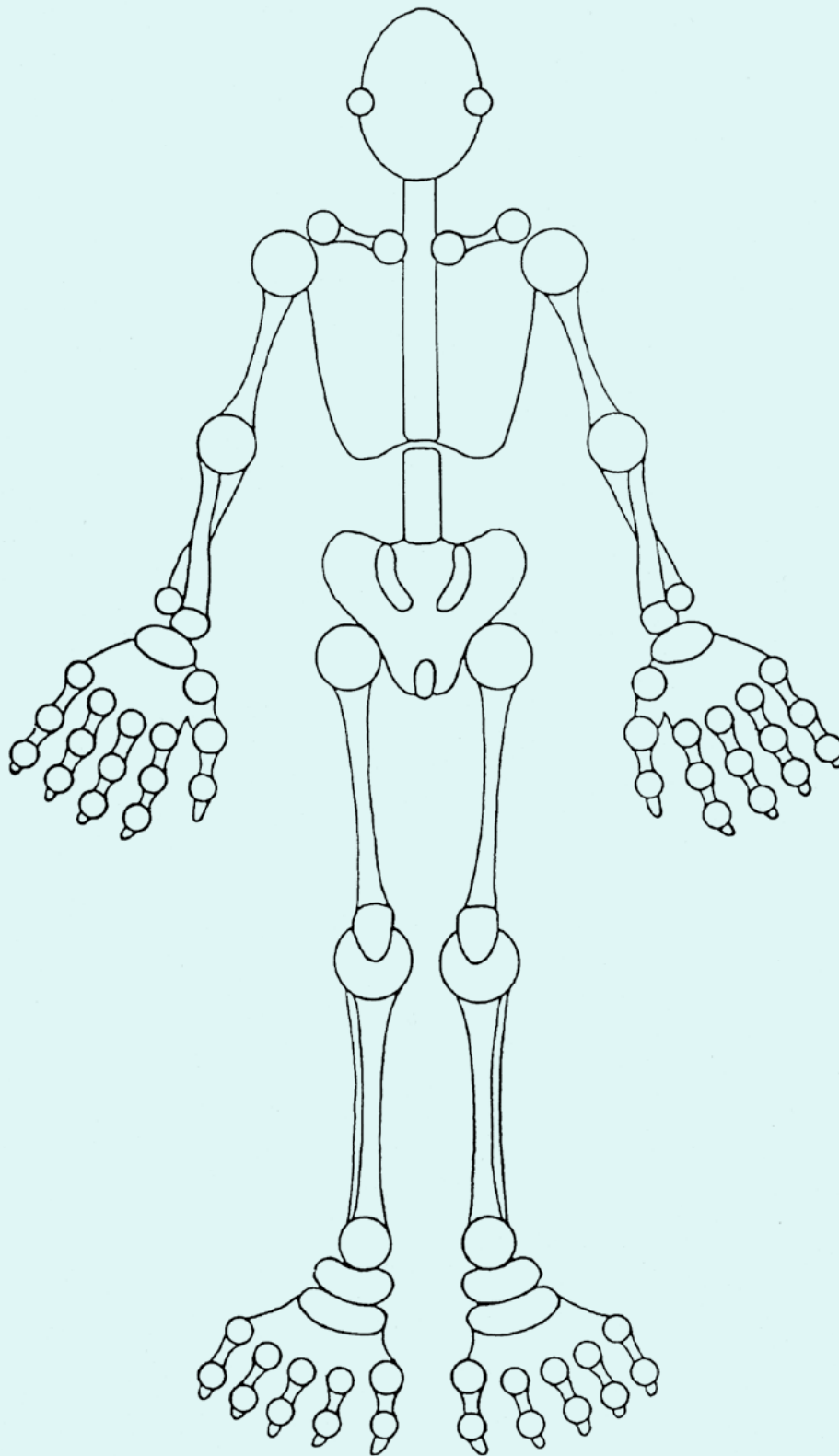
The positive and significant negative findings of the REMS examination are usually documented longhand in the notes. You may find it helpful to document joint involvement on a homunculus such as the one shown in **Figure 21**. In electronic patient records there is often a similar

homunculus for ease of documentation. The total number of tender and swollen joints can be used for calculating a Disease Activity Score (DAS) – these are useful in monitoring disease severity and response to treatment over time.



Figure 21

Printed homunculus for annotation.





5

Investigations

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Investigations

There are three main types of investigations that can be used to further classify MSK presentations:

- imaging of bones and joints
- blood tests
- synovial fluid analysis.

