19.4 Back pain and regional disorders 4406 Carlo A

19.4 Back pain and regional disorders 4406 Carlo Ammendolia and Danielle Southerst

ESSENTIALS Low back pain Over 70% of people in industrialized countries suffer from low back pain at some time, and it is one of the main reasons for visits to phys- icians. Risk factors include heavy physical work, smoking, stress, depression, and job dissatisfaction. In more than 90% of cases the exact anatomical source of back pain cannot be determined, and the preferred diagnostic label is ‘nonspecific low back pain’. ‘Red flags’ is the term used for the presence on history of any of the following: age over 50; fever; weight loss; significant trauma; previous history of neoplasia; use of corticosteroids; drug or alcohol abuse; neurological symptoms and signs; night pain; morning stiffness; and the persistence of pain after one month of conservative therapy. Such red flags may suggest the possibility of serious disorders (e.g. neo- plasia, infection, fracture, or inflammatory spinal disease). Investigation should be restricted to patients with red flags and clinical suspicion of serious disease, with magnetic resonance imaging the best imaging modality for the diagnosis of lumbar dis- orders. In the absence of red flags, patients with acute low back pain should receive non pharmacological care as first treatment option including reassurance, advise to remain active, massage and spinal manipulation followed by non steroidal anti-inflammatory drugs and muscle relaxants if necessary. The early recognition of psychosocial risk factors, or ‘yellow flags’, is important to identify patients who are at higher risk of progressing towards chronic low back pain. Cognitive behavioural therapy, supervised exercise therapy, brief educational interventions, multi-disciplinary treatment, and short courses of manipulation/mobiliza- tion can each be recommended in patients with nonspecific chronic low back pain, but the condition is often refractory. Other regional disorders Neck pain—the clinical approach should follow the same principles as described for low back pain. Regional musculoskeletal pain disorders—painful conditions af- fecting a specific

region of the body are extremely common. Various pains have been described affecting the shoulder, elbow, wrist and hand, hip, knee, ankle, and foot regions. The majority can usually be identified by a careful history and directed physical examination. The principles of management include temporary rest, analgesics or nonsteroidal anti-inflammatory drugs, local corticosteroid injections, thermal modalities, orthotics, and graded flexibility and strength- ening exercises. Low back pain Low back pain is one of the commonest symptoms and a leading reason for all visits to physicians in the United States. Between 60 and 80% of adults suffer from at least one episode of back pain during their lifetime. The vast majority of those who develop an episode of low back pain improve quickly with or without professional care. However, recurrences are common with 24–80% of individuals experiencing further episodes within a year. Low back pain is best viewed as a re- current disorder that can occur anytime in a person's life and fluctu- ates between no or mild pain to disabling pain. In the United States 1–2% of the population are disabled due to back pain and worldwide back pain is the leading cause of years lived with disability. Those with persistent and disabling low back pain are a difficult therapeutic chal- lenge, owing to the influence of psychological and social factors on the continuation of pain. In terms of costs, persistent back pain and related disability is responsible for more than 75% of the total costs of low back pain to society, estimated to be between 1 and 2% of the gross national product in most industrialized countries. Significant risk factors for the occurrence of back pain include older age, heavy labour (in particular jobs requiring lifting in an awkward position), lower education and income, smoking, high birth weight (in males), and obesity. Twin studies suggest that genetic factors have an important influence on the lifetime preva- lence of back pain, with heritability ranging from 52 to 68%. Long- distance driving and whole-body vibration such as experienced by truck drivers are well-known risk factors for disc herniation. Previous episodes of back pain are strong predictors of recurrence. Several psychosocial risk factors, or so-called 'yellow flags', predict poor outcomes (Box 19.4.1). These include beliefs that back pain is harmful or potentially severely disabling, resulting in fear/avoid- ance behaviour and reduced activity levels, excessive reliance on aids and appliances, depressed mood, withdrawal from social inter- action, and job dissatisfaction. 19.4 Back pain and regional disorders Carlo Ammendolia and Danielle Southerst

19.4 Back pain and regional disorders 4407 Many structures of the back, including the muscles, ligaments, discs, bones, and zygapophyseal and sacroiliac joints are innervated and can therefore be a source of pain. However, in more than 90% of patients presenting with low back pain it is extremely difficult—if not impossible—to identify precisely the anatomical source of the pain on the basis of history and physical examination. These pa- tients should be diagnosed as suffering from 'nonspecific low back pain'. A host of clinical entities such as muscle strain, degenerative disc disease, facet syndrome, myofascial pain syndrome, segmental instability, piriformis syndrome, and so on, have been described within this broad category based on the localization of pain and ten- derness, reproduction of symptoms by specific manoeuvres, radio- logical features, or pathophysiological hypotheses. Unfortunately, the signs and manoeuvres described for each of these clinical syn- dromes lack sensitivity and specificity and are not reproducible, even by experienced clinicians. Moreover, the claim that any of these entities is responsible for the pain in a given patient can very rarely be validated. For example, it is hazardous to ascribe pain to degen- erative disc disease or zygapophyseal joint osteoarthritis when it has been shown that individuals with similar radiological changes can be completely asymptomatic. The only way to determine if the discs or zygapophyseal or sacroiliac joints are the source of pain in a given patient is through injection studies done under stringent, controlled conditions (see next). Clinical approach to the

