ANATOMICAL STRUCTURE	CLINICAL COMMENT	PLATE NUMBERS
Nervous System and Sense Organs		
Long thoracic nerve	Injury may produce "winged scapula" caused by denervation of serratus anterior muscle; can be injured with repetitive overhead motion	436, 439
Axillary nerve	Position of nerve close to surgical neck of humerus makes it vulnerable to injury with fractures or dislocations of humerus; poorly fitting crutches can also compress axillary nerve	441
Median nerve	Compressed in carpal tunnel syndrome, producing pain and paresthesia in lateral three and one-half digits; major risk factors include obesity, pregnancy, diabetes, and hypothyroidism	470, 486
Recurrent branch of median nerve	May be injured in superficial lacerations of palm over thenar eminence	469
Ulnar nerve	Vulnerable to compression or injury where it passes posterior to medial epicondyle of humerus, and at wrist in ulnar tunnel (Guyon's canal)	483, 487
Radial nerve	Vulnerable to compression or injury where it lies against humerus in radial groove (e.g., with humerus fracture); common symptom is wrist drop due to weakness of wrist extensors; poorly fitting crutches can also compress radial nerve	488, 489
Skeletal System		
Clavicle	Most clavicular fractures are caused from fall on outstretched arm or direct trauma delivered to lateral side of shoulder; middle third of clavicle is most commonly fractured; supraclavicular nerve block relieves acute pain associated with fracture	427, 429
Humerus	Proximal humerus, especially surgical neck, is fractured due to low-energy falls in elderly persons and high-energy trauma in young persons; axillary nerve and circumflex humeral arteries can be injured; hematoma from anterior/posterior circumflex humeral artery damage as result of dislocation may complicate reductions; midbody fractures are also relatively common and may affect radial nerve and/or deep brachial artery; distal humerus fractures may affect ulnar nerve medially and radial nerve laterally	427, 428, 430
Ulna	Subcutaneous location of olecranon makes it vulnerable to fracture by direct trauma, especially when elbow is flexed; ulnar styloid process may also be fractured with distal radial fractures	446, 449
Radius	Fractures of distal radius are most common fracture of upper limb (Colles' fracture), typically caused by fall on outstretched hand (FOOSH)	449
Scaphoid bone	Most commonly fractured carpal bone, typically from fall on outstretched hand (FOOSH)	459, 460, 462
Muscular System		
Palmar aponeurosis	Progressive fibrosis may result in nodules and eventually a palpable cord that limits finger extension (Dupuytren's contracture)	469
Rotator cuff muscles	Injuries to this group of muscles can result from acute injury or chronic overuse and are a common cause of shoulder pain and disability	431, 43 44
Supraspinatus tendon	Most commonly torn rotator cuff tendon	434–4 44
Biceps brachii tendon	Can rupture from sudden load on muscle when contracting; used in flexor compartment reflex assessing C5 and C6 spinal nerves	440, 4
Long head of biceps brachii muscle	Tendon of long head of biceps brachii muscle can cause shoulder pain from tendinosis of intraarticular portion and can rupture in elderly persons from falls on outstretched arm; when long head has been ruptured, it usually tears from supraglenoid tubercle and retracts down into arm; muscle commonly bulges (Popeye deformity) at midbody of humerus; spontaneous rupture may occur in amyloidosis, infiltrative disease that also causes cardiomyopathy	440

ANATOMICAL STRUCTURE	CLINICAL COMMENT	PLATE NUMBERS
Muscles of posterior compartment of forearm	Repetitive use of muscles arising from common extensor origin can damage tendons and produce pain over lateral epicondyle region (epicondylitis); activities such as swinging tennis racquet and poor technique with hammer can result in "tennis elbow"; muscle most likely involved is extensor carpi radialis brevis	451
Muscles of anterior compartment of forearm	Repetitive use of muscles arising from common flexor origin can damage tendons and produce pain over medial epicondyle region (golfer's elbow)	452, 453
Cardiovascular System		
Median cubital vein	Accessed in cubital fossa for venipuncture	424
Suprascapular, dorsal scapular, and circumflex scapular arteries	Provide collateral circulation around scapula, allowing blood to reach distal part of upper limb if axillary artery is blocked or compressed	437
Brachial artery	During deflation of sphygmomanometer on upper arm, brachial artery is auscultated for Korotkoff sounds to measure systolic and diastolic blood pressure; identified medial to biceps brachii tendon and deep to bicipital aponeurosis in cubital fossa	442, 443
Radial artery	Palpated at lateral aspect of wrist to assess radial pulse; common site of vascular access for percutaneous cardiac procedures, such as angioplasty, and for sampling of arterial blood	14, 443
Ulnar artery	Provides important collateral circulation to hand via palmar arch during catheterization of radial artery; patency is assessed prior to procedure using Allen test, in which both radial and ulnar arteries are compressed, then pressure over ulnar artery is released; return of color to wrist within a few seconds indicates patent ulnar artery	443, 476

*Selections were based largely on clinical data and commonly discussed clinical correlations in macroscopic ("gross") anatomy courses.