This guide aims to outline the methods you might use in the initial clinical assessment and so a comprehensive overview of investigations is not possible here. However, this section gives a brief introduction to some of the investigations that might be considered.

Imaging of bones and joints

A plain x-ray of the affected joint is one of the most useful investigations. Changes that occur on plain x-ray can be characteristic of specific MSK diseases such as RA, OA and gout. Most changes occur over a prolonged period and x-rays can therefore provide a useful historical record.

Ultrasound is becoming increasingly widely used, particularly in identifying early joint inflammation (see **Figures 22, 23**), although it doesn't necessarily add significantly to the clinical assessment in patients with clinical signs. Other investigations – including magnetic resonance imaging (MRI), computerised tomography (CT) scanning, isotope bone scans and dual-energy x-ray absorptiometry (DEXA) scans (for osteoporosis) – all have an important role.

Figure 22

Grey-scale scan of early OA of the 1st metatarsophalangeal joint, showing a small anechoic effusion with some hypoechoic synovial thickening within the joint capsule. (A = anechoic effusion; H = hypoechoic synovium)

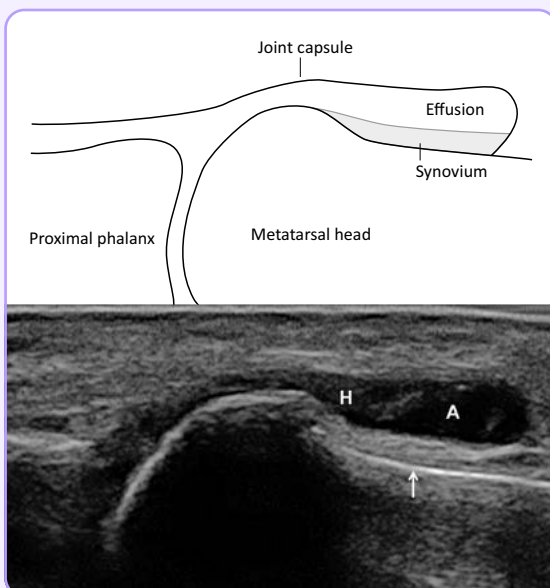
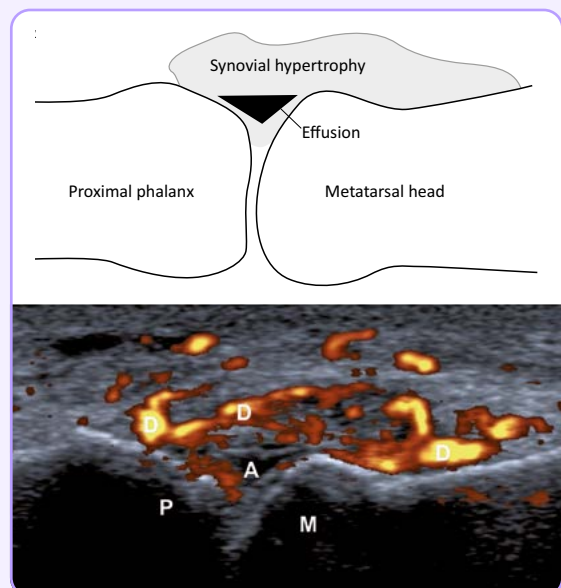


Figure 23

Power Doppler scan of the 1st metatarsophalangeal joint, showing a small anechoic effusion surrounded by a grade 3 Doppler signal that represents florid synovitis. (A = anechoic effusion; D = Doppler signal; M = metatarsal head; P = proximal phalanx)



Blood tests

Blood tests can be useful in indicating the degree of inflammation and in monitoring response to therapy as well as helping to achieve a diagnosis:

- The **erythrocyte sedimentation rate (ESR)** is one of the best-known inflammatory markers and indicates what has been happening over the last few days or longer. It is non-specific and influenced by many things including anaemia.
- **C-reactive protein** responds more rapidly to changes in inflammation – normally within days.
- **Serum uric acid** may be raised in gout, although it may be unreliable during an acute episode.
- Increased titres of a number of autoantibodies may be found, although their significance is not always clear. Tests for **rheumatoid factor** and **anti-CCP (cyclic citrullinated peptide)** antibody, for example, are both often strongly positive in patients with rheumatoid arthritis. However,

rheumatoid factor may also be positive in other disease states and in the elderly, and is therefore not highly specific.

It is also important to consider infection as a cause of an arthropathy, particularly in the case of a single joint – blood cultures for infection should be taken even if there is no fever.

