全国高等医药院校规划双语教材

Bailey & Love

外科学

SHORT PRACTICE OF SURGERY

第24版

原著 R.C.G. Russell
Norman S. Williams
Christopher J.K. Bulstrode

主编 陈孝平 刘允怡
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第2卷

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秘书 陈义发 张万广

人民卫生出版社

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CHAPTER 26

CLINICAL EXAMINATION IN MUSCULOSKELETAL DISORDERS

LEARNING OBJECTIVES

- To understand the three major types of history, their functions and the different ways in which they are obtained
- To understand the three zones of abnormality that a history should address
- To know a simple system for examining the musculoskeletal system
- To learn the specific features to be sought in each area of the body

HISTORY

The history in trauma and orthopaedics is different from the rest of surgery (see Chapter 3) in that there are some specific areas which need to be covered. The three main areas are pain, dysfunction and deformity (summarised in Table 26.1). Table 26.2 shows a more general form of orthopaedic history that we use as a check-sheet when assessing a junior doctor's competence in taking an orthopaedic history.

Pain

Patients should be asked to define in what way the pain troubles them. Their answer may give the clue as to how the pain can best be managed if it cannot be alleviated. For example, if it is pain at night that is preventing sleep, then a combination of pain-killers and sleeping tablets might offer the best option if no other option is available. If, however, the pain occurs in a joint on weight-bearing a splint might stabilise the joint and make the pain manageable.

Disability

Loss of function may be a result of pain, stiffness, weakness, instability or even locking. In the first instance, the patient should be allowed to describe in his or her own words what the problem is, for example the inability to reach up to hang clothes on the washing line. This problem will later be translated into a clinical diagnosis, but at this stage it should be reported in the patient's own words.

Deformity

Most patients want to look normal. Patients may want bunions corrected because they are unsightly, not because they are painful (although they may initially claim this). It is important to be clear about patients' real reasons for seeking treatment, and what it is they hope you will be able to do about it.

Table 26.1 Three areas in which orthopaedics and trauma concentrate on treatment

Pain	When, where, how bad? Does anything make it worse/better?
Dysfunction	What can you no longer do? Are there any ways round this?
Deformity	How much does it bother you? Why or when is this a problem?

Table 26.2 A flow chart for taking an orthopaedic history

Skill	Details
Introduction	
Put the patient at ease	Introduce yourself. Check the patient's name. Explain what you are doing and ensure that the patient agrees and is comfortable
Setting agenda – patient's problems and expectations	
Question	Ask open questions: 'Could you tell me what the problem is?'
Listen	Listen actively and without interruption
Record	Record the patient's problems and expectations, in his or her own words
Making a diagnosis – onset and consequences	
Pain	Ask about onset – speed and cause of onset Ask about consequences – duration, nature, site, radiation, type, constancy. Things that make it better or worse
Disability	What are the effects on activities of daily living, i.e. work and recreation?
Deformity	What is the cosmetic problem? When is it important?
Fitness for surgery – comorbidity and control	
Identify	Problems with previous anaesthetics Cardiac or circulatory – angina palpitations, myocardial infarctions Respiratory – asthma bronchitis Metabolic – diabetes, steroids
Control	Evidence that identified comorbidity is controlled Exclude acute untreated conditions such as infection
Closure	Check for any further questions. Thank the patient

MUSCULOSKELETAL EXAMINATION

System of musculoskeletal examination

Musculoskeletal examination works on a simple system originally designed by Apley. It consists of four-letter words divided into

three sets of three. Table 26.3 is a check-sheet that we use when assessing a doctor's competence to perform an orthopaedic examination.

- The main structure is *look*, *feel* and *move*. Each of these is divided into three as well.
- Look and feel each separate into *skin*, *soft tissue* and *bone*.
- Move is divided into *active*, *passive* and *resisted*.

Look

Make sure that you can see enough of the patient's body. This means exposing at least one joint above and one below the area in question. It also means exposing the opposite side. It is said by some that the human body was made bilaterally symmetrical to help orthopaedic surgeons distinguish abnormal from normal. Do not spurn such ready-made help.

It is not always necessary to lay the patient down in order to perform an orthopaedic examination. It may be easier if the patient remains standing, provided this is comfortable. In this position it is easier to look at the patient's back as well as his or her front. It is important to inspect all sides of the patient to make sure that no lesion is missed.

Skin

Look for:

- bruising and wounds – evidence of recent injury;
- redness – signs of inflammation;
- scars – the archaeology of superficial injury;
- sweating – loss of sweating may indicate nerve damage.

Soft tissues

Look now at the soft tissues. You are looking for:

- swelling – a cardinal sign of injury and inflammation;
- wasting – signs of disuse and nerve damage, the archaeology of deep injury.

Bones

Finally look at the bones (shape of the skeleton). Look for:

- deformity – unusual angles or joints held in unusual positions.

You have now looked at skin, soft tissue and bone. Summarise these in your mind and make a record of what you have found.

Table 26.3 A comprehensive flow chart for performing an orthopaedic examination

Skill	Details
Introduction	Find out where patient is tender Check for other problems/injuries
Expose	Both limbs. One joint above and below
Look	Skin – redness, scars, wounds Soft tissues – swelling/wasting Bone – deformity
Feel	Skin – temperature, sensation, sweating Soft tissue – tender, effusion, pulses Bone – tenderness, osteophytes
Move	Active – demonstrate to patient if necessary Passive – watch patient's face. Note limits from pain Resisted – power, stability, reflexes
Closure	Check that the patient is comfortable
Thank the patient	
Record	Neurovascular status, salient findings, and differences between the two sides

Alan Apley | 1914–1996. Director of Orthopaedic Surgery, St Thomas's Hospital, London, England.

Feel

Skin

Temperature Stroke the patient's limbs with the back of your hand; it is more sensitive than the front. Use the patient's other side for comparison. Warmth may indicate inflammation. A cold limb may indicate nerve or vascular damage.