diagnosis of low back pain In evaluating a patient presenting with low back pain, the physician should not try to differentiate between the various elusive entities responsible for nonspecific back pain, but rather should focus on determining if the patient needs emergency surgery, has sciatica (radiculopathy) with signs of nerve root compression, or has an underlying pathological cause of back pain (infectious, inflamma- tory, metabolic, tumoural, or visceral) (Table 19.4.1). Back pain with an identifiable cause is referred to as specific low back pain. Is this a surgical emergency? Cauda equina syndrome and an expanding vascular aneurysm are two extremely rare but important conditions to recognize, because both are surgical emergencies. In the first instance, the patient will usually present with low back and/or buttock pain, associated with bilateral sciatica, neurological symptoms in the lower extremities, and urinary and/or bowel incontinence. Physical examination may show bilateral weakness, sensory losses, saddle anaesthesia, de- creased reflexes in the legs, and decreased rectal tone. Diagnostic procedures (MRI or CT) should be performed on an emergency basis if bowel and bladder control are to be preserved. Central disc herniation is the most common cause of the syndrome, followed by tumours and epidural abscesses. An aortic aneurysm can be responsible for a dull, gnawing back pain due to direct compression of the aneurysm on the lumbar ver- tebrae. They are typically seen in elderly patients, especially white men, and physical examination may reveal a pulsating abdom- inal mass and decreased pulses in the legs. Diagnosis is most im- portant because rupture or dissection of the aneurysm is often fatal. Dissection should be suspected in patients presenting with sudden, excruciating, tearing abdominal or back pain radiating to the groin, buttocks, or thighs along with haemodynamic compromise (hypo- tension, tachycardia, and shock). Up to 30% of ruptured aneurysms are initially misdiagnosed. Preventive surgery (before rupture or dissection) is the optimal treatment. Box 19.4.1 Yellow flags predicting poor outcome in back pain • Belief that pain is harmful or disabling resulting in fear; avoidance behaviour • Belief that all pain must be abolished before attempting to return to work or normal activity • Catastrophizing, thinking the worst, misinterpreting bodily symptoms • Passive attitude to rehabilitation • Report of extremely high intensity of pain (e.g. above 10, on a 0–10 visual analogue scale) • Excessive reliance on use of aids or appliances • Depression (long-term low mood), loss of sense of enjoyment • Lack of social support and interaction • Job dissatisfaction Table 19.4.1 Causes of back pain Surgical emergencies Cauda equina syndrome (disc, tumour mass, abscess) Aortic aneurysm (ruptured, dissected) Radiculopathy with neurological signs Ruptured intervertebral disc Spinal stenosis (the neurological examination is often normal) Spinal cord tumours (extradural, intradural—extramedullary/intramedullary) Pathological conditions Neoplastic Benign: osteoid osteoma Malignant: primary (multiple myeloma), secondary (metastasis) Infectious Acute: pyogenic discitis, osteomyelitis Chronic: tuberculosis Inflammatory Ankylosing spondylitis Psoriatic arthritis Reactive arthritis Inflammatory bowel diseases Metabolic Osteoporosis (with fractures) Osteomalacia Paget’s disease of bone Visceral Pelvic organs (endometriosis, prostatitis) Renal disease (pyelonephritis, renal colic) Gastrointestinal (pancreatitis) Aortic aneurysm Nonspecific low back pain Muscle Ligaments Discs Zygapophyseal joints Spondylolisthesis Sacroiliac joints

 Does the patient have lumbar radiculopathy (sciatica) and/or neurological signs? Lumbar radiculopathy refers to pain in the back or buttock that ra- diates down the leg in a dermatomal distribution. It is usually asso- ciated with an identifiable aetiology, typically a herniated disc giving rise to compression and/or irritation of the spinal nerves most com- monly originating between L4 and L5 (L5 nerve root) and/or L5 and S1 (S1 nerve root). About 4% of back pain patients have a lumbar herniated disc causing radiculopathy. Lumbar