The roots of the brachial plexus are typically the anterior rami of the C5–T1 spinal nerves. Variation in the spinal nerve contributions to the plexus, and the nerves that arise from this plexus, is common, due to prefixed (high) and postfixed (low) plexuses.

NERVE	ORIGIN	COURSE	BRANCHES	MOTOR	CUTANEOUS
Dorsal scapular nerve	Anterior ramus of C5 spinal nerve	Pierces scalenus medius muscle to run posteriorly and inferiorly on levator scapulae along vertebral border of scapula		Rhomboid major and minor muscles, levator scapulae	
Long thoracic nerve	Anterior rami of C5–C7 spinal nerves	C5–C6 join within scalenus medius muscle, and at 1st rib are joined by C7; runs inferiorly and posterior to brachial plexus and axillary vessels; follows midaxillary line on surface of serratus anterior muscle		Serratus anterior muscle	
Suprascapular nerve	Superior trunk (C5–C6)	Traverses posterior cervical triangle, coursing posterior to inferior belly of omohyoid muscle and border of trapezius muscle to pass through scapular notch deep to superior transverse scapular ligament; continues laterally and then through spinoglenoid notch into infraspinous fossa		Supraspinatus and infraspinatus muscles	
Subclavian nerve	Superior trunk (C5–C6)	Runs inferiorly at distal aspect of anterior rami		Subclavius muscle	
Lateral pectoral nerve	Lateral cord (C5–C7)	Emerges lateral and superficial to axillary artery and vein, coursing just medial to pectoralis minor muscle		Pectoralis major and minor muscles	
Musculocutaneous nerve	Lateral cord (C5–C7)	Emerges at inferior border of pectoralis minor muscle, pierces coracobrachialis muscle to run between brachialis and biceps brachii muscles; just proximal to elbow, pierces deep fascia to continue as lateral antebrachial cutaneous nerve	Muscular branches, lateral antebrachial cutaneous nerve	Anterior compartment of arm	See lateral antebrach cutaneous nerve
Lateral antebrachial cutaneous nerve	Musculocutaneous nerve	Runs posterior to cephalic vein and travels along lateral surface of forearm	Divides at elbow joint into anterior and posterior branches		Lateral forearm
Subscapular nerves	Posterior cord (C5–C6)	Upper and lower subscapular nerves emerge to traverse anterior surface of subscapularis muscle; lower subscapular nerve ends in teres major muscle		Teres major and subscapularis muscles	
Thoracodorsal nerve	Posterior cord (C6–C8)	Emerges between upper and lower subscapular nerves, courses with thoracodorsal artery along posterior axillary wall, diving deep to latissimus dorsi muscle		Latissimus dorsi muscle	
Radial nerve	Posterior cord (C5–T1)	Runs anterior to latissimus dorsi muscle to inferior border of teres major muscle, where it accompanies deep brachial artery along radial groove of humerus to course between medial and lateral heads of triceps brachii muscle	Posterior and inferior lateral brachial cutaneous nerves, posterior antebrachial cutaneous nerve, muscular, deep, and superficial branches and posterior interosseous nerve	Triceps brachii, anconeus, and brachioradialis muscles, extensores carpi radiales longus and brevis, supinator (also see posterior interosseous nerve)	Lateral part of do of hand (also cutaneous bra
Posterior brachial cutaneous nerve	Radial nerve	Emerges from radial nerve in medial axilla			Posterior part o arm

NERVE	ORIGIN	COURSE	BRANCHES	MOTOR	CUTANEOUS
Inferior lateral brachial cutaneous nerve	Radial nerve	Perforates lateral head of triceps brachii muscle below deltoid tuberosity, coursing anteriorly with cephalic vein			Distal part of lateral arm