Sensation Stroke first the normal limb then the other limb lightly. Ask if the touch on the two limbs feels the same. By comparing the two sides the patient should be able to detect any change in sensation, however slight.

Soft tissue

When you feel the soft tissues, you must be very careful to avoid hurting the patient. The best way to do this is to place your hands on the area under examination, then look up and watch the patient's face as you palpate.

Feel for:

- *Tenderness.* As you press with your fingers try to describe to yourself the actual anatomical structure that you are palpating: subcutaneous fat, bursae, muscle bodies, tendons, nerves, arteries and ligaments.
- *Lumps and effusions.* Each time you feel an abnormality under the skin you should be able to run through a checklist of features of a lump. A simple system is shown in Table 26.4.
- *Distal circulation.* Feel for peripheral pulses and check capillary filling. When checking pulses, take the patient's pulse elsewhere at the same time. This should ensure that it is the patient's pulse you are feeling, not your own!

Bone (bone outlines and joint margins)

Feel the bone and joint margins gently for areas of tenderness, steps and lumps. Again, try to work out what anatomical structure your fingers are touching as you palpate.

Review your findings. Try to decide what structures are tender, what structures are swollen, wasted or displaced, and whether the circulation and sensation to the distal limb is normal. If not, where is the likely damage?

Move

Once again there are three phases of the examination, but this time they are *active*, *passive* and *stability*.

Active

The patient should move his or her own joints within the limits of pain. Use simple language to explain what you want the patient to do, and if necessary demonstrate the movement.

Table 26.4 SWELLING – an acronym for history and examination of a lump

Start	Did it appear after trauma or just gradually on its own?
Where	Anatomical site. Does it lie in skin fat or muscle? Will it move in relation to these?
External features	Size, surface and definition of margins
Lymph nodes	Are the local ones enlarged?
Liquid	Is it fluctuant? Can it be transilluminated?
Internal features	Is it hard? Is it tender?
Noise	Is there a thrill? Is there a bruit?
General	Examination of the whole patient for other lumps and general health

Passive

Do not take the range of movement beyond the active range without watching the patient's face.

Stability

There are two types of stability: dynamic and static. Dynamic stability is provided by muscle power; static stability by ligaments and intact joint surfaces.

Dynamic stability Measure the force that the patient can develop by showing the movement and then asking the patient to repeat it while you try to stop it. For each movement, try to work out which muscles are the drivers of that movement, which nerves supply them and the nerve root values.

Static stability Static stability tests the integrity of the ligaments and the joint surface. The joint should be gently stressed in each direction controlled by a ligament, while watching the patient's face to make sure that he or she is not in pain. You do not need to use any force. Indeed, the tests will not work if you do, as the patient's muscles will go into spasm and hide the underlying static instability.

GENERAL PRINCIPLES OF LOWER LIMB EXAMINATION

Ask the patient to walk up and down before getting on the examination couch. Observe the patient's gait, note particularly any limp.

Types of limp

The limp caused by any specific diagnosis is usually a complex mixture of several pathological processes, which can be divided simply into the following groups to produce an easily remembered (if mis-spelled) mnemonic, LIMPS (see Table 26.5 for a summary).

Long

If one limb is short then the other is long in relation to it. The patient bobs up and down when walking, when looked at from the front. However, the cadence (rhythm) of the gait is normal. Equal time is spent on each limb.

Incoordinated

Walking has been described as controlled falling (Alexander McNeil). In patients with neuromuscular disorders, the falling is less controlled and so the patient's limp is similar to the gait of a normal person who has tripped or who is drunk. The arms are swung around to act as counterbalances. The legs frequently scissor across each other and the gait has no rhythm to it.

Alexander McNeil | Professor of Anatomy, Loughborough, England.

Table 26.5 LIMPS – common causes of a limp and their features

Type	Characteristics of the gait
Long	The gait is even in cadence but when looked at from in front the patient bobs upwards on stepping off the shorter onto the longer leg
Incoordinated	There is no regularity. Arms and legs may fly in all directions as the patient struggles to maintain balance
Muscle weakness	Hip. The body sways over sideways as the patient steps on the weak hip Knee. The patient locks the knee with a hand on the thigh as the heel strikes Ankle. Hip-stepping gait to bring floppy foot through
Pain	The gait is uneven in cadence. The patient spends a short time on the painful limb, and the centre of gravity also falls as the patient takes weight on it
Stiffness	A stiff hip may make the patient stoop if it is flexed A fixed knee has to be swung out sideways in the swing phase

Muscle weakness

Hip (Trendelenburg gait)

The patient's body sways sideways to and fro when looked at from the front. The patient uses the trunk muscles to lift the pelvis high enough to swing the leg through, as it is not possible to lift the pelvis any other way.

Knee

Patients with weak quadriceps (often seen after polio) use a trick manoeuvre to lock the knee. As they swing the leg forward, they flick the lower leg forward so that the knee extends fully well before the heel strikes the ground. They then hold the knee locked straight by keeping their hand in their pocket and pushing back on the front of the thigh as the foot comes down to heel strike. If they do not do this then the knee will buckle into flexion as they start to take weight on the leg.

Ankle

With weak ankle dorsiflexors the patient lifts the foot very high in order to swing the leg through without catching the toes.

The painful limp (antalgic gait)

The patient spends less time on the painful limb than the painless one. When looked at from the front, the patient appears to bob up and down, dropping down when taking the weight on the bad limb, and rising back up again on transferring the weight to the good limb. This gait can be confused with the 'long' leg gait, but there is a major difference. The cadence is abnormal. The gait is dot–dash–dot–dash because so much less time is spent on the painful limb than on the painless one.

Friedrich Trendelenburg | 1844–1924. Professor of Surgery, Rostock (1875–82), Bonn (1882–95) and Leipzig (1895–1911), Germany.

