Table 16-1 Low Back Pain

Patterns	Possible Causes	Physical Signs
Mechanical Low Back Pain[5,74] Aching pain in the lumbosacral area; may radiate into lower leg, especially along L5 (lateral leg) or S1 (posterior leg) dermatomes. Refers to anatomic or functional abnormality in absence of neoplastic, infectious, or inflammatory disease. Usually acute (<3 months), idiopathic, benign, and self-limiting; represents 97% of symptomatic low back pain. Commonly work related and occurring in patients 30 to 50 years. Risk factors include heavy lifting, poor conditioning, obesity.	Often arises from muscle and ligament injuries (~70%) or age-related intervertebral disc or facet disease (~4%). Causes also include herniated disc (~4%), spinal stenosis (~3%), compression fractures (~4%), and spondylolisthesis (2%).	Paraspinal muscle or facet tenderness, pain with back movement, loss of normal lumbar lordosis, but no motor or sensory loss or reflex abnormalities. In osteoporosis, check for thoracic kyphosis, percussion tenderness over a spinous process, or fractures in the thoracic spine or hip.
Sciatica (Radicular Low Back Pain)[5,22,75] Shooting pain below the knee, commonly into the lateral leg (L5) or posterior calf (S1); typically accompanies low back pain. Patients report associated paresthesias and weakness. Bending, sneezing, coughing, straining during bowel movements often worsen pain.[1]	Sciatic pain very sensitive, ~95%, and specific, ~88%, for disc herniation. Usually from herniated intervertebral disc with compression or traction of nerve root(s) in people 50 years or older. Involves L5 and S1 roots in ~95% of disc herniations. Root or spinal cord compression from neoplastic conditions in fewer than 1% of cases. Tumor or midline disc herniation in bowel or bladder dysfunction, leg weakness from cauda equina syndrome (S2–4).	Disc herniation most likely if calf wasting, weak ankle dorsiflexion, absent ankle jerk, positive crossed straight-leg raise (pain in affected leg when healthy leg tested); negative straight-leg raise makes diagnosis highly unlikely. Ipsilateral straight-leg raise sensitive, about 65% to 98%, but not specific, about 10% to 60%.
Lumbar Spinal Stenosis[76,77] "Pseudoclaudication" pain in the back or legs with walking that improves with rest, lumbar flexion (which decompresses spinal cord), or both. Pain vague but usually bilateral, with paresthesias in one or both legs.	Arises from hypertrophic degenerative disease of one or more vertebral facets and thickening of the ligamentum flavum, causing narrowing of the spinal canal centrally or in lateral recesses. More common after age 60 years.	Posture may be flexed forward, with lower extremity weakness and hyporeflexia. Thigh pain after 30 seconds of lumbar extension. Straight-leg raise usually negative.
Chronic Back Stiffness[59,60]	*Ankylosing spondylitis*, an inflammatory polyarthritis, most common in men younger than 40 years. *Diffuse idiopathic hyperostosis (DISH)* affects men more than women, usually 50 years or older	
Nocturnal Back Pain, Unrelieved by Rest[5,78]	Consider *metastatic malignancy* to the spine from cancer of the prostate, breast, lung, thyroid, and kidney, and multiple myeloma.	Loss of the normal lumbar lordosis, muscle spasm, limited anterior and lateral flexion. Improves with exercise. Lateral immobility of the spine, especially in thoracic area.
Pain Referred from the Abdomen or Pelvis Usually a deep, aching pain; the level varies with the source. Accounts for ~2% of low back pain.	Peptic ulcer, pancreatitis, pancreatic cancer, chronic prostatitis, endometriosis, dissecting aortic aneurysm, retroperitoneal tumor, and other causes.	Variable with the source. Local vertebral tenderness may be present. Spinal movements are not painful and range of motion is not affected. Look for signs of the primary disorder.