radiculopathy can also be caused by spinal stenosis, which is a narrowing of the central and/or lateral spinal canals, usually due to degenerative thinning and bulging of discs and thickening of bone and ligaments. Tumours, infections, or epidural haemorrhage can very rarely produce similar symptoms and signs. The pain in a patient with a herniated disc tends to be aggravated by prolonged sitting, forward bending, and manoeuvres that increase intrathecal pressure, such as sneezing, coughing, or defecation. It is often as- sociated with paraesthesias and weakness in the distribution of the involved nerve. Patients with spinal stenosis are usually older and typically com- plain of pain and/or paraesthesias in one or both buttocks, thighs, and/or legs that develop on standing or walking and are relieved by sitting (neurogenic claudication). These patients often walk with the trunk flexed, as extension aggravates their symptoms by worsening nerve impingement. The neurological examination is often normal or shows nonspecific abnormalities such as reduced or absent ankle reflexes. Differentiating neurological from vascular claudication can be difficult as both problems occur in the same age category, but changing trunk posture does not typically influence pain from vas- cular claudication. Does the patient have an underlying pathological cause for their back pain? The patient history is by far the most important diagnostic step in the search for potential pathological causes of low back pain. Certain clues or ‘red flags’ should be looked for systematically (Table 19.4.2). These include the presence of fever, chills, night sweats, weight loss, and nocturnal pain, which should direct the clinician towards the possibility of neoplasia or infection. An insidious onset of back pain accompanied by significant early morning stiffness in a young patient suggests a spondyloarthropathy and should prompt the clinician to enquire about the family history and undertake a detailed review of the ocular (conjunctivitis, iritis), cutaneous (psoriasis, mouth ul- cers, balanitis, keratoderma blennorrhagica), gastrointestinal (diar- rhoea, haematochezia, abdominal pain), genitourinary (urethritis), and musculoskeletal (peripheral arthritis, dactylitis, enthesitis, heel pain) systems. Risk factors for neoplasia (previous or current history of malignancy), infection (history of tuberculosis, AIDS, intravenous drug abuse, or recent genitourinary procedures), and metabolic bone diseases (previous fractures, menopause, corticosteroid intake, his- tory of anorexia nervosa) should also be sought in patients suspected of having a pathological problem underlying their back pain. What are the key signs to look for in the physical examination? A good examination of the lumbar spine and relevant nerves can be accomplished in less than three minutes if it is done systematically (Table 19.4.3). A full physical examination must be completed in patients suspected of having a pathological cause for their back pain. The diagnostic utility of the many physical manoeuvres described to identify zygapophyseal and sacroiliac joint pain has been refuted when validated against diagnostic blocks with local anaesthetic. Waddell has described several nonorganic physical signs (Box 19.4.2): psychological factors or secondary gains may be involved when a patient has three or more of these. Who should be investigated and how? There is a general agreement that the initial assessment should focus on the detection of ‘red flags’ suggestive of a pathological aetiology, and that the vast majority of patients with back pain do not need any investigations. Recommendations for ordering imaging in a patient presenting with back pain include those with red flags combined with clinical suspicion of underlying cancer, fracture, infection, inflammatory or Table 19.4.2 Red flags for possible pathological cause of back paina Pathology Red flags Cancer

1. History of cancer in past 10 years
2. Unexplained weight loss >10 kg within 6 months
3. Age over 50 or under 18 years old
4. Failure to improve with therapy

5. Activity-limiting pain >4 weeks
6. Night pain or pain at rest Infection
7. Persistent fever (temperature >38oC)
8. History of IV drug abuse
9. Indwelling intravascular catheters (e.g. dialysis lines)
10. Recent bacterial infection (i) urinary tract infection or pyelonephritis (ii) cellulitis (iii) pneumonia
11. Immunocompromised States (i) therapeutic (e.g. corticosteroids or other immunosuppressants) (ii) diabetes mellitus (iii) HIV
12. Pain at rest Fracture
13. Prolonged corticosteroid use
14. Mild trauma age over 70 years of age
15. Major trauma any age
16. History of osteoporosis Abdominal aneurysm
17. Abdominal palpating mass
18. Atherosclerotic vascular disease
19. Pain at rest or night pain
20. Age greater than 60 years Inflammatory disease
21. Age of onset <40 years of age
22. Morning back stiffness improved with exercise
23. Three months duration or greater
24. Iritis and/or conjunctivitis
25. Psoriasis, mouth ulcer, or other skin lesions
26. Gastrointestinal disturbance
27. Peripheral arthritis, dactylitis, enthesitis, heel pain a Presence of one red flag alone may not necessary increase risk of underlying pathology causing back pain but rather a combination of red flags may increase risk.

19.4 Back pain and regional disorders 4409 visceral disease; those with progressive neurological signs including cauda equina syndrome. Magnetic resonance imaging (MRI) is the imaging method of choice for the detection of most pathological causes of low back pain, although plain film radiography can be used for the initial work up of suspected sacroiliitis or vertebral fractures. All other tests should be restricted to patients in whom a patho- logical aetiology is suspected from the history and physical exam- ination, and patients with significant abnormalities on neurological examination. Ordering blood tests and imaging in any other situation cannot be justified. Abnormalities on computed tom- ography (CT) and MRI such as disc herniation can be seen in 25–50% of asymptomatic individuals. In back pain patients, these nonspecific findings may lead to unnecessary interventions. In add- ition to being unhelpful, excessive testing also contributes signifi- cantly to healthcare costs. The erythrocyte sedimentation rate (ESR) is the most useful blood test in patients suspected of having spinal infection, as it is elevated in up to 80% of cases. Neutrophilia and anaemia are also commonly seen in patients with neoplasia and infection. Laboratory evaluation of patients with osteoporosis and/or pathological fractures should include serum calcium, phosphate and alkaline phosphatase, as well as serum and urine immunoelectrophoresis (to detect myeloma), particularly if the ESR is elevated. MRI is also the imaging modality of choice for the diagnosis of lumbar disorders. It provides a unique noninvasive means of studying the spine and is unsurpassed for imaging soft tissues. It is particularly helpful in