Posterior antebrachial cutaneous nerve	Radial nerve	Emerges from plane between lateral and medial heads of triceps brachii muscle to become cutaneous			Posterior part of lateral forearm
Posterior interosseous nerve	Deep branch of radial nerve	Continuation of deep radial nerve courses under cover of supinator distally along posterior surface of interosseous membrane of forearm		Posterior compartment of forearm (some exceptions)	
Axillary nerve	Posterior cord (C5–C6)	Passes anterior to subscapularis muscle to exit axilla with posterior circumflex humeral artery through quadrangular space	Muscular branches, superior lateral brachial cutaneous nerve	Deltoid and teres minor muscles	See superior lateral brachial cutaneous nerve
Superior lateral brachial cutaneous nerve	Axillary nerve	Pierces deep fascia at posteroinferior edge of deltoid muscle to become cutaneous			Proximal part of lateral arm
Medial pectoral nerve	Medial cord (C8–T1)	Emerges and runs between axillary artery and vein to pierce pectoralis minor muscle en route to pectoralis major muscle		Pectoralis minor and major muscles	
Medial brachial cutaneous nerve	Medial cord (T1)	Emerges and traverses axilla anterior to latissimus dorsi muscle, running posteromedial with axillary vein, piercing deep fascia to descend with basilic vein	Anterior and posterior branches		Anterior part of medial arm
Medial antebrachial cutaneous nerve	Medial cord (C8–T1)	Emerges medial to axillary artery, traverses axilla to pierce deep fascia supplying anterior arm, and continues on ulnar side of forearm with basilic vein	Anterior and posterior branches		Anterior arm, medial part of forearm
Ulnar nerve	Medial cord (C7–T1)	Emerges medial to axillary artery, continuing medial to brachial artery along medial head of triceps brachii muscle in groove for ulnar nerve between olecranon and medial epicondyle; enters forearm between heads of flexor carpi ulnaris; runs distally between flexor carpi ulnaris and flexor digitorum profundus, giving off dorsal branch before entering hand	Muscular, dorsal, palmar, superficial, and deep branches	Flexor carpi ulnaris, flexor digitorum profundus (medial half), adductor pollicis, hypothenar muscles, dorsal and palmar interosseous muscles, lumbrical muscles (medial two)	Medial part of palm and dorsum of hand, 5th finger and part of 4th
Median nerve	Medial and lateral cords (C6–T1)	Emerges and runs distally with brachial artery to enter forearm between heads of pronator teres; courses distally on deep surface of flexor digitorum superficialis to become superficial at flexor retinaculum of wrist; traverses carpal tunnel deep to flexor retinaculum of wrist	Anterior interosseous nerve, muscular, palmar, recurrent, and common palmar digital branches	Anterior compartment of forearm (*some exceptions*), lumbricals (lateral two), and thenar muscles (also see anterior interosseous nerve)	Lateral part of palm, thumb, 2nd and 3rd fingers, and part of 4th finger
Anterior interosseous nerve	Median nerve	At elbow runs distally with anterior interosseous artery along anterior surface of interosseous membrane of forearm		Flexor pollicis longus, pronator quadratus, flexor digitorum profundus (lateral half)	

MUSCLE	MUSCLE GROUP	PROXIMAL ATTACHMENT	DISTAL ATTACHMENT	INNERVATION	BLOOD SUPPLY	MAIN ACTIONS