Table 16-2 Pains in the Neck

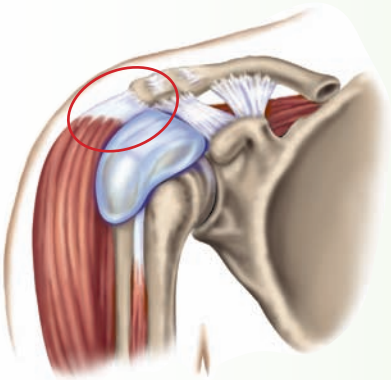
Patterns	Possible Causes	Physical Signs
Mechanical Neck Pain Aching pain in the cervical paraspinal muscles and ligaments with associated muscle spasm and stiffness and tightness in the upper back and shoulder, lasting up to 6 weeks. No associated radiation, paresthesias, or weakness. Headache may be present.	Mechanism poorly understood, possibly sustained muscle contraction. Associated with poor posture, stress, poor sleep, poor head position during activities such as computer use, watching television, and driving.	Local muscle tenderness, pain on movement. No neurologic deficits. Possible trigger points in *fibromyalgia*. *Torticollis* if prolonged abnormal neck posture and muscle spasm.
Mechanical Neck Pain—Whiplash[9] Mechanical neck pain with aching paracervical pain and stiffness, often beginning the day after injury. Occipital headache, dizziness, malaise, and fatigue may be present. Chronic whiplash syndrome if symptoms last more than 6 months; occurs in 20% to 40% of injuries.	Musculoligamentous sprain or strain from forced hyperflexion–hyperextension injury to the neck, as in rear-end collisions.	Localized paracervical tenderness, decreased neck range of motion, perceived weakness of the upper extremities. Causes of cervical cord compression such as fracture, herniation, head injury, or altered consciousness are excluded.
Cervical Radiculopathy—from nerve root compression[9,10] Sharp burning or tingling pain in the neck and one arm, with associated paresthesias and weakness. Sensory symptoms often in myotomal pattern, deep in muscle, rather than dermatomal pattern.	Dysfunction of cervical spinal nerve, nerve roots, or both from foraminal encroachment of the spinal nerve (~75%), herniated cervical disc (~25%). Rarely from tumor, syrinx, or multiple sclerosis. Mechanisms may involve hypoxia of the nerve root and dorsal ganglion, release of inflammatory mediators.	C7 nerve root affected most often (45%–60%), with weakness in triceps and finger flexors and extensors. C6 nerve root involvement also common, with weakness in biceps, brachioradialis, wrist extensors.
Cervical Myelopathy—from cervical cord compression[9] Neck pain with bilateral weakness and paresthesias in both upper and lower extremities, often with urinary frequency. Hand clumsiness, palmar paresthesias, and gait changes may be subtle. Neck flexion often exacerbates symptoms.	Usually from cervical *spondylosis,* defined as cervical degenerative disc disease from spurs, protrusion of ligamentum flavum, and/or disc herniation (~80%); also from cervical stenosis from osteophytes, ossification of ligamentum flavum. Large central or paracentral disc herniation may also compress cord.	Hyperreflexia; clonus at the wrist, knee, or ankle; extensor plantar reflexes (positive Babinski signs); and gait disturbances. May also see *Lhermitte's sign:* neck flexion with resulting sensation of electrical shock radiating down the spine. Confirmation of cervical myelopathy warrants neck immobilization and neurosurgical evaluation.

Table 16-3 Patterns of Pain In and Around the Joints

Problem	Process	Common Locations	Pattern of Spread	Onset	Progression and Duration
Rheumatoid Arthritis[12,48,79]	Chronic inflammation of *synovial membranes* with secondary erosion of adjacent cartilage and bone, and damage to ligaments and tendons	Hands (proximal interphalangeal and metacarpophalangeal joints), feet (metatarsopha-langeal joints), wrists, knees, elbows, ankles	Symmetrically additive: progresses to other joints while persisting in the initial ones	Usually insidious	Often chronic, with remissions and exacerbations
Osteoarthritis *(degenerative joint disease)* [22]	Degeneration and progressive loss of *cartilage* within the joints, damage to underlying bone, and formation of new bone at the margins of the cartilage	Knees, hips, hands (distal, sometimes proximal interphalangeal joints), cervical and lumbar spine, and wrists (first carpometacarpal joint); also joints previously injured or diseased	Additive; however, only one joint may be involved.	Usually insidious	Slowly progressive, with temporary exacerbations after periods of overuse
Gouty Arthritis[80,81]					
Acute Gout	An inflammatory reaction to microcrystals of monosodium urate	Base of the big toe (the first metatarso-phalangeal joint), the instep or dorsa of feet, the ankles, knees, and elbows	Early attacks usually confined to one joint	Sudden; often at night; often after injury, surgery, fasting, or excessive food or alcohol intake	Occasional isolated attacks lasting days up to 2 weeks; they may get more frequent and severe, with persisting symptoms
Chronic Tophaceous Gout	Multiple local accumulations of sodium urate in the joints and other tissues (*tophi*), with or without inflammation	Feet, ankles, wrists, fingers, and elbows	Additive, not so symmetric as rheumatoid arthritis	Gradual development of chronicity with repeated attacks	Chronic symptoms with acute exacerbations
Polymyalgia Rheumatica[14]	A disease of unclear etiology in people older than 50, especially women; overlaps with giant cell arteritis	Muscles of the hip and shoulder girdles and neck; symmetric		Insidious or abrupt, even appearing overnight	Chronic but ultimately self-limiting
Fibromyalgia Syndrome[13]	Widespread musculoskeletal pain and tender points. Mechanism may involve aberrant pain signaling and amplification	"All over," but especially in the neck, shoulders, hands, low back, and knees	Shifts unpredictably or worsens in response to immobility, excessive use, or exposure to cold	Variable	Chronic, with "ups and downs"