the evaluation of spinal cord tumours, as well as infections of the spine, including discitis and epidural and paraspinal abscesses. CT is a recommended imaging modality for the evaluation of bony structures and therefore is a good choice for spinal stenosis. The diagnostic accuracy of MRI and plain CT is comparable for the assessment of nerve root compression due to disc herniation. Although MRI is noninvasive and involves no ra- diation to the patient, the much lower cost of plain CT makes it an excellent choice in this context. CT-guided percutaneous biopsy can be used to obtain histological material from patients with tumour mass or infection. As mentioned previously, injection studies done under fluoro- scopic guidance are the only means of diagnosing back pain of discal, zygapophyseal, or sacroiliac joint origin. However, the impact of this approach on patient management is unclear, as no specific treatment has yet been demonstrated to be significantly effective for these conditions. Radionuclide bone scintigraphy with technetium-99m is helpful in conditions characterized by increased bone turnover. These in- clude bone metastases, fracture, Paget's disease, and infections. Gallium-67 binds to polymorphonuclear leucocytes and can be helpful in the evaluation of vertebral osteomyelitis and sacroiliac septic arthritis. Typically, bone scans are negative in patients with multiple myeloma, which is characterized by lytic lesions. Neurophysiological studies are rarely indicated, except in pa- tients in whom it is difficult to distinguish between a neuropathy, radiculopathy, or plexopathy. Fibrillations in the paraspinous muscles are the most common and earliest findings seen in radiculopathy. Their presence indicates a lesion proximal to the vertebral foramen and excludes a plexopathy. How are patients with low back pain best managed? Surgical emergencies As mentioned earlier, cauda equina syndrome and a ruptured vas- cular aneurysm are the only two conditions that must be managed surgically on an emergency basis. Radiculopathy and neurological deficits More than 90% of patients with radiculopathy will improve sig- nificantly with conservative treatment including education,
Table 19.4.3 Physical examination of the patient with back pain Patient standing Posture (protruding abdomen, hyperlordosis, loss of lordosis, scoliosis) Spinal motion (flexion–extension–lateral flexion) Walking on heels (L4–L5) and toes (S1) Squatting (L2–L3–L4) Patient sitting Straight leg-raising test (tripod sign) Knee (L4) and ankle (S1) reflexes Patient supine Abdominal examination (mass, bruit) Vascular examination Sensory examination: L4: anteromedial knee and leg L5: lateral leg, web space between first and second toes S1: lateral aspect of the foot, heel Motor examination (if abnormalities are noted in the standing position): L4: quadriceps L5: dorsiflexion of first toe S1: plantar flexion of foot and toes Hip examination Patient prone Palpation (spinous processes, paraspinal muscles) Sensory examination: S2–S4: saddle anaesthesia Motor examination: S1: contraction of gluteus maximus Femoral stretch test (L2 to L4) Sphincter tone Box 19.4.2 Waddel's tests for nonorganic back pain • Tenderness to superficial touch • Simulation testsa — Axial loading — Spinal rotation in one plane • Distraction tests — Inconsistent results on confirmatory testing • Regional disturbances — Abnormalities not following neuroanatomical structures • Overreaction — Disproportionate verbalization a A positive test results in aggravation of low back pain.

 reassurance, advise to keep active, manual therapy and anti- inflammatory drugs. The role of epidural steroids remains un- clear: they may afford short-term improvement in leg pain, but they do not reduce the need for surgery. Indications for surgery include persistent disabling buttock and/or leg pain despite two to three months of conservative management, and/or severe or progressive worsening neurological deficit while on treatment. Surgical outcomes for herniated lumbar disc are superior to con- servative management in the first three to six months but out- comes are similar at 12 months or longer. Surgery may also