The stiff limp

Hip

The patient tends to sway forwards and backwards when looked at from the side. There is also a tendency to hoist the pelvis up as the hip is brought through to stop it dragging on the ground.

Knee

Patients with a stiff knee often swing the leg out to the side as they walk. This is because you need to be able to lift the knee to avoid catching your toe on the ground as you bring the leg forward for the next stride.

Ankle

Patients with a stiff ankle walk with a foot that rocks forward from heel to toe in a very pronounced way.

THE FOOT AND ANKLE

Look

Watch the patient walking. Look at the shoes for signs of abnormal wear. Wear on the shoe is an indicator of rubbing, not pressure. In the normal wear pattern a corner is worn off the posterolateral side of the heel (the normal point for heel strike). There may then be a circular wear pattern under the ball of the big toe (where toe-off occurs as the foot provides its final drive and then lifts off).

Skin

Look for calluses, corns, bunions and scars. A bunion is a red swelling on the medial side of the metatarsophalangeal joint consisting of inflamed skin, a subcutaneous bursa and an osteophyte on the joint margin of the medial side of the metatarsal head (Fig. 26.1). In patients with gout, the whole metatarsophalangeal joint will be red and swollen.

In patients with rheumatoid arthritis, the fat pad under the metatarsal heads becomes thin, and the heads become prominent and tender immediately beneath the skin of the sole of the foot. The patient complains of pain in the sole of the foot when walking, as if walking barefoot on pebbles. Areas of thickened callous skin form over the metatarsal heads.

Feet do not fit easily into most shoes, even when they are normal. If the toes have started to claw then the pulp of the toe will be driven into the floor of the shoe, while the dorsum of the interphalangeal joints will be driven into the top of the shoe (a sort of contrecoup injury) (Fig. 26.2).

The counter of shoes (the part that wraps around the heel) can rub on the calcaneum, producing a bunion on the insertion of the Achilles tendon into the bone.

Soft tissues (swelling and wasting)

Swelling Swelling in the foot is commonly seen on the dorsum only. In the ankle joint it is commonly seen at the front of the ankle.

Wasting This is seen in neurological conditions, and there may be wasting in the clefts between the metatarsals. Wasting may be associated with clawing of the toes (see Fig. 26.2).

Bone

Check for clawing (Fig 26.2) and hammering (Fig. 26.3) of the toes, and for a foot which cannot rest flat on the ground (Fig 26.2).

Feel

Skin

Inflammation This may be indicated by heat in the skin.

Sensation Feeling may be lost distally in neuropathies, such as that caused by diabetes, and the toes may be numb. In nerve compression there may be numbness over a dermatome.

Figure 26.1 A bunion.

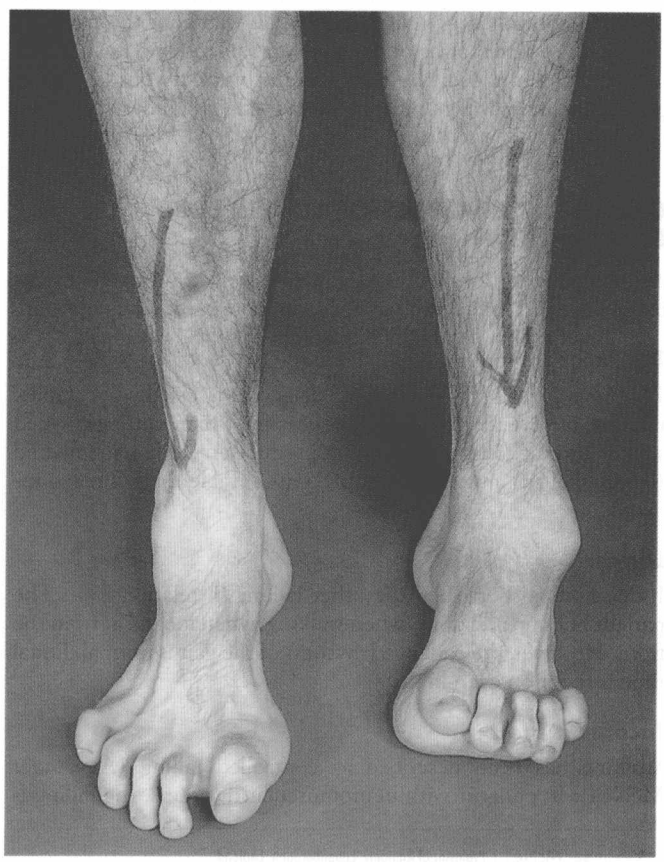


Figure 26.2 Claw toes and wasting of intrinsic muscles of the foot.

Figure 26.3 Hammer toe – second toe on the left foot.

Soft tissue

Pulses The easiest foot pulses to feel are the posterior tibial behind the medial malleolus and the dorsal pedis between the proximal ends of the first and second metatarsals (Fig. 26.4). The toes should also be tested for capillary fillings.

Tenderness If the extensor tendons of the toes in the dorsum of the foot and up the front of the tibia are tender ask the patient to move his or her toes and you may feel crepitus under your fingers, a characteristic of tenosynovitis.