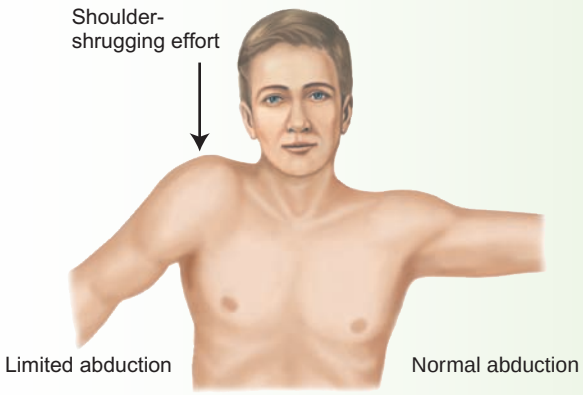
Associated Symptoms				
Swelling	**Redness, Warmth, and Tenderness**	**Stiffness**	**Limitation of Motion**	**Generalized Symptoms**
Frequent swelling of synovial tissue in joints or tendon sheaths; also subcutaneous nodules	Tender, often warm, but seldom red	Prominent, often for an hour or more in the mornings, also after inactivity	Often develops	Weakness, fatigue, weight loss, and low fever are common.
Small effusions in the joints may be present, especially in the knees; also bony enlargement	Possibly tender, seldom warm, and rarely red	Frequent but brief (usually 5–10 min), in the morning and after inactivity	Often develops	Usually absent
Present, within and around the involved joint	Exquisitely tender, hot, and red	Not evident	Motion is limited primarily by pain.	Fever may be present. Consider also septic arthritis.
Present as tophi in joints, bursae, and subcutaneous tissues. Check ears and extensor surfaces for tophi.	Tenderness, warmth, and redness may be present during exacerbations.	Present	Present	Possibly fever; patient may also develop symptoms of renal failure and renal stones.
Swelling and edema may be present over dorsum of hands, wrists, feet	Muscles often tender, but not warm or red	Prominent, especially in the morning	Pain restricts movement, especially in shoulders	Malaise, depression, anorexia, weight loss, and fever, but no true weakness
None	Multiple specific and symmetric tender "trigger points," often not recognized until the examination	Present, especially in the morning	Absent, though stiffness is greater at the extremes of movement	A disturbance of sleep, usually associated with morning fatigue; overlaps with depression

Table 16-4 Painful Shoulders



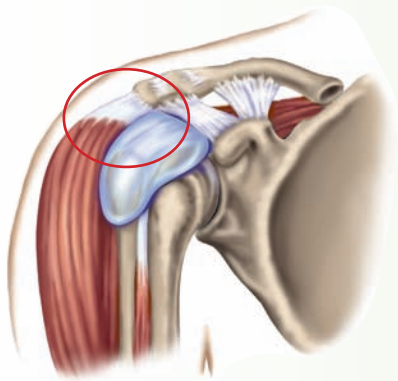
Rotator Cuff Tendinitis (Impingement Syndrome)

Repeated shoulder motion, for example, from throwing or swimming, can cause edema and hemorrhage followed by inflammation, most commonly involving the supraspinatus tendon. Acute, recurrent, or chronic pain may result, often aggravated by activity. Patients report sharp catches of pain, grating, and weakness when lifting the arm overhead. When the supraspinatus tendon is involved, tenderness is maximal just below the tip of the acromion. In older adults, bone spurs on the undersurface of the acromion may contribute to symptoms.



