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Physical Examination

Gerald Kayingo, Vasco Deon Kidd, and Joshua Anderson

LEARNING OBJECTIVES

At the conclusion of this chapter, the learner will be able to:

- ▶ Summarize the fundamental physical assessment skills and concepts necessary to care for older adults.
- ▶ Describe correct techniques in performing focused and comprehensive physical examinations with attention to the geriatric patient's comfort, modesty, and cultural values.
- ▶ Present a systematic approach to examining the geriatric patient from head to toe.
- ▶ Discuss common physical examination abnormalities or features frequently associated with the aging patient.
- ▶ Integrate surface anatomy landmarks, physiologic principles, and the aging process when approaching a physical examination in older adults.
- ▶ Discuss how appropriate physical assessment skills, knowledge, and attitudes play a critical role in the improving health of older adults.

INTRODUCTION

Older adults display heterogeneous changes in anatomy and physiology. These changes often lead to atypical presentation of diseases, a loss of function, and an increased risk of disability. Older adults are also most likely to have multiple comorbidities;¹ they often overestimate healthiness and underestimate the severity of disease. It is important that healthcare professionals develop competencies and skills necessary for a comprehensive assessment to prevent or reduce disability while maximizing function in older adults. Health professionals should be able to perform geriatric-tailored physical examinations and measure physical, cognitive, psychologic, social, and environmental domains of health. This chapter presents an overview of a systematic and sequential physical examination of older adults and describes various techniques commonly performed in primary care settings. Both comprehensive and focused examinations are covered using the four cardinal techniques of examination: inspection, palpation, percussion, and auscultation. Unlike a traditional

physical examination in other populations, assessment of older adults calls for enhanced focus on functional assessment during the physical examination.

GENERAL SURVEY, VITAL SIGNS, AND ASSESSING FUNCTIONAL STATUS

A systematic approach to examining older adults should start with evaluating the general appearance and assessing functional status. Examiners should note the apparent state of health, level of consciousness, signs of distress, skin color changes, or any obvious lesions. It is also important to note how the older adult is dressed, along with their grooming and hygiene. During this general survey, also note facial expression, any odors of body or mouth, posture, gait, and motor activity, as well as height, weight, and body mass index (BMI). General appearance can signal an underlying medical condition. For example, flat or impoverished affect may signal depression, Parkinson's disease, or Alzheimer's disease.

Assessment of functional status in older adults addresses the individual's ability to perform tasks and fulfill social roles associated with daily living. It provides a baseline around various aspects of health such as cognitive abilities, mobility, bowel and bladder function, nutritional status, and vision and hearing. Several validated tools are available to assess functional status; a commonly used performance-based assessment tool is the 10-Minute Geriatric Screener.² This tool covers three important areas of geriatric assessment: cognitive, psychosocial, and physical function. The tool asks about vision, hearing, leg mobility, urinary incontinence, nutrition/weight loss, memory, depression, and physical disability. Additionally, examiners should screen for fall risk among older adults through a detailed history, medical review, and assessment of gait and balance.

Vital Signs

Similar to a traditional physical examination, assessing vital signs in older adults includes measuring temperature, heart rate (HR), respiratory rate (RR), and blood pressure (BP). In addition to determining the HR, the examiner should also assess the rhythm for irregularities. A regularly

irregular heart rhythm may suggest premature ventricular contractions (PVCs) or premature atrial contractions (PACs), while an irregularly irregular heart rhythm is classically associated with atrial fibrillation. Evaluate pulses for their intensity or amplitude, as well as their contour. The amplitude is generally rated on the following scale:

- 0 = *absent*
- 1 = *faint or weak*
- 2 = *normal*
- 3 = *strong*
- 4 = *bounding*

When assessing the BP, ensure that the BP cuff is the proper size and that the patient is appropriately positioned sitting in a chair with feet flat on the ground and relaxed. When assessing vital signs in the ambulatory office, have the patient sit for 5 minutes prior to measuring the BP and pulse to avoid getting a false high reading. It is very important for older adults to determine orthostatic vital signs, commonly referred to as “orthostatics.” With the patient in the supine position for 5 to 10 minutes, measure HR and BP, and then have the patient stand up for 3 minutes and measure HR and BP again. Orthostatic hypotension is a drop in systolic BP of 20 mmHg or more or diastolic BP drop of 10 mmHg or more from supine to standing position. Orthostatic hypotension may signal dehydration, medication side effects, or other systemic causes.