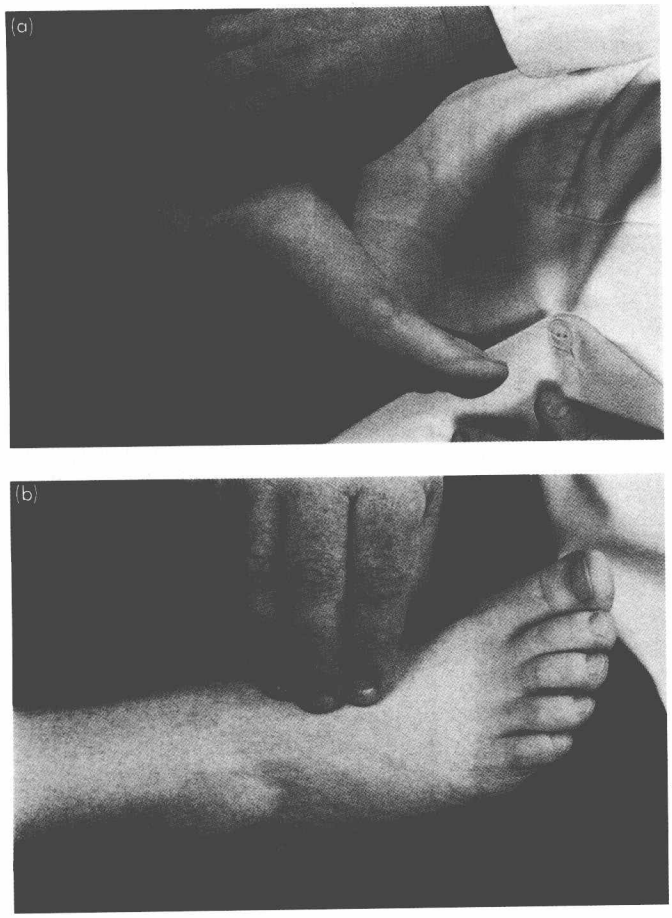


Figure 26.4 Feeling dorsali pedis and posterior tibial pulses.

Bone

Tenderness Palpate for tenderness down the length of the fibula to its tip (the lateral malleolus), and then over the lateral collateral ligament as it passes from there to the calcaneum. Then palpate down the medial side of the leg, down the tibia to the tip of the medial malleolus and on to the medial deltoid ligament. Feel the talus and navicular, on the dorsomedial side of the forefoot. Feel the fifth metatarsal head on the lateral side of the midfoot (a common site for a fracture after an inversion injury).

After a fall from a height, check for tenderness in the calcaneum, as this may be fractured. If the forefoot has been crushed then check for tenderness in the bones of the forefoot, which may be both fractured and dislocated.

Move

Active

The Windlass test

Make the patient stand on his or her toes while you look from in front and from behind. Some patients' feet look very flat when at

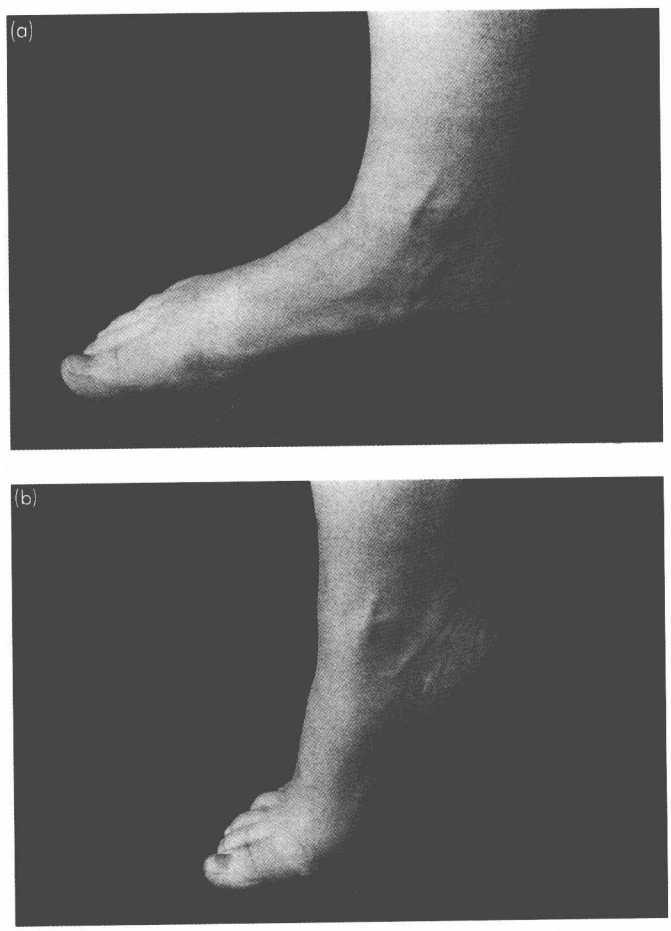


Figure 26.5 The Windlass test. (a) At rest, the arch of the foot may be obvious. (b) As the patient rises on to the toes, the arch of the foot increases. This shows a normal result. If the arch does not increase then the patient has a pathological flat foot.

rest. This can simply be a physiological flat foot. As soon as these patients stand on their toes, the arch forms (Fig. 26.5). In pathological flat foot the arch does not form.

Other movements

You should also ask the patient to move the toes, and move the ankle through a full range of movement (flexion, extension, inversion and eversion).

Passive

The Apley test

If you hold the heel in one hand and the forefoot in the other, ankle, subtalar and metatarsal mobility can be tested one after the other without moving your hands. Rocking the ankle by moving your hands in opposite directions, like a see-saw, tests ankle mobility. Tilting the foot outwards and inwards using both hands together tests subtalar movement. Twisting the forefoot while holding the hindfoot still tests midtarsal mobility (Fig. 26.6).

The metatarsophalangeal joint of the big toe is stiff in hallux rigidus. In claw toes the metatarsophalangeal joint is commonly dislocated, with the phalanx riding dorsally over the metatarsal head (Fig. 26.2).

Stability

Stability of the ankle and foot joints is not easy to test, especially after acute trauma.