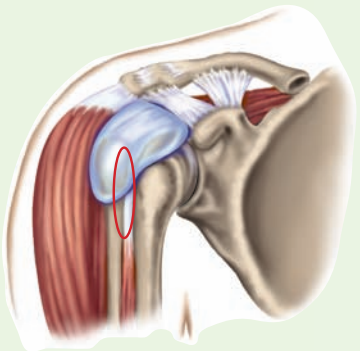
Rotator Cuff Tears

The rotator cuff muscles and tendons compress the humeral head into the concave glenoid fossa and strengthen arm movement—the subscapularis in internal rotation, the supraspinatus in elevation, and the infraspinatus and teres minor in external rotation.[52] Injury from a fall, trauma, or repeated impingement against the acromion and the coracoacromial ligament may cause a partial or full-thickness tear of the rotator cuff, the most common clinical problem of the shoulder, especially in older patients. Patients complain of chronic shoulder pain, night pain, or catching and grating when raising the arm overhead. Weakness or tears of the tendons usually start in the supraspinatus tendon and progress posteriorly and anteriorly. Look for atrophy of the deltoid, supraspinatus, or infraspinatus muscles. Palpate anteriorly over the anterior greater tuberosity of the humerus to check for a defect in muscle attachment and below the acromion for crepitus during arm rotation. In a complete tear, active abduction and forward flexion at the glenohumeral joint are severely impaired, producing a characteristic shrug of the shoulder and a positive "drop arm" test (see p. 625).



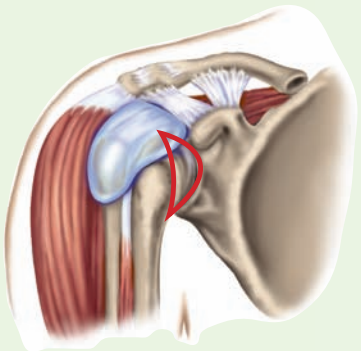
Calcific Tendinitis

Calcific tendinitis is a degenerative process in the tendon associated with the deposition of calcium salts that usually involves the supraspinatus tendon. Acute, disabling attacks of shoulder pain may occur, usually in patients older than age 30, more often in women. The arm is held close to the side, and all motions are severely limited by pain. Tenderness is maximal below the tip of the acromion. The subacromial bursa, which overlies the supraspinatus tendon, may be inflamed. Chronic, less severe pain may also occur.



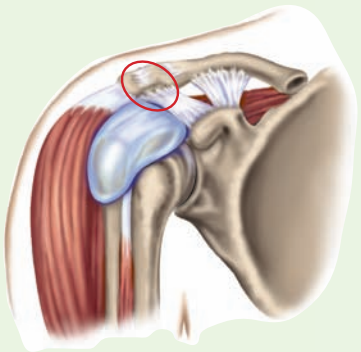
Bicipital Tendinitis

Inflammation of the long head of the biceps tendon and tendon sheath causes anterior shoulder pain resembling and often coexisting with rotator cuff tendinitis. Both conditions may involve impingement injury. Tenderness is maximal in the bicipital groove. Externally rotate and abduct the arm to separate this area from the subacromial tenderness of supraspinatus tendinitis. With the patient's arm at the side, elbow flexed to 90 degrees, ask the patient to supinate the forearm against your resistance. Increased pain in the bicipital groove confirms this condition. Pain during resisted forward flexion of the shoulder with the elbow extended is also indicative.



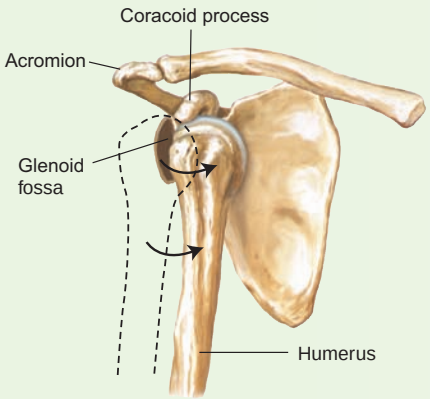
Adhesive Capsulitis (Frozen Shoulder)

Adhesive capsulitis refers to fibrosis of the glenohumeral joint capsule, manifested by diffuse, dull, aching pain in the shoulder and progressive restriction of active and passive range of motion, especially in external rotation, with localized tenderness. The condition is usually unilateral and occurs in people aged 40 to 60. There is often an antecedent disorder of the shoulder or another condition (such as myocardial infarction) that has decreased shoulder movements. The disorder may take 6 months to 2 years to resolve. Stretching exercises may help.