be indicated in patients with neurological claudication due to spinal stenosis, but only after all attempts with conservative manage- ment have failed. However, what conservative treatments are most effective in neurogenic claudication remains unknown. The positive benefits of surgery for neurological claudication tend to diminish after two to four years. Patients with spinal stenosis who are more incapacitated by back pain than by neurogenic claudica- tion should probably not be operated on, because surgery is rarely effective and may worsen back pain. Specific (pathological) back pain Primary and secondary tumours of the spine can be treated by sur- gery, radiotherapy, or chemotherapy, whereas antibiotics with or without surgical drainage are the treatments for discitis and osteo- myelitis. Postural exercises and nonsteroidal anti-inflammatory drugs (NSAIDs) remain the cornerstone of treatment for patients with spondyloarthropathies. Sulphasalazine and methotrexate are helpful for the peripheral arthritis associated with these condi- tions, but they have no role in the treatment of the spinal disease. Biological agents including etanercept, infliximab, adalimumab, golimumab, and certolizumab are the drugs of choice in patients with spinal disease associated with spondyloarthropathies who fail NSAIDs. The treatment of metabolic bone diseases is discussed in Chapters 20.1 and 20.4. Nonspecific low back pain Several systematic reviews of randomized controlled trials of the most common interventions have been published and form the basis of the recommendations found in the over 15 national guidelines published in the past two decades. These national guidelines were developed with the main objectives of improving prevention and management of acute and chronic nonspecific low back pain. Patients with acute back pain should receive non pharmaco- logical care as a first treatment option including reassurance, ad- vise to stay active and continue with normal activities, including work if possible. Referral for spinal manipulation or massage therapy, and if necessary, non steroidal anti-inflammatory drugs and muscle relaxants should be considered in patients failing to return to normal activities. Exercise therapy is ineffective in the acute phase but should be recommended for prevention of recurrence. An important objective in managing acute low back pain is to re- duce the likelihood of patients progressing to chronicity, not least because there are only a few modalities that have been shown to be beneficial in chronic back pain. The early identification of psy- chosocial risk factors, or ‘yellow flags’ (Box 19.4.1), should lead to appropriate cognitive and behavioural management in an attempt to influence positively some of these factors. In patients with chronic low back pain, non pharmacological care should initially be considered including cognitive behavioural therapy, supervised exercise therapy, yoga, spinal manipulation, educational interventions including instruction in self-management and multidisciplinary (biopsychosocial) treatment. In patients who fail to respond, non steroidal anti-inflammatory drugs followed by tramadol or duloxetine may be considered. Invasive treatments including epidural corticosteroids, intra-articular steroid injec- tions, and local facet nerve blocks, radiofrequency facet joint de- nervation, intradiscal injections, and prolotherapy (injection of an irritant solution into a joint space, ligament, or tendon insertion) are generally not recommended. Surgery is rarely indicated for nonspecific low back pain. Neck pain Neck pain is a very common symptom: in the general population, its 12-month prevalence among adults ranges between 30% and 50% and one-month prevalence between 15% and 45%. As for low back pain, neck pain can rarely be attributed to a specific anatom- ical source, and most patients presenting with this symptom should be diagnosed as suffering from ‘nonspecific neck pain’ or ‘cervical spinal pain of unknown origin’, rather than applying nonvalidated diagnostic labels. Trauma, in particular acceleration–deceleration (whiplash) injuries, younger age, female gender, and previous his- tory of neck pain are the most common risk factors associated with seeking care for neck pain. The clinical approach to the patient with neck pain should follow the same principles as described for low back

pain. Signs of nerve root and/or spinal cord compression should always be looked for, particularly in patients complaining of associated pain, numbness, or weakness in their arms or legs. Older patients with cervical spinal stenosis due to severe osteoarthritis may present with wasting and lower motor neuron weakness in the arms or hands, and spastic weakness and sensory disturbance in the legs. Certain diseases of the pharynx (pharyngitis, retropharyngeal abscess), larynx (laryngitis), trachea (tracheitis), thyroid (acute thyroiditis), lymph nodes (lymphadenitis), carotids (carotidynia), lungs (Pancoast tumour), heart (myocardial infarction), pericar- dium (pericarditis), aorta (dissecting aneurysm), and diaphragm (subphrenic abscess) can refer pain to the neck and should be considered. These conditions will usually have other clinical manifestations to alert the physician to the proper diagnosis. The neoplastic, infectious, inflammatory, and metabolic conditions enumerated in Table 19.4.1 can also affect the cervical spine. In addition, rheumatoid arthritis and diffuse idiopathic skeletal hyperostosis should be considered in the differential diagnosis, as both can involve the cervical spine and cause spinal cord compression. A special task force proposed a classification of neck pain and associated disorders that takes into account presenting signs and symptoms and impact on activities of daily living (Table 19.4.4). This can be very useful in guiding management.