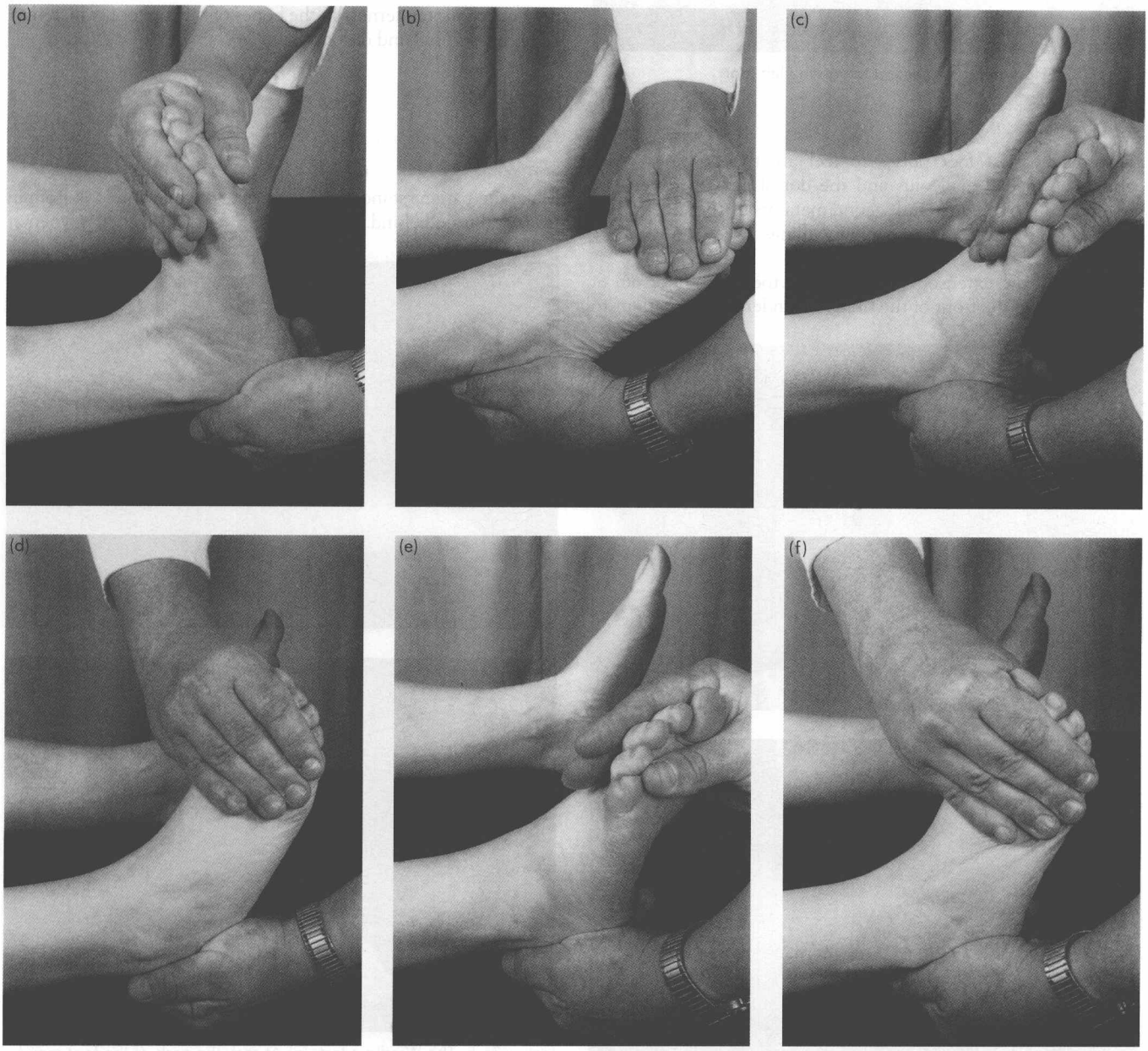


Figure 26.6 The Apley test for movement of the ankle, the subtalar and the midfoot. The hand remains in the same position throughout testing first dorsiflexion and plantarflexion then subtalar movements (inversion and eversion) and, finally, forefoot movement (pronation and supination). (a) Dorsiflexion. (b) Plantarflexion. (c) Eversion. (d) Inversion. (e) Pronation. (f) Supination.

Resisted

Test for power of extensor hallucis longus (Fig. 26.7). Remember that this muscle is specifically served only by the L5 nerve root and is a key test for damage to this nerve in a prolapsed intervertebral disc.

In patients with polio and other neurological disorders, each muscle will need to be tested in turn. One way to do this is to put the tips of your fingers over the muscle body, or its tendon, while holding the limb still with the other hand. The patient is asked to try to move the limb against the resistance that you have created. Your fingertips will detect whether there is any activity in the muscle, as the movement itself might be produced by alternative muscles, the so-called 'trick manoeuvres'. The power of each muscle can be graded using the Medical Research Council (MRC) power scale (Table 26.6).

Table 26.6 MRC muscle power scale

Grade	Description
1	Flicker of movement
2	Moves but not against gravity
3	Moves just against gravity
4	Not quite full power
5	Full power

Figure 26.7 Testing the power of the extensor hallucis longus.

Simmonds' test

The patient lies face down, feet over the end of the bed. Squeeze the calf and the foot should passively dorsiflex (Fig. 26.8). If it does not, the tendoachilles is likely to be ruptured.

THE KNEE

Look from in front or behind to see whether the knees are aligned in the sagittal plane. In patients with varus knees (or bow legs) a clear space is visible between the knees when the ankles are together.

Valgus knees tend to brush together as the patient walks even though the ankles may be wide apart.

Look

Skin

Check for redness, scars and lacerations.

Figure 26.8 The Simmonds test. If the foot plantarflexes when the calf is squeezed, the tendoachilles is intact.

Franklin Adin Simmonds | 1911–1983. Orthopaedic surgeon, The Rowley Bristow Hospital, Pyrford, Surrey, England.

Soft tissue

Look for an effusion in the knee. The dimple on the medial side of the knee will be lost compared with the other side if there is an effusion.

Vastus medialis wastes within days of a knee injury and will fail to bulge when contracted compared with the other side.

Bone

Check for knock-knee, bow legs and fixed flexion, and for the position of the patella (Fig. 26.9). Fixed flexion is the position of comfort in the knee and tends to develop secondary to any acute infection or inflammation.