Acromioclavicular Arthritis

Acromioclavicular arthritis is relatively common, usually arising from prior direct injury to the shoulder girdle with resulting degenerative changes. Tenderness is localized over the acromioclavicular joint. Patients report pain with movements of the scapula and arm abduction.



Anterior Dislocation of the Humerus[49–51]

Shoulder instability from anterior subluxation or dislocation of the humerus usually results from a fall or forceful throwing motion, then can become common unless treated or the precipitating motion is avoided. The shoulder seems to "slip out of the joint" when the arm is abducted and externally rotated, causing a *positive apprehension sign* for anterior instability when the examiner places the arm in this position. Any shoulder movement may cause pain, and patients hold the arm in a neutral position. The rounded lateral aspect of the shoulder appears flattened. Dislocations may also be inferior, posterior (relatively rare), and multidirectional.

Table 16-5 Swollen or Tender Elbows

Olecranon bursitis

Olecranon Bursitis

Swelling and inflammation of the olecranon bursa may result from trauma, gout, or rheumatoid arthritis. The swelling is superficial to the olecranon process and may reach 6 cm in diameter. Consider aspiration for both diagnosis and symptomatic relief.

Rheumatoid nodules

Rheumatoid Nodules

Subcutaneous nodules may develop at pressure points along the extensor surface of the ulna in patients with rheumatoid arthritis or acute rheumatic fever. They are firm and nontender. They are not attached to the overlying skin but may be attached to the underlying periosteum. They can develop in the area of the olecranon bursa, but often occur more distally.

Arthritis

Arthritis of the Elbow

Synovial inflammation or fluid is felt best in the grooves between the olecranon process and the epicondyles on either side. Palpate for a boggy, soft, or fluctuant swelling and for tenderness. Causes include rheumatoid arthritis, gout and pseudogout, osteoarthritis, and trauma. Patients report pain, stiffness, and restricted motion.

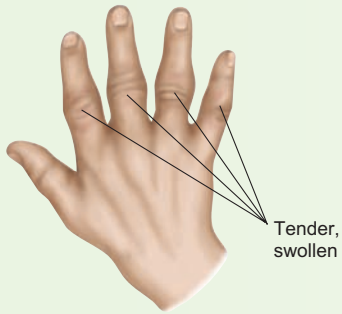
Epicondylitis

Epicondylitis

Lateral epicondylitis (tennis elbow) follows repetitive extension of the wrist or pronation–supination of the forearm. Pain and tenderness develop 1 cm distal to the lateral epicondyle and possibly in the extensor muscles close to it. When the patient tries to extend the wrist against resistance, pain increases.

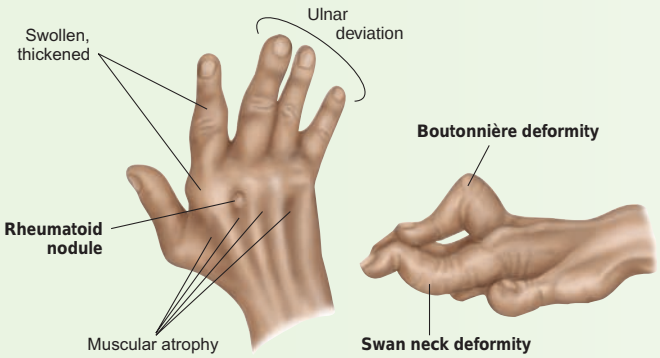
Medial epicondylitis (pitcher's, golfer's, or Little League elbow) follows repetitive wrist flexion, as in throwing. Tenderness is maximal just lateral and distal to the medial epicondyle. Wrist flexion against resistance increases the pain.