Synovial fluid analysis

Obtaining a sample of synovial fluid for analysis is an important skill to learn and is vital to perform in order to exclude infection of a joint, which would normally present with an acute monoarthritis with systemic symptoms. Synovial fluid should be sent for culture and gram staining. If gout or other crystals are considered as a cause of the problem, the fluid is examined for crystals under a polarizing light microscope.



6

Conclusion

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Conclusion

This guide, together with the accompanying videos, has documented the core skills of musculoskeletal examination and history taking. However, the importance of guided clinical teaching and the development of clinical reasoning skills cannot be overemphasised. It is only through real-life clinical practice that competence and confidence in musculoskeletal clinical examination can be achieved.

We hope that you will find the guide valuable for reference and revision, but Arthritis UK is always delighted to receive feedback at:

professionalengagement@arthritis-uk.org

Appendix 1:

Revision checklists

History taking

(see p.16)

Symptoms

- ☐ Pain
- ☐ Stiffness
- ☐ Swelling
- ☐ Pattern of joint involvement

Evolution

- ☐ Acute or chronic?
- ☐ Associated events
- ☐ Response to treatment

Involvement of other systems

- ☐ Skin, eye, lung or kidney symptoms?
- ☐ Malaise, weight loss, fevers, night sweats?

Impact on patient's lifestyle

- ☐ Patient's needs/aspirations
- ☐ Ability to adapt to functional loss

GALS screening questions

(see p.26)

- ☐ Do you have any pain or stiffness in your muscles, joints or back?
- ☐ Can you dress yourself completely without any difficulty?
- ☐ Can you walk up and down stairs without any difficulty?

GALS screening examination

(see p.28)

Gait

- ☐ Observe gait
- ☐ Observe patient in anatomical position

Arms

- ☐ Observe movement – hands behind head
- ☐ Observe backs of hands and wrists
- ☐ Observe palms
- ☐ Assess power grip and grip strength
- ☐ Assess fine precision pinch
- ☐ Squeeze MCP joints

Legs

- ☐ Assess full flexion and extension
- ☐ Assess internal rotation of hips
- ☐ Assess for a knee effusion
- ☐ Inspect feet
- ☐ Squeeze MTP joints

Spine

- ☐ Inspect spine
- ☐ Assess lateral flexion of neck
- ☐ Assess lumbar spine movement

REMS general principles

(see p.34)

Introduction

- ☐ Introduce yourself
- ☐ Gain verbal consent to examine

Look for:

- ☐ Scars
- ☐ Swellings
- ☐ Rashes
- ☐ Muscle wasting

Feel for:

- ☐ Temperature
- ☐ Swellings
- ☐ Tenderness

Move

- ☐ Full range of movement – active and passive
- ☐ Restriction – mild, moderate or severe?

Function

- ☐ Functional assessment of joint

Examination of the hand and wrist

(see p.36)

- ☐ Introduce yourself/gain consent to examine
- ☐ Inspect hands (palms and backs) for muscle wasting, skin and nail changes
- ☐ Check wrist for carpal tunnel release
- ☐ Feel for radial pulse, tendon thickening and bulk of thenar and hypothenar eminences
- ☐ Assess median, ulnar and radial nerve sensation
- ☐ Assess skin temperature
- ☐ Squeeze MCP joints
- ☐ Bimanually palpate swollen or painful joints, including wrists
- ☐ Look and feel along ulnar border
- ☐ Assess full finger extension and full finger tuck
- ☐ Assess wrist flexion and extension – active and passive
- ☐ Assess median and ulnar nerve power
- ☐ Assess function: grip and pinch, picking up small object
- ☐ Perform Phalen's test (if suggestion of carpal tunnel syndrome)

Appendix 1:

Revision checklists (continued)

Examination of the elbow

(see p.39)

- ☐ Introduce yourself/gain consent to examine
- ☐ Look for scars, swellings or rashes
- ☐ Assess skin temperature
- ☐ Palpate over head of radius, joint line, medial and lateral epicondyles
- ☐ Assess full flexion and extension, pronation and supination – actively and passively
- ☐ Assess function – for example, hand to nose or mouth

Examination of the shoulder

(see p.39)

- ☐ Introduce yourself/gain consent to examine
- ☐ Inspect shoulders from in front, from the side and from behind
- ☐ Assess skin temperature
- ☐ Palpate bony landmarks and surrounding muscles
- ☐ Assess movement and function: hands behind head, hands behind back
- ☐ Assess (actively and passively) external rotation, flexion, extension and abduction
- ☐ Observe scapular movement