The patella almost always dislocates laterally (Fig. 26.10). If not reduced, it may remain jammed outside the lateral femoral condyle.

Feel

Skin

Temperature Inflammation of the knee will produce a knee hot to the touch compared with the other side.

Sensation Damage to nerves at or around the knee will produce disturbance of sensation mainly in the foot.

Soft tissue

Check for a knee effusion.

Stroke test

With the patient lying supine, empty the medial side of the knee joint by stroking any fluid up into the suprapatellar pouch. Then, watching the medial side of the knee carefully, stroke down the front of the thigh, squeezing any fluid lying in the suprapatellar pouch back into the medial side of the knee. As the fluid returns the dimple on the medial side of the knee pops out (Fig. 26.11).

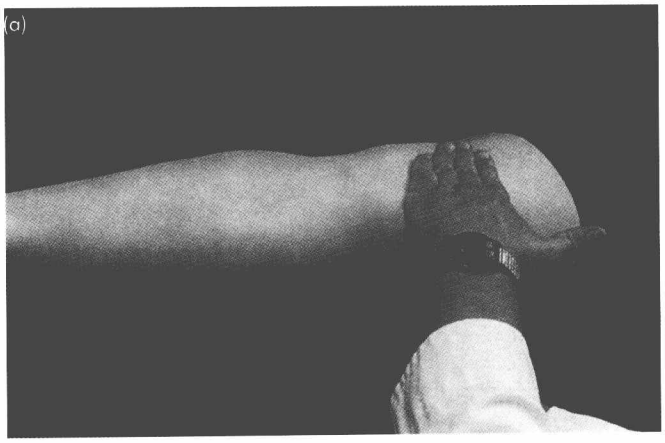
Baker's cyst

This is an outpouching of the synovium through a defect in the capsule posteriorly. It can be difficult to feel. As soon as the knee is flexed the cyst disappears, but it reappears in full extension. It is associated with osteoarthritis of the knee. The patient will guide your fingers to the lump if you are having difficulty finding it.

Figure 26.9 (a) Knock knees. (b) Bow legs.

William Morrant Baker | 1838–1896. Surgeon, St Bartholomew's Hospital, London, England. He described these cysts in 1877.

Figure 26.10 Dislocated patella.



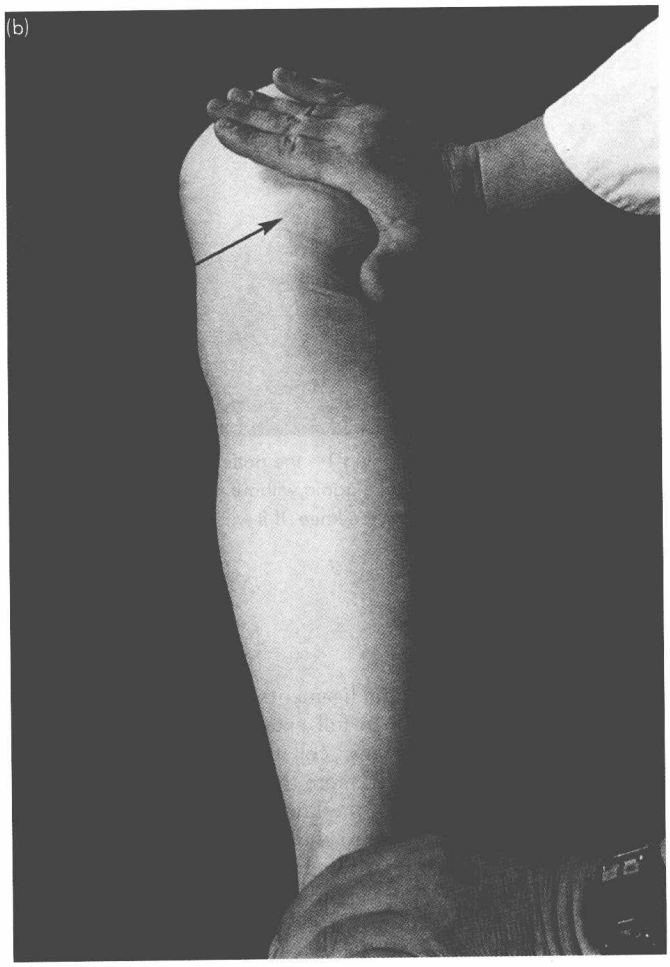


Figure 26.11 Stroke test for fluid in the knee. (a) Any fluid in the knee is stroked up into the suprapatellar pouch. (b) The fluid is forced back down and a watch kept for pouting of the dimple on the medial side of the patella (see arrow).

Circulation

The distal pulses and capillary filling should be checked in the same way as during examination of the foot.

Bone

The margins of the patella, the femoral condyles and the margins of the tibial plateau are all easy to feel as they are subcutaneous.

Move

Active

Flexion

The knee should be able to flex until the heel touches the buttock. Loss of flexion can be measured by the number of centimetres that the heel stops short of the buttock, rather than by actually measuring the angle of the knee. Comparison with the other side gives a sensitive guide to loss of range of movement.

Extension

The patient should be asked to force the knee into the bed. Most knees hyperextend at least by a few degrees.

Passive

Flexion

The knee can be bent up passively, but be sure to watch the patient's face, especially if you push the knee beyond the active range of flexion. It may be limited because of pain.

Extension

With the patient lying supine and relaxed, the feet can be raised off the bed by lifting under the heels. Any loss of extension will be visible because one knee will remain higher (in fixed flexion) than the other.

Lag test

A subtle test for quadriceps weakness is to ask the patient to lift the leg straight off the bed. Most patients can do this and, indeed, even if the quadriceps mechanism is completely ruptured this manoeuvre is still possible because the patient uses the lateral retinaculum to lock the knee in extension. The patient is then asked to bend the knee 20° and straighten it (Fig. 26.12). A patient who has a quadriceps lag will not be able to return the knee to its original extension. This loss of flexion is not a fixed flexion deformity (as extension of the knee has already been demonstrated); it is caused by weakness in the quadriceps.