Table 16-6 Arthritis in the Hands



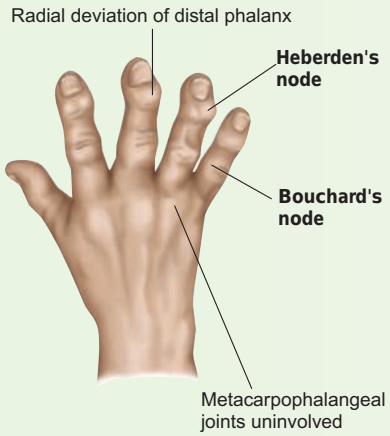
Acute Rheumatoid Arthritis

Tender, painful, stiff joints in *rheumatoid arthritis*, usually with *symmetric* involvement on both sides of the body. The proximal interphalangeal, metacarpophalangeal, and wrist joints are the most frequently affected. Note the fusiform or spindle-shaped swelling of the proximal interphalangeal joints in acute disease.



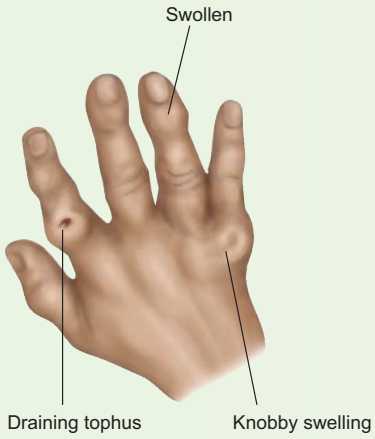
Chronic Rheumatoid Arthritis

In chronic disease, note the swelling and thickening of the metacarpophalangeal and proximal interphalangeal joints. Range of motion becomes limited, and fingers may deviate toward the ulnar side. The interosseous muscles atrophy. The fingers may show *"swan neck" deformities* (hyperextension of the proximal interphalangeal joints with fixed flexion of the distal interphalangeal joints). Less common is a *boutonnière deformity* (persistent flexion of the proximal interphalangeal joint with hyperextension of the distal interphalangeal joint). Rheumatoid nodules are seen in the acute or the chronic stage.



Osteoarthritis *(Degenerative Joint Disease)*

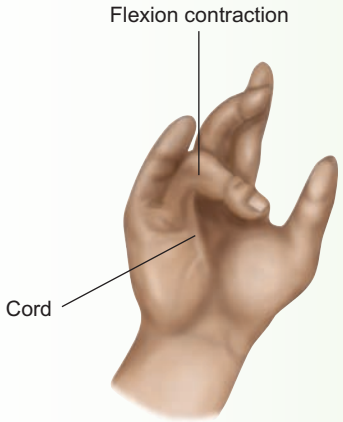
Heberden's nodes on the dorsolateral aspects of the distal interphalangeal joints from bony overgrowth of osteoarthritis. Usually hard and painless, they affect the middle-aged or elderly; often associated with arthritic changes in other joints. Flexion and deviation deformities may develop. *Bouchard's nodes* on the proximal interphalangeal joints are less common. The metacarpophalangeal joints are spared.



Chronic Tophaceous Gout

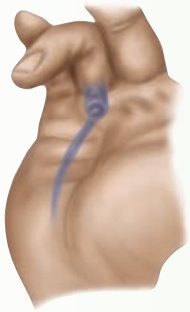
The deformities of long-standing chronic tophaceous gout can mimic rheumatoid arthritis and osteoarthritis. Joint involvement is usually not as symmetric as in rheumatoid arthritis. Acute inflammation may be present. Knobby swellings around the joints ulcerate and discharge white chalklike urates.

Table 16-7 Swellings and Deformities of the Hands



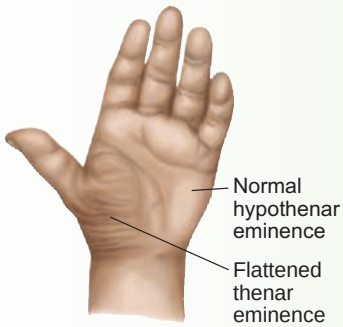
Dupuytren's Contracture

The first sign of a *Dupuytren's contracture* is a thickened nodule overlying the flexor tendon of the ring finger and possibly the little finger near the distal palmar crease. Subsequently, the skin in this area puckers, and a thickened fibrotic cord develops between palm and finger. Finger extension is limited, but flexion is usually normal. Flexion contracture of the fingers may gradually ensue.