19.4 Back pain and regional disorders 4411 Investigation of patients with neck pain—who and how? Patients with grade I or grade II neck pain (nonspecific neck pain) do not usually require radiographic evaluation. Those with grade III and grade IV neck pain and associated disorders may require a baseline radiological examination, particularly if there is associated trauma. This should consist of plain films with anteroposterior, lateral, and open-mouth views. Degenerative changes in the discs and zygapophyseal joints increase with age and do not correlate with symptoms of neck pain. CT is helpful for evaluating the bony structures of the neck. MRI is therefore preferred in most cases with spinal cord or nerve root com- promise. Fifty per cent (50%) of patients with chronic neck pain after motor vehicle collisions respond to diagnostic zygapophyseal joint injection, suggesting that these joints are responsible for their pain. Management of patients with neck pain Most treatments recommended for the management of patients with neck pain have not been evaluated in a scientifically rigorous manner. Those that have been have shown very little, if any, evidence of efficacy. These include soft cervical collars, zygapophyseal joint injections, and acupuncture. Patients with acute neck pain should be encouraged to maintain their usual level of activity. There is evidence that NSAIDs, exercise, mobilization, and manipulation are effective, whereas the promotion of rest and soft collars tends to prolong disability. Surgery is indicated only for patients with se- vere radiculopathy not responsive to 6–12 weeks of conservative management. Regional pain disorders Regional musculoskeletal pain disorders, defined as painful condi- tions in a specific region of the body, are extremely common. Several clinical entities have been described for the shoulder, elbow, wrist and hand, hip, knee, ankle, and foot regions (Table 19.4.5). The ma- jority can be identified by a careful history and directed physical examination, although recent research indicates that interobserver diagnostic agreement is only moderate for the conditions related to the shoulder and knee regions, particularly in patients complaining of severe or chronic pain, and those with bilateral involvement. Investigations are not usually required for the diagnosis of most re- gional pain disorders. In a patient presenting with regional pain, one should aim to de- termine whether the pain has its origin in the bones and joints, peri- articular soft tissues (tendons, bursa, and fascia), nerve roots and peripheral nerves, or blood vessels, or if it is referred from distant musculoskeletal or visceral structures. Lesions of the periarticular soft tissues account for most causes of regional pain disorders. Plain radiographs are helpful in delineating soft

tissue calcifica- tion that may or may not be relevant to the patient's presentation. Ultrasonography and MRI are of equal value in confirming a diag- nosis of tendon rupture in the shoulder, knee, or ankle regions. The principles of management include temporary or relative rest, analgesics or NSAIDs, local corticosteroid injections, thermal or electrical modalities, orthotics or supportive devices, and graded flexibility and/or strengthening exercises. Diffuse musculoskeletal pain Between 8 and 10% of adults report suffering from chronic dif- fuse musculoskeletal pain and a large proportion of these satisfy the classification criteria for fibromyalgia. Fibromyalgia has a female:male ratio of 2:1 and it can develop at any age, including childhood. In addition to widespread pain, coexisting symptoms include sleep disturbance, negative mood, cognitive dysfunction, and fatigue, which together give rise to high levels of disability. The aetiology of fibromyalgia is unknown, but appears to result from central nervous system changes that lead to amplification of pain (central sensitization). Underlying genetic and environmental risk factors appear equally important. Common environmental triggers include acute pain episode(s), infections, and psycho- logical stress. The diagnosis of fibromyalgia is made clinically and should be suspected in patients having multifocal pain not fully explained by injury or inflammation and who display central sensitization and the coexisting symptoms described here. Fibromyalgia is challenging and best managed by integrating pharmacological and nonpharmacological treatments while engaging patients as active participants in the process. Patient education, regular aerobic exercise, and cognitive behavioural therapy with the goal of adopting self-management strategies are likely important nonpharmacological treatments. Potentially effective pharmacological treatments include low-dose tricyclic agents, gabapentinoids, sero- tonin norephinephrine reuptake inhibitors, and y-hydroxybutyrate. For further discussion see Chapters 19.2, 26.3.3, and 26.5.12.

Table 19.4.4 Classification of neck pain and associated disorders

Grade	Clinical presentation
I	Neck pain and associated disorders with no signs or symptoms suggestive of major structural pathologya and no or minor interference with activities of daily living
II	Neck pain and associated disorders with no signs or symptoms of major structural pathology, but major interference with activities of daily living
III	Neck pain and associated disorders with no signs or symptoms of major structural pathology, but presence of neurological signsb
IV	Neck pain and associated disorders with signs and symptoms suggestive of major structural pathology

Symptoms and disorders that can manifest in all grades include deafness, dizziness, tinnitus, headache, memory loss, dysphagia, and temporomandibular joint pain. a Major structural pathology include (but not limited to) fracture, vertebral dislocation, injury to spinal cord, infection, neoplasm, or systemic disease including the inflammatory arthropathies. b Neurological signs include decreased or absent deep tendon reflexes, weakness, and sensory deficits. Adapted from Haldeman et al. A best evidence synthesis on Neck Pain: Findings from the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders. Spine 2008, 33 (supp) pS1–220, with permission from Lippincott Williams and Wilkins.

Table 19.4.5 Common musculoskeletal disorders by body region

Diagnosis	Epi-demiology	Clinical symptoms	Physical examination	Associations	Investigations	Treatment
Shoulder region						
Rotator cuff tendinopathy	Any age; although more common among 40–50	Pain over the deltoid region; increased at night and by specific movements depending on involved tendon	Painful arc of abduction 60–120 degrees; full passive range; pain aggravated by resisted contraction of the involved tendon; positive impingement signs	DM, repetitive movements (sports, occupational), may precede tendon tears	Radiograph in chronic