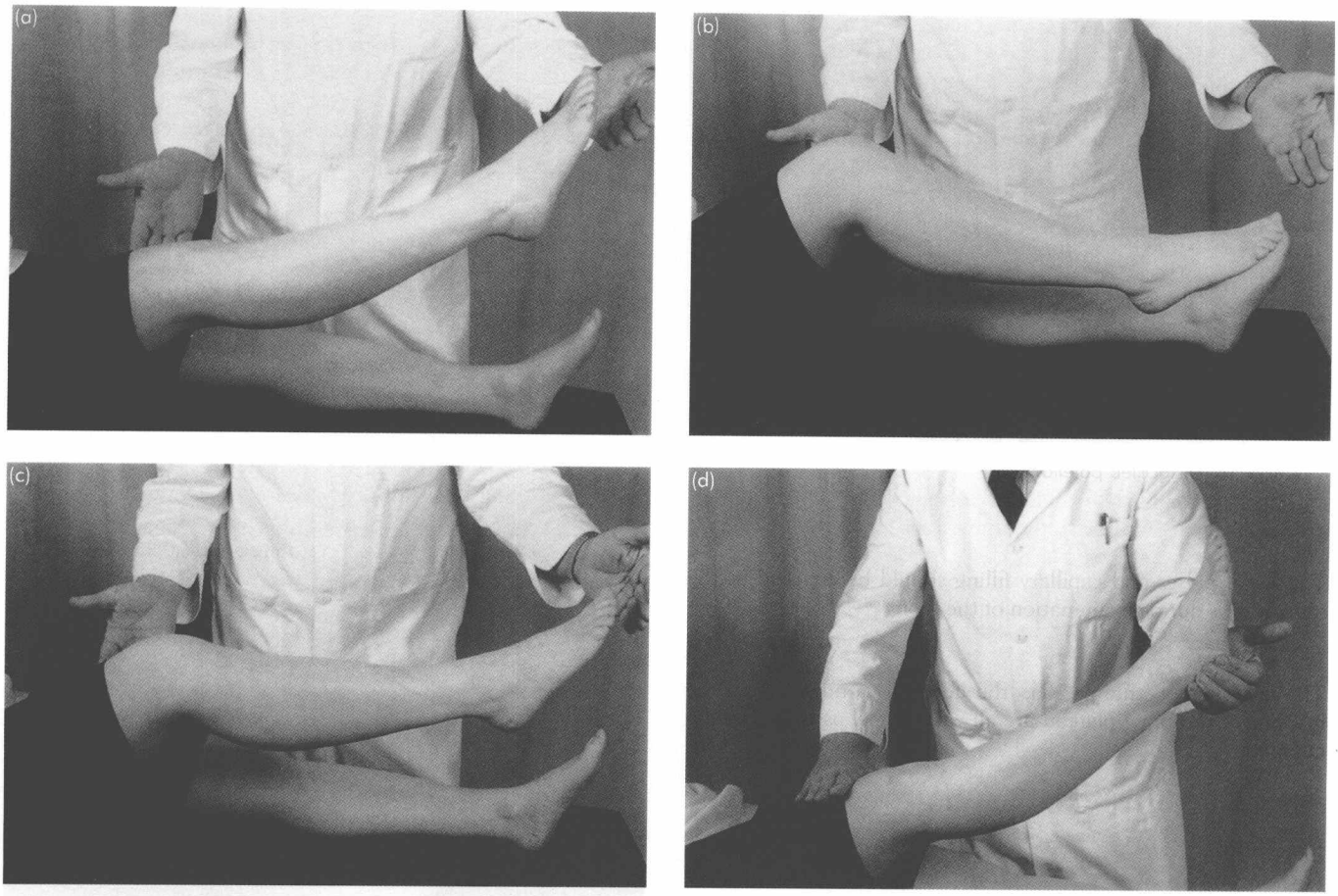


Figure 26.12 The lag test. (a) Step 1 – the patient lifts the leg with the knee straight. (b) Step 2 – the patient flexes the knee. (c) Step 3 – the patient is now asked to extend the knee again without support. If the patient is not able to extend the knee fully there is a 'flexion deformity'. (d) Step 4 – the patient is helped to extend the knee. If it will not extend further there is a 'fixed flexion deformity'. If it will there is 'quadriceps lag'.

Stability

Collateral ligaments

The integrity of the collateral ligaments can be tested only when the knee is slightly flexed. In full extension the stability of the posterior capsule masks any collateral ligament instability. However, if the knee is flexed more than a few degrees, the knee rotates when stress is put on the knee to test medial and lateral stability, and it is not possible to check integrity of the ligaments. The leg should be rested on the bed with the patient supine. One of your hands should be put behind the knee to lift it slightly into flexion, hold it stable and feel with thumb and fingers over the joint line. Your other hand should grasp the patient's ankle, and gently stress the lower leg into varus (putting load on the lateral collateral ligament) then into valgus (stressing the medial collateral ligament) (Fig. 26.13). Knee ligaments vary in their laxity between patients, and it is a difference between the two legs which once again gives a clue to instability.

Figure 26.13 Hand positioning for testing of callateral ligament stability in the knee.

Cruciate ligaments

There are several tests for cruciate disruption, but one simple method is as follows. The patient lies supine with both knees bent up to a right angle and the feet resting on the bed. The examiner looks from the side to see whether one tibial tubercle is lying further back than the other. If the tubercle on the injured side is lying further back, then the knee has a posterior sag (suggestive of a posterior cruciate ligament injury).