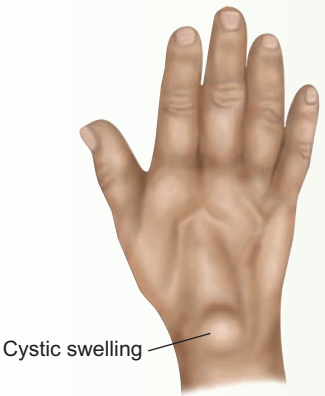
Trigger Finger

Trigger finger is caused by a painless nodule in a flexor tendon in the palm, near the metacarpal head. The nodule is too big to enter easily into the tendon sheath during extension of the fingers from a flexed position. With extra effort or assistance, the finger extends and flexes with a palpable and audible snap as the nodule pops into the tendon sheath. Watch, listen, and palpate the nodule as the patient flexes and extends the fingers.



Thenar Atrophy

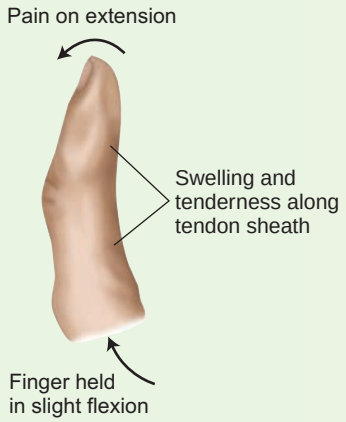
Thenar atrophy suggests a *median nerve disorder* such as *carpal tunnel syndrome* (see p. 634). Hypothenar atrophy suggests an *ulnar nerve disorder.*



Ganglion

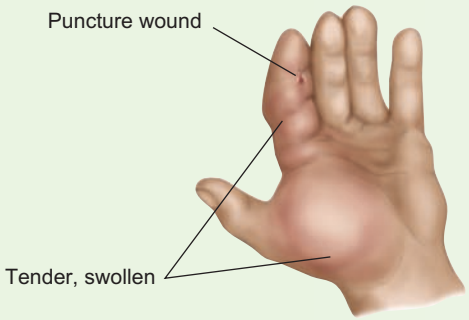
Ganglia are cystic, round, usually nontender swellings along tendon sheaths or joint capsules, frequently at the dorsum of the wrist. The cyst contains synovial fluid arising from erosion or tearing of the joint capsule or tendon sheath and trapped in the cystic cavity. Flexion of the wrist makes ganglia more prominent; extension tends to obscure them. Ganglia may also develop on the hands, wrists, ankles, and feet. They can disappear spontaneously.

Table 16-8 Tendon Sheath, Palmar Space, and Finger Infections



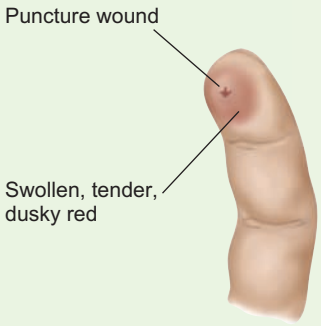
Acute Tenosynovitis

Infection of the flexor tendon sheaths, *acute tenosynovitis*, may follow local injury. Unlike arthritis, tenderness and swelling develop not in the joint but along the course of the tendon sheath, from the distal phalanx to the level of the metacarpophalangeal joint. The finger is held in slight flexion; finger extension is very painful.



Acute Tenosynovitis and Thenar Space Involvement

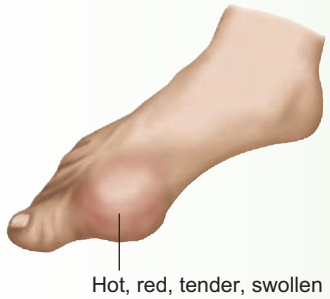
If the infection progresses, it may extend from the tendon sheath into the adjacent fascial spaces within the palm. Infections of the index finger and thenar space are illustrated. Early diagnosis and treatment are important.



Felon

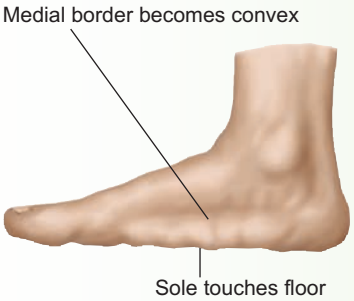
Injury to the fingertip may result in infection of the enclosed fascial spaces of the finger pad, usually from *Staphylococcus aureus*. Severe pain, localized tenderness, swelling, and dusky redness are characteristic. Early diagnosis and treatment, usually incision and drainage, are important. If vesicles are present, consider *herpetic whitlow* instead, usually seen in health care workers exposed to *herpes simplex virus* in human saliva.