cases may show cysts and sclerosis of greater tuberosity NSAIDs, exercise, activity modification, steroid injections Calcific tendinpathy Age 20–60 Acute severe pain over the tip of the shoulder Limitation of both active and passive movements due to pain; occasional swelling when bursa involved Calcification on radiograph NSAIDs, exercise, activity modification, electrical modalities (shockwave therapy), steroid injection Adhesive capsulitis Age 40–65, more common in females Diffuse pain in the shoulder; progressive capsular restriction of movement Limitation of both active and passive movements in all directions (external rotation-abduction internal rotation) DM, prior history of adhesive capsulitis in opposite shoulder; Note: MI, stroke, thyroid and pulmonary diseases may also present at diffuse shoulder pain Arthrography NSAIDs, steroid injection, shoulder mobility, and stretching exercises, passive mobilizations, arthrographic distension, suprascapular nerve block Bicipital tendinitis Very rare in isolation Pain in anterior aspect of the shoulder and over the deltoid region Speed’sa and Yerganson’sb manoeuvres nonspecific Rotator cuff tendinitis NSAIDs, exercise, activity modification, steroid injection Rotator cuff tear Age >40; incidence increases with age Sudden pain over the deltoid area; high prevalence of asymptomatic rotator cuff tears Weakness of abduction if full thickness May be preceded by tendinopathy US, arthrography, MRI Surgery if acute/traumatic, symptomatic and patient <65; NSAIDs, exercise, activity modification otherwise Elbow region Lateral epicondylitis Age 40–55 Pain over the lateral epicondyle; may radiate proximally or distally Tenderness lateral epicondyle; increased by resisted extension of the wrist or middle finger Overuse or repetitive strain injury (sport or occupational), smoking, obesity, DM NSAIDs, forearm bracing/taping, exercise, activity modification, modalities (shockwave therapy, laser, ultrasound), steroid injection Medial epicondyltiis 15 times more rare than lateral epicondylitis Pain over the medial epicondyle Tenderness medial epicondyle; increased by resisted flexion of the wrist or fingers Overuse or repetitive strain injury (sports or occupational) NSAIDs, forearm bracing/taping, exercise, activity modification, modalities (shockwave therapy, laser, ultrasound), steroid injection Olecranon bursitis Swelling ± pain over the olecranon bursa Swelling ± erythema ± tenderness Trauma, RA, gout Bursal aspiration: cell count, Gram stain, culture, crystals NSAIDs, compression, ice, steroid injection, antibiotics if septic Wrist and hand region DeQuervain tenosynovitis Age 30–50, more common in females Pain radial aspect of wrist and base of the thumb; exacerbated by pinching Tenderness ± swelling surround abductor pollicis longus tendon;

- Finkelstein manoeuvre c, pain with resisted thumb abduction/ extension Overuse or repetitive strain injury (manual handling activities) NSAIDs, splinting, activity modification, steroid injection

19.4 Back pain and regional disorders 4413 Trigger finger Any age Pain over palm of hand; snapping finger Tenderness ± swelling ± nodule in flexor tendon Diabetes, RA NSAIDs, steroid injection, manual release Dupuytren’s contracture Males, age 40–80 Flexion contracture of 4th and 5th fingers Thickening palmar aponeurosis Alcohol, liver disease, DM Steroid injection Hip region Trochanteric bursitis Women, age 40–70 Pain lateral aspect of hip and thigh; worse at night; increased by lateral decubitus Tenderness greater trochanter Hip OA, obesity NSAIDs, exercise, modalities (shockwave therapy) steroid injection Knee region Prepatellar bursitis Women Swelling ± pain anterior aspect of knee Tenderness in prepatellar region Kneeling Synovial fluid aspiration NSAIDs, compression, ice, steroid injection Patello-femoral syndrome Age 15–40 Pain in the anterior knee, aggravated with stairs, and squatting Tenderness patella ± patellofemoral crepitus NSAIDs, exercise, activity modification Anserine bursitis Women, age 40–60 Pain over the medial aspect

upper tibia Tenderness medial aspect of tibia Knee OA, obesity NSAIDs, compression, ice, steroid injection Popliteal cyst Any age Pain, stiffness, swelling posterior knee Swelling posterior knee; leg swelling with rupture Inflammatory arthritis Steroid injection Ankle and foot region Achilles tendinopathy Age 20–50 Pain over Achilles tendon Tenderness ± swelling ± crepitus over Achilles tendon Spondyloarthropathies Relative rest, NSAIDs, exercise (eccentric over concentric), splinting/ bracing, modalities (shockwave therapy laser therapy) Plantar fasciitis Pain plantar aspect foot, especially with first step upon waking or after prolonged inactivity Tenderness medial calcaneus, pain with passive extension of the
toes, decreased range of motion in ankle Spondyloarthropathies, obesity, work-related weight-bearing, runners, recent increase in
weight-bearing activity Orthotics (prefabricated or custom), night splinting, stretching exercises, weight loss, modalities (shockwave therapy), steroid injection Morton's neuroma Women, age 40–60 Burning pain in interdigital clefts increased by walking Tenderness interdigital cleft exacerbated by squeezing the forfoot; rarely sensory alteration; cleft 4th toe Pes planus, pes cavus, tight shoes Proper shoes, surgery, injections DM, diabetes mellitus; NSAIDs, nonsteroidal anti-inflammatory drugs; MI, myocardial infarction; US, ultrasonography; MRI, magnetic resonance imaging; RA, rheumatoid arthritis; OA, osteoarthritis. a Speed's test: the examiner resists shoulder forward flexion while the patient's arm is held in flexion and supination. Pain over the biceps tendon within the bicipital groove indicates a positive test. b Yergason's test: the patient's elbow is flexed to 90 degrees and the forearm pronated. The examiner resists the patient's attempts to flex the elbow and supinate the forearm. Pain over the biceps tendon within the bicipital groove indicates a positive test. c Finkelestein's test: the patient's thumb is flexed inside the fingers and the wrist is passively deviated in an ulnar direction. Pain over the abductor pollicis longus and extensor pollicis brevis tendons at the wrist indicates a positive test.