Examination of the hip

(see p.42)

- ☐ Introduce yourself/gain consent to examine

With the patient lying on couch:

- ☐ Look for flexion deformity and leg length disparity
- ☐ Check for scars
- ☐ Feel the greater trochanter for tenderness
- ☐ Assess full hip flexion, internal and external rotation
- ☐ Perform the Thomas test

With the patient standing:

- ☐ Look for gluteal muscle bulk
- ☐ Perform the Trendelenburg test
- ☐ Assess the patient's gait

Examination of the knee

(see p.44)

- ☐ Introduce yourself/gain consent to examine

With the patient lying on couch:

- ☐ Look from the end of the couch for varus/valgus deformity, muscle wasting, scars and swellings
- ☐ Look from the side for fixed flexion deformity
- ☐ Assess skin temperature
- ☐ With the knee slightly flexed palpate the joint line and the borders of the patella
- ☐ Feel the popliteal fossa
- ☐ Perform a patellar tap and cross fluctuation (bulge sign)
- ☐ Assess full flexion and extension (actively and passively)
- ☐ Assess stability of knee ligaments medial and lateral collateral – and perform anterior draw test

With the patient standing:

- ☐ Look again for varus/valgus deformity and popliteal swellings
- ☐ Assess the patient's gait

Examination of the foot and ankle

(see p.46)

- ☐ Introduce yourself/gain consent to examine

With the patient lying on couch:

- ☐ Look at dorsal and plantar surfaces of the foot
- ☐ Assess skin temperature
- ☐ Palpate for peripheral pulses
- ☐ Squeeze the MTP joints
- ☐ Palpate the midfoot, ankle joint line and subtalar joint
- ☐ Assess movement (actively and passively) at the subtalar joint (inversion and eversion), the big toe (dorsi- and plantar flexion), the ankle joint (dorsi- and plantar flexion) and mid-tarsal joints (passive rotation)
- ☐ Look at the patient's footwear

With the patient standing:

- ☐ Look at the forefoot, midfoot (foot arch) and the hindfoot
- ☐ Assess the gait cycle (heel strike, stance, toe-off)

Appendix 1: Revision checklists (continued)

Examination of the spine

(see p.47)

- ☐ Introduce yourself/gain consent to examine

With the patient standing:

- ☐ Inspect from the side and from behind
- ☐ Palpate the spinal processes and paraspinal muscles
- ☐ Assess movement: lumbar flexion and extension and lateral flexion; cervical flexion, extension, rotation and lateral flexion

With the patient sitting on couch:

- ☐ Assess thoracic rotation

With the patient lying on couch:

- ☐ Perform straight leg raising and dorsiflexion of the big toe
- ☐ Assess limb reflexes



Appendix 2:

The core set of regional musculoskeletal examination skills appropriate for a medical student at the point of qualification

(Coady et al. 2004)

A student at the point of qualification should be able to:

1. detect the difference between bony and soft tissue swelling
2. elicit tenderness around a joint
3. elicit temperature around a joint
4. detect synovitis
5. understand the difference between active and passive movements
6. perform passive and active movements at all relevant joints
7. detect a loss of full extension and a loss of full flexion
8. assess gait
9. correctly use the terms 'varus' and 'valgus'
10. assess limb reflexes routinely – when examining the spine and in other relevant circumstances
11. have an understanding of the term 'subluxation'
12. where appropriate, examine neurological and vascular systems when assessing a problematic joint (check for intact sensation and peripheral pulses)
13. assess leg length with a tape measure when assessing for a real leg length discrepancy
14. make a qualitative assessment of movement (features such as cog-wheeling)
15. assess the median and ulnar nerves
16. be able to localise tenderness within the joints of the hand (palpate each small joint of the hand if necessary)
17. assess power grip
18. assess pincer grip in the hand
19. make a functional assessment of the hand such as holding a cup
20. correctly use the term 'Heberden's nodes'
21. be able to perform Phalen's test
22. detect a painful arc and frozen shoulder
23. make a functional assessment of the shoulder (can the patient put their hands behind their head and back?)
24. perform external/internal rotation of the shoulder with the elbow flexed to 90° and held in against the patient's side
25. examine a patient's shoulder from behind for scapular movement
26. assess the acromioclavicular joint (by palpation alone)
27. palpate for tenderness over the epicondyles of the elbow
28. palpate for tenderness over the greater trochanter of the hip
29. perform internal and external rotation of the hip with it flexed to 90°
30. perform Trendelenburg test
31. perform the Thomas test
32. detect an effusion at the knee
33. perform a patellar tap
34. demonstrate cross-fluctuation or the bulge sign when looking for a knee effusion
35. test for collateral ligament stability in the knee
36. use the anterior draw test to assess anterior cruciate ligament stability in the knee