Table 16-9 Abnormalities of the Feet



Acute Gouty Arthritis

The metatarsophalangeal joint of the great toe is the initial site of attack in 50% of the episodes of *acute gouty arthritis.* It is characterized by a very painful and tender, hot, dusky red swelling that extends beyond the margin of the joint. It is easily mistaken for a cellulitis. The ankle, tarsal joints, and knee are also commonly involved.

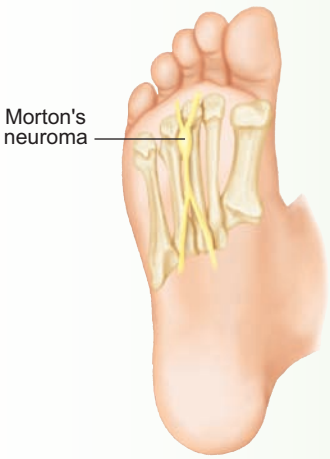


Flat Feet

Signs of *flat feet* may be apparent only when the patient stands, or they may become permanent. The longitudinal arch flattens so that the sole approaches or touches the floor. The normal concavity on the medial side of the foot becomes convex. Tenderness may be present from the medial malleolus down along the medial-plantar surface of the foot. Swelling may develop anterior to the malleoli. "Flat foot" may be a normal variant or arise from posterior tibial tendon dysfunction, seen in obesity, diabetes, and prior foot injury. Inspect the shoes for excess wear on the inner sides of the soles and heels.

Hallux Valgus

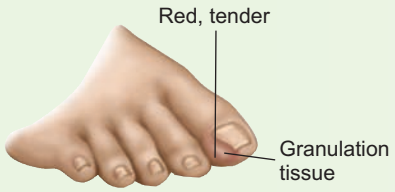
In *hallux valgus,* there is lateral deviation of the great toe and enlargement of the head of the first metatarsal on its medial side, forming a bursa or bunion. This bursa may become inflamed. Women are 10 times more likely to be affected than men.



Morton's Neuroma

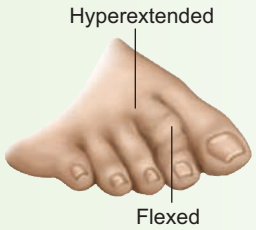
Look for tenderness over the plantar surface between the third and fourth metatarsal heads, from perineural fibrosis of the common digital nerve due to repetitive nerve irritation (not a true neuroma). Check for pain radiating to the toes when you press on the plantar interspace and squeeze the metatarsals with your other hand. Symptoms include hyperesthesia, numbness, aching, and burning from the metatarsal heads into the third and fourth toes.

Table 16-10 Abnormalities of the Toes and Soles



Ingrown Toenail

The sharp edge of a toenail may dig into and injure the lateral nail fold, resulting in inflammation and infection. A tender, reddened, overhanging nail fold, sometimes with granulation tissue and purulent discharge, results. The great toe is most often affected.



Hammer Toe

Most commonly involving the second toe, a hammer toe is characterized by hyperextension at the metatarsophalangeal joint with flexion at the proximal interphalangeal joint. A corn frequently develops at the pressure point over the proximal interphalangeal joint.

Corn

A corn is a painful conical thickening of skin that results from recurrent pressure on normally thin skin. The apex of the cone points inward and causes pain. Corns characteristically occur over bony prominences such as the fifth toe. When located in moist areas such as pressure points between the fourth and fifth toes, they are called soft corns.

Callus

Like a corn, a callus is an area of greatly thickened skin that develops in a region of recurrent pressure. Unlike a corn, a callus involves skin that is normally thick, such as the sole, and is usually painless. If a callus is painful, suspect an underlying plantar wart.

Plantar Wart

A plantar wart is a hyperkeratotic lesion caused by *human papillomavirus,* located on the sole of the foot. It may look like a callus. Look for the characteristic small dark spots that give a stippled appearance to a wart. Normal skin lines stop at the wart's edge. It is tender if pinched side to side, whereas a callus is tender to direct pressure.

Neuropathic Ulcer

When pain sensation is diminished or absent, as in diabetic neuropathy, neuropathic ulcers may develop at pressure points on the feet. Although often deep, infected, and indolent, they are painless. Underlying osteomyelitis and amputation may ensue. Early detection of loss of sensation using a nylon filament is the standard of care in diabetes.