The examiner then grasps the uninjured knee with fingers

meeting in the popliteal fossa and thumbs side by side over the tibial tubercle. Sit on the patient's foot to keep it still and then rock the upper tibia gently backwards and forwards against the femur, feeling for the amount of laxity in the joint. Now repeat the manoeuvre with the injured limb, comparing the amount of 'play' in the injured knee with that in the normal one. If there is more play and the injured knee had a posterior sag then the posterior cruciate is ruptured. If there is laxity but no sag then the problem is rupture of the anterior cruciate (Fig. 26.14).

The pivot shift test

This test relies on the fact that an anterior cruciate-deficient knee frequently has some rotatory instability in extension. In this position the femoral condyles rolling on the tibia do not control rotation well. With the patient lying supine and the examiner sitting at the patient's foot facing up the bed, one hand is used to lift the leg off the bed by the ankle and to rotate the tibia inwards on the femur. The examiner's other hand presses against the lateral side of the knee, pushing it into valgus, so that the lateral femoral condyle is engaged firmly with the tibial plateau. This hand now gently pushes the knee into flexion (Fig. 26.15). If there is anterior cruciate instability the knee starts to bend under the guidance of the examiner's hand, but then jams at about 10° of flexion. The tibia has rotated so much on the femur (because of the absent anterior cruciate ligament) that the knee will no longer work as a hinge, and jams as soon as it tries to do so. As the examiner's hand pushes the knee on into flexion, the tibia has to come out of internal rotation so that the jammed joint can continue to flex. The jolt as the tibia derotates under the examiner's hand is clearly palpable to the examiner and to the patient. It is even easier to feel if the examiner's thumb lies tucked behind the fibula head. It is then forced smartly back when the derotation occurs. This test should be done very gently. If it is not the patient will be hurt and the test will be inconclusive because muscle spasm will mask the pivot shift.

The patella apprehension test

If patients have ever dislocated their patella they will be anxious about dislocating it again. If the knee is placed in extension and the patella pushed laterally, flexing the knee will encourage the patella to dislocate over the lateral femoral condyle (Fig. 26.16). As soon as this starts to happen the patient will become very apprehensive. Do not continue – just note the apprehension; you do not want actually to dislocate the patella.

Figure 26.14 Anterior draw. The tibia is unstable on the femur and has fallen forwards. The anterior cruciate ligament is disrupted.

Figure 26.15 Positioning of the hands for the pivot shift test.

Figure 26.16 Patella apprehension test. The patella is pushed laterally as the knee is passively flexed with the examiner's other hand.

THE HIP

The hip is rarely involved in extrinsic trauma but is commonly affected by intrinsic trauma (fractured neck of femur) and by chronic conditions (osteoarthritis). The examination of the joint is made more difficult by the fact that it is covered by muscles. It is also likely to present with pain referred to the knee, and can be the site of pain referred from the spine.

Look

Limp

Watch the patient walk and look for a limp. The limp of a stiff hip is difficult to spot as the patient rocks the pelvis with the femur on the affected side, but fixed flexion deformity is common and leads to the patient walking with a characteristic stooped gait.

Skin

The scars from surgery on the hip are usually on the lateral side of the hip.

Soft tissue

Gluteal wasting can occur if the superior gluteal nerve was damaged after hip surgery, but beware of confusing gluteal wasting with loss of lumbar lordosis caused by back problems. The tilt of the pelvis may make it look as if there is bilateral gluteal wasting. If there is a leg length discrepancy, the pelvis will be tilted and the spine curved when the patient stands. The spinal curvature then disappears as soon as he or she sits on the side of the couch.

Bone

There is little to see because the hip is so deeply buried, but a limp may give a clue to underlying bony deformity. If there is a leg length discrepancy, the pelvis will be tilted and the spine curved when the patient stands. The spinal curvature then disappears as soon as he or she sits on the side of the couch.

Feel

Skin

As the joint is so deeply buried the only item that needs to be checked is distal sensation. Damage to the femoral nerve produces numbness over the front of the thigh. Damage to the sciatic nerve will produce numbness in the lower leg.

Soft tissue

Peripheral pulses should be tested in the foot.

Bone

The hip can be palpated anteriorly in the groin beneath the femoral pulse, but it is deep and difficult to feel. Tenderness on the lateral side of the hip arises from the greater trochanter or is referred from the spine. Pain posteriorly usually arises from the sciatic nerve or, once again, has been referred from the spine.

Leg length discrepancy

Leg length discrepancy can be caused by bones in the two limbs being of unequal length, such as might occur after a malunited fracture. It can also be caused by deformity such as a fixed flexion deformity of the hip. Leg length discrepancy caused solely by short bones is known by convention as 'true' leg length discrepancy. That caused by joint deformity is known as 'apparent' shortening. Most leg length discrepancy is caused by a mixture of the two.

True leg length discrepancy

It is usual to measure the 'true' leg length discrepancy first by putting both legs as straight as possible, and then measuring the leg which cannot be put straight. The other leg is then put into an identical position, so that the deformity has no effect on leg length discrepancy. If the end of the tape measure is held firmly between the pulp of the thumb and the side of the index finger, the tip of the thumb can be used to trace the inguinal ligament upwards until it catches in the notch immediately below the anterior superior iliac crest. A similar manoeuvre can be used at the lower end of the leg. The tip of the examiner's other thumb is traced up the calcaneus, until it jams in the notch immediately below the medial malleolus. The measure is repeated on the other limb, which is first put in the identical position.

In order to decide which bone(s) are responsible for the shortening, the patient should lie supine and the knees should be bent up to a right angle. The examiner can then look at the knees from the side. If the femur on the short side lies lower then the shortening is below the knee. If the tibia lies further back then the shortening lies above the knee. If the shortening is above the knee then palpation of the greater trochanters will reveal whether the shortening is in the femoral neck or in the femoral shaft. If the shortening is below the knee then palpation of the medial and lateral malleolus will reveal whether the shortening is above or below the ankle.