Abductor digiti minimi of hand	Hand	Pisiform bone, tendon of flexor carpi ulnaris	Medial surface of base of proximal phalanx of little finger (5th digit)	Ulnar nerve (deep branch)	Deep palmar branch of ulnar artery	Abducts little finger
Abductor pollicis brevis	Hand	Flexor retinaculum of wrist, tubercles of scaphoid and trapezium bones	Base of proximal phalanx of thumb	Median nerve (recurrent branch)	Superficial palmar branch of radial artery	Abducts thumb
Abductor pollicis longus	Posterior forearm	Posterior surfaces of ulna, radius, and interosseous membrane of forearm	Base of 1st metacarpal	Posterior interosseous nerve	Posterior interosseous artery	Abducts and extends thumb
Adductor pollicis	Hand	*Oblique head:* bases of 2nd and 3rd metacarpals, capitate and adjacent carpal bones *Transverse head:* anterior surface of 3rd metacarpal	Base of proximal phalanx of thumb	Ulnar nerve (deep branch)	Deep palmar arch	Adducts thumb
Anconeus m.	Posterior forearm	Posterior surface of lateral epicondyle of humerus	Lateral surface of olecranon, posterior surface of proximal ulna	Radial nerve	Deep brachial artery	Assists triceps brachii m. in extending elbow
Biceps brachii m.	Anterior arm	*Long head:* supraglenoid tubercle of scapula *Short head:* coracoid process of scapula	Radial tuberosity, fascia of forearm (via bicipital aponeurosis)	Musculocutaneous nerve	Brachial artery	Flexes and supinates forearm
Brachialis m.	Anterior arm	Distal half of anterior surface of humerus	Coronoid process and tuberosity of ulna	Musculocutaneous and radial nerves	Radial recurrent and brachial arteries	Flexes forearm
Brachioradialis m.	Posterior forearm	Proximal two thirds of lateral supracondylar ridge of humerus	Lateral surface of distal end of radius	Radial nerve	Radial recurrent artery	Weak flexion of forearm when forearm is in midpronation
Coracobrachialis m.	Anterior arm	Coracoid process of scapula	Middle one third of medial surface of humerus	Musculocutaneous nerve	Brachial artery	Flexes and adducts arm
Deltoid m.	Shoulder	*Clavicular part:* lateral one third of clavicle *Acromial part:* acromion *Spinous part:* spine of scapula	Deltoid tuberosity of humerus	Axillary nerve	Posterior circumflex humeral artery Deltoid branch of thoraco-acromial artery	*Clavicular part:* flexes and medially rotates arm *Acromial part:* abducts arm beyond initial 15 degrees done by supraspinatus m. *Spinous part:* extends and laterally rotates arm
Dorsal interosseous mm. of hand	Hand	Facing surfaces of adjacent metacarpal bones	Base of proximal phalanges, and extensor expansions of digits 2–4	Ulnar nerve (deep branch)	Deep palmar arch	Abduct digits; flex digits at metacarpophalangeal joint and extend interphalangeal joints
Extensor carpi radialis brevis	Posterior forearm	Lateral epicondyle of humerus	Bases of 3rd and 2nd metacarpal bones	Radial nerve (deep branch)	Radial and radial recurrent arteries	Extends and abducts hand
Extensor carpi radialis longus	Posterior forearm	Distal one third of lateral supracondylar ridge of humerus	Base of 2nd metacarpal	Radial nerve	Radial and radial recurrent arteries	Extends and abducts hand

MUSCLE	MUSCLE GROUP	PROXIMAL ATTACHMENT	DISTAL ATTACHMENT	INNERVATION	BLOOD SUPPLY	MAIN ACTIONS
Extensor carpi ulnaris	Posterior forearm	Lateral epicondyle of humerus, posterior border of ulna	Base of 5th metacarpal bone	Posterior interosseous nerve	Posterior interosseous artery	Extends and adducts hand
Extensor digiti minimi	Posterior forearm	Lateral epicondyle of humerus	Extensor expansion of little finger	Posterior interosseous nerve	Posterior interosseous artery	Extends 5th digit