 FURTHER READING Accident Compensation Corporation (2009). Distal upper limb: guide- lines for management of some common musculoskeletal disorders. Accident Compensation Corporation, New Zealand. American Academy of Orthopaedic Surgeons (2010). Optimizing the management of rotator cuff problems: guideline and evidence report. American Academy of Orthopaedic Surgeons, Rosemont. Ammendolia C, et al. (2013). Nonoperative treatment for lumbar spinal stenosis with neurogenic claudication. Cochrane Database Syst Rev, 30, CD010712. Baumbach SF, et al. (2014). Prepatellar and olecranon bursitis: lit- erature review and development of a treatment algorithm. Arch Orthopaedic Trauma Surg, 134, 359–70. Carette S, Fehlings MG (2005). Cervical radiculopathy. New Engl J Med, 353, 392–9. Chou R, et al. (2017). Nonpharmacologic Therapies for Low Back Pain: A Systematic Review for an American College of Physicians Clinical Practice Guideline. Ann Intern Med, 166, 493–505. Chou R, et al. (2017). Systemic Pharmacologic Therapies for Low Back Pain: A Systematic Review for an American College of Physicians Clinical Practice Guideline. Ann Intern Med, 166, 480–92. Côté P, et al. (2016). Management of neck pain and associated dis- orders: A clinical practice guideline from the Ontario Protocol for Traffic Injury Management (OPTIMa) Collaboration. Eur Spine J, 25, 2000–22. Clauw DJ (2014). Fibromyalgia: a clinical review. JAMA, 311, 1547–55. Haldeman S, et al. (2008). Best evidence synthesis on neck pain: find- ings from the bone and joint decade 2000–2010 task force on neck pain and its associated disorders. Spine, 33, S1–220. Hill JC, et al. (2011). Comparison of stratified primary care manage- ment for low back pain with current best practice (STarT Back): a randomised controlled trial. Lancet, 378, 1560–71. Hoy D, et al. (2010). The epidemiology of low back pain. Best Pract Res Clin Rheumatol, 24, 769–81. Kelley MJ, et al. (2013). Shoulder pain and mobility deficits: adhesive capsulitis. Clinical practice guidelines linked to the

International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association. J Orthop Sports Phys Ther, 43, A1–31. Kent P, Kjaer P (2012). The efficacy of targeted interventions for modi- fiable psychosocial risk factors of persistent nonspecific low back pain—a systematic review. Man Ther, 17, 385–401. Lawry G, et al. (2010). Fam's musculoskeletal examination and joint in- jection techniques, 2nd edition, Mosby Elsevier, Maryland. Martin RL, et al. (2014). Heel pain—plantar fasciitis: revision 2014. Clinical practice guideline linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association. J Orthop Sports Phys Ther, 44, A1–23. Qaseem A, Wilt TJ, McLean RM, Forciea MA (2017). Clinical Guidelines Committee of the American College of Physicians. Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. Ann Intern Med, 166, 514–30. Schwarzer AC, et al. (1994). The relative contributions of the disc and zygapophyseal joint in chronic low back pain. Spine, 19, 801–6. Scottish Intercollegiate Guidelines Network (SIGN) (2013). Management of Chronic Pain: A National Clinical Guideline. Scottish Intercollegiate Guidelines Network (SIGN), Edinburgh (Scotland); December 2013. http://www.sign.ac.uk/guidelines/fulltext/136/index.html Winters ME, Kluetz P, Zilberstein J (2006). Back pain emergencies. Med Clin North Am, 90, 505–23. Woitzik E, et al. (2015). The effectiveness of exercise on recovery and clinical outcomes of soft tissue injuries of the leg, ankle, and foot: a systematic review by the Ontario Protocol for Traffic Injury Management (OPTIMa) Collaboration. Man Ther, 20, 633–45. Yu H, et al. (2015). Effectiveness of passive physical modalities for shoulder pain: systematic review by the Ontario protocol for traffic injury management collaboration. Phys Ther, 95, 306–18.

Revision #1
Created 2026-01-22 16:40:46 UTC by Omar Ayman
Updated 2026-01-22 16:40:46 UTC by Omar Ayman