Appendix 2:

The core set of regional musculoskeletal examination skills appropriate for a medical student at the point of qualification (continued)

(Coady et al. 2004)

- 37.** examine the soles of a patient's feet
- 38.** recognise hallux valgus, claw and hammer toes
- 39.** assess a patient's feet with them standing
- 40.** assess for flat feet (including the patient standing on tip toes)
- 41.** recognise hindfoot/heel pathologies
- 42.** assess plantar and dorsiflexion of the ankle
- 43.** assess movements of inversion and eversion of the foot
- 44.** assess the subtalar joint
- 45.** perform a lateral squeeze across the metatarsophalangeal joints
- 46.** assess flexion/extension of the big toe
- 47.** examine a patient's footwear
- 48.** palpate the spinal processes
- 49.** assess lateral and forward flexion of the lumbar spine (using fingers, not tape measure)
- 50.** assess thoracic rotation with the patient sitting.

Appendix 3: pGALS and pREMS

pGALS follows the same approach as GALS but with additions as listed in the table below. These were added as adult GALS missed significant abnormalities when tested on school-aged children.

Movement	Purpose
Walk on heels and then on tiptoes.	Assesses foot and ankles, gives information about balance and co-ordination.
Open mouth and insert 3 of the child's own fingers into their mouth.	Assesses temporomandibular joint opening and symmetry.
Reach up and touch the sky.	Assesses full extension at the elbow joint and rotation at the shoulder joints.
Look at the ceiling.	Assesses cervical spine extension.

pREMS follows the same approach as REMS with 'look, feel, move' but with the addition of 'measure' in certain regions (for example, measurement of leg length or thigh girth). The table below lists suggestions for examinations (for example, neurological or muscle strength) that should be conducted in addition to those included in the adult REMS.



Video demonstrations of pGALS and pREMS are available at Paediatric Musculoskeletal Matters:

www.pmmonline.org

Movement

Hand and wrist

- Tinel's test (carpal tunnel syndrome)
- Nailfold capillaroscopy
- Hypermobility

Elbow

- Muscle power
- Peripheral nerves
- Peripheral pulses
- Hypermobility
- Entheses

Shoulder

- Muscle power
- Peripheral nerves
- Peripheral pulses
- Hypermobility

Spine

- 1-leg standing spine extension test

Hip

- Gower's test
- Entheses
- Muscle power
- Hypermobility

Knee

- Clarke's test
- Patellar tracking
- Thigh-foot angle
- Hamstring tightness
- Iliotibial band tightness

- Knock-knee/bow-leg assessment
- Thigh girth measurement
- Muscle power
- Hypermobility
- Normal development of leg alignment

Foot and ankle

- Thigh-foot angle
- Hypermobility
- Entheses
- Muscle power
- Nailfold capillaroscopy

Gait

- Limb and trunk proportions
- Jaw profile

Hypermobility and inherited collagen disorders

- Beighton score
- Hypermobility
- Habitus
- Skin elasticity
- Sclerae

Entheses

- Knee
- Foot and ankle

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Endorsements



This guide is endorsed by the British Society for Rheumatology. Rheumatology is a fun, friendly and rewarding specialty, with a strong focus on teamwork and cohesiveness across the entire multidisciplinary team. Rheumatologists work closely with other specialties to solve difficult diagnoses and often have an active role in research; trainees have plenty of opportunities to get involved in education, clinical governance and management.

The British Society for Rheumatology is there for you from the start of your career in the specialty. They'll help you progress, collaborate and innovate to deliver the best care for your patients through a wide range of courses, conferences, fellowships, bursaries and awards, and peer-reviewed eLearning lectures and modules.

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This guide is endorsed by the British Orthopaedic Association. The BOA supports around 5,000 members across the UK and internationally, bringing together professionals working in trauma and orthopaedic surgery to provide national leadership and a unifying focus for excellence in patient care.

Its 2025–2029 strategic plan emphasises driving high standards in care, tackling inequalities, supporting sustainability, and championing research and innovation so that advances such as robotics and AI benefit patients responsibly.

Guided by its vision of 'Relieving pain, restoring function, transforming lives', the BOA works to ensure safe, high-quality musculoskeletal care for patients while supporting the profession through education, training, and advocacy.

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