Extensor digitorum	Posterior forearm	Lateral epicondyle of humerus	Extensor expansions of digits 2–5	Posterior interosseous nerve	Posterior interosseous artery	Extends medial four metacarpophalangeal joints, assists in wrist extension
Extensor indicis	Posterior forearm	Posterior surfaces of ulna and interosseous membrane of forearm	Extensor expansion of 2nd digit	Posterior interosseous nerve	Posterior interosseous artery	Extends 2nd digit and helps extend hand
Extensor pollicis brevis	Posterior forearm	Posterior surfaces of radius and interosseous membrane of forearm	Dorsal surface of base of proximal phalanx of thumb	Posterior interosseous nerve	Posterior interosseous artery	Extends proximal phalanx of thumb
Extensor pollicis longus	Posterior forearm	Posterior surfaces of middle one third of ulna and interosseous membrane of forearm	Dorsal surface of base of distal phalanx of thumb	Posterior interosseous nerve	Posterior interosseous artery	Extends distal phalanx of thumb
Flexor carpi radialis	Anterior forearm	Medial epicondyle of humerus	Base of 2nd metacarpal bone	Median nerve	Radial artery	Flexes and abducts hand
Flexor carpi ulnaris	Anterior forearm	*Superficial head:* medial epicondyle of humerus *Deep head:* olecranon and posterior border of ulna	Pisiform bone, hook of hamate bone, base of 5th metacarpal bone	Ulnar nerve	Posterior ulnar recurrent artery	Flexes and adducts hand
Flexor digiti minimi of hand	Hand	Flexor retinaculum of wrist, hook of hamate bone	Medial surface of base of proximal phalanx of little finger	Ulnar nerve (deep branch)	Deep palmar branch of ulnar artery	Flexes proximal phalanx of little finger
Flexor digitorum profundus	Anterior forearm	Medial and anterior surfaces of proximal three fourths of ulna, interosseous membrane of forearm	Palmar surface of base of distal phalanges of digits 2–5	Medial part: ulnar nerve Lateral part: median nerve	Anterior interosseous and ulnar arteries	Flexes distal phalanges of medial four digits, assists with flexion of hand
Flexor digitorum superficialis	Anterior forearm	*Humeroulnar head:* medial epicondyle of humerus, coronoid process of ulna, ulnar collateral ligament *Radial head:* anterior surface of proximal radius	Bodies of middle phalanges of medial four digits	Median nerve	Ulnar and radial arteries	Flexes middle and proximal phalanges of medial four digits, flexes hand
Flexor pollicis brevis	Hand	*Superficial head:* flexor retinaculum, tubercle of trapezium bone *Deep head:* trapezoid and capitate bones	Lateral surface of base of proximal phalanx of thumb	Superficial head: median nerve (recurrent branch) Deep head: ulnar nerve (deep branch)	Superficial palmar branch of radial artery	Flexes proximal phalanx of thumb
Flexor pollicis longus	Anterior forearm	Anterior surfaces of radius and interosseous membrane	Palmar base of distal phalanx of thumb	Anterior interosseous nerve	Anterior interosseous artery	Flexes thumb

MUSCLE	MUSCLE GROUP	PROXIMAL ATTACHMENT	DISTAL ATTACHMENT	INNERVATION	BLOOD SUPPLY	MAIN ACTIONS
Infraspinatus m.	Shoulder	Infraspinous fossa of scapula, infraspinatus fascia	Greater tubercle of humerus	Suprascapular nerve	Suprascapular artery	Lateral rotation of arm
Lumbrical mm. of hand	Hand	Tendons of flexor digitorum profundus	Lateral sides of extensor expansions of digits 2–5	*Lateral two:* median nerve (digital branches) *Medial two:* ulnar nerve (deep branch)	Superficial and deep palmar arches	Extend digits, flex metacarpophalangeal joints
Opponens digiti minimi m. of hand	Hand	Flexor retinaculum of wrist, hook of hamate bone	Palmar surface of 5th metacarpal bone	Ulnar nerve (deep branch)	Deep palmar branch of ulnar artery	Draws 5th metacarpal bone anteriorly and rotates it to face thumb
Opponens pollicis m.	Hand	Flexor retinaculum of wrist, tubercle of trapezium bone	Lateral surface of 1st metacarpal bone	Median nerve (recurrent branch)	Superficial palmar branch of radial artery	Draws 1st metacarpal forward and rotates it medially
Palmar interosseous mm.	Hand	Palmar surfaces of metacarpal bones 2, 4, and 5	Bases of proximal phalanges and extensor expansions of digits 2, 4, and 5	Ulnar nerve (deep branch)	Deep palmar arch	Adduct digits; flex digits and extend interphalangeal joints
Palmaris brevis m.	Hand	Palmar aponeurosis, flexor retinaculum	Skin of medial border of palm	Ulnar nerve (superficial branch)	Superficial palmar arch	Deepens hollow of hand, assists grip
Palmaris longus m.	Anterior forearm	Medial epicondyle of humerus	Distal half of flexor retinaculum of wrist, palmar aponeurosis	Median nerve	Posterior ulnar recurrent artery	Flexes hand and tenses palmar aponeurosis
Pronator quadratus	Anterior forearm	Distal one fourth of anterior surface of ulna	Distal one fourth of anterior surface of radius	Anterior interosseous nerve	Anterior interosseous artery	Pronates forearm
Pronator teres	Anterior forearm	*Humeral head:* medial epicondyle of humerus *Ulnar head:* coronoid process of ulna	Middle part of lateral surface of radius	Median nerve	Anterior ulnar recurrent artery	Pronates forearm and flexes elbow
Subscapularis m.	Shoulder	Subscapular fossa	Lesser tubercle of humerus	Upper and lower subscapular nerves	Subscapular and lateral thoracic arteries	Medially rotates and adducts arm; helps hold humeral head in glenoid fossa
Supinator	Posterior forearm	Lateral epicondyle of humerus, radial collateral and annular ligaments, supinator fossa, and crest of ulna	Lateral, posterior, and anterior surfaces of proximal one third of radius	Radial nerve	Radial recurrent and posterior interosseous arteries	Supinates forearm
Supraspinatus m.	Shoulder	Supraspinous fossa of scapula, supraspinatus fascia	Greater tubercle of humerus	Suprascapular nerve	Suprascapular artery	Initiates arm abduction
Teres major m.	Shoulder	Posterior surface of inferior angle of scapula	Medial lip of intertubercular sulcus of humerus	Lower subscapular nerve	Circumflex scapular artery	Adducts and medially rotates arm
Teres minor m.	Shoulder	Superior two-thirds of posterior surface of lateral border of scapula	Greater tubercle of humerus	Axillary nerve	Circumflex scapular artery	Laterally rotates arm

MUSCLE	MUSCLE GROUP	PROXIMAL ATTACHMENT	DISTAL ATTACHMENT	INNERVATION	BLOOD SUPPLY	MAIN ACTIONS
Triceps brachii m.	Posterior arm	*Long head:* infraglenoid tubercle of scapula	Posterior surface of olecranon	Radial nerve	Deep brachial artery	Extends forearm; long head stabilizes head of abducted humerus and extends and adducts arm
		Lateral head: proximal half of posterior humerus				
		Medial head: distal two thirds of medial and posterior humerus				

Variations in spinal nerve contributions to the innervation of muscles, their arterial supply, their attachments, and their actions are common themes in human anatomy. Therefore, expect differences between texts and realize that anatomical variation is normal.