SKIN EXAMINATION

Skin examinations in older adults are particularly important to screen for skin cancer. The examiner should inspect and palpate the skin, noting color, moisture, texture, and turgor. Assess for any lesions: anatomic location/distribution, patterns/shapes—linear, clustered, annular (ring-shaped), aciform (in an arc), geographic, serpiginous, or dermatomal. Pay attention to the ABCDs of melanoma (**A**symmetry, **I**rrregular **B**order, **V**ariation in **C**olor (mixtures of black/blue/red), **D**iameter >6 mm). During the skin examination, inspect and palpate the hair, noting for quantity, distribution, and texture. Hair loss may signal endocrine abnormalities or alopecia. In addition to skin and hair, inspect and palpate the fingernails and toenails, noting for lesions, and any changes in color or texture.

HEAD, EARS, NOSE, SINUSES, MOUTH, THROAT, NECK, AND THYROID EXAMINATIONS

Examination of the Head

Among older adults, serious pathologies such as basal and squamous cell skin cancers manifest on the head. Endocrine disorders such as hyperthyroidism, as well as head trauma, should always be assessed in this population.

Inspection

Clinicians should examine the hair quantity, distribution, texture, and pattern of loss (if any). The presence of coarse or fine hair may signal hypothyroidism and hyperthyroidism, respectively. Hair loss/patches may indicate lupus or alopecia areata. The clinician should examine the scalp for lesions or scaliness as seen in older adults with seborrheic dermatitis, psoriasis, or fungal infections. Inspection should also note the skull size, contour, and if there are any lumps or deformities. Inspect the face for any asymmetry, twitches, swelling, or lesions. Note the patient’s facial expression (a depressed stare may signal Parkinson’s disease or other neurologic disorders).

Palpation

Palpate the head for any tenderness, lumps, depressions, or any skull irregularities.

Examination of the Ears

Hearing in older adults can be impacted by a variety of disorders such as cerumen impaction, ear infections, ruptured tympanic membranes, cholesteatoma of the middle ear, as well as sensorineural and conductive hearing loss.

Inspection

Clinicians should start by examining the external ear for any erythema, scaliness, swelling, deformities, skin lesions, or lumps. The inspection should note if there is any discharge or bleeding.

Palpation

Assess for any tenderness with movement or palpation of tragus, auricle, or mastoid process. Tenderness may indicate otitis externa, otitis media, or mastoiditis.

Otoscopic Evaluation

Using an otoscope, the clinician should inspect the inside ear for erythema, discharge, edema, cerumen, or foreign bodies. Inspect the tympanic membrane for color, contour, scarring, the presence of tympanostomy tubes, or perforations. The otoscopic inspection also helps in identifying any fluid or pus in the middle ear as well as assessing membrane mobility.

Evaluation of Hearing

Start with a gross evaluation by assessing the individual’s ability to hear a whispered phrase such as “99” or “baseball.” If deficits are noted, it is a good idea to assess whether the individual has conductive or sensorineural hearing loss. Two special tests are commonly performed to help differentiate the form of hearing loss.

1. **Weber Test for Lateralization:** Administered by holding a vibrating tuning fork (128 Hz) on the vertex of the patient’s head. The patient is asked to report in which ear the sound is heard louder. In normal hearing, the patient will hear the sound equally in

both ears. In a conductive hearing loss, the sound is lateralized to the impaired ear. With a sensorineural hearing loss, the sound is heard better in the nonimpaired ear.

2. **Rinne Test:** Test for comparison of air conduction versus bone conduction hearing loss. Place the stem of the vibrating tuning fork (typically 512 Hz) initially on the mastoid process behind the ear until the sound is no longer heard. Then, without restriking the fork, place the prong end of the fork quickly just outside the ear and ask the patient to report when the sound is no longer heard. In normal hearing, the sound should still be heard when the tuning fork is moved to air near the ear, indicating that air conduction (AC) is equal or greater than bone conduction (BC). Normally, AC is greater than BC; in conductive hearing loss, BC equals AC or BC is greater than AC; and in sensorineural loss, AC is greater than BC (Rinne is not ideal in distinguishing sensorineural hearing loss from normal hearing).

Examination of the Nose and Sinuses

Inspection

Gross inspection of the nose and sinuses will identify any swelling, obvious deformities, bruising, lesions, and skin color. In older adults, skin cancers are commonly on the nose. Rhinophyma (a large, red, bumpy nose) may be seen in older adults with rosacea or alcohol abuse.

Palpation

Assess for patency of the nares. Palpation of the frontal and maxillary sinuses may reveal tenderness.

Visual Examination With Otoscope

Inspect the nasal mucosa, color, and inflammation and compare bilaterally. Inspect for discharge and note amount, color, consistency, or blood. A clinician should evaluate for structural abnormalities, such as a deviated nasal septum or nasal polyps. Older adults who have a history of intranasal drug use may have a perforated nasal septum. Transillumination of the sinuses can be helpful to elucidate fluid-filled sinuses that may occur with sinus infection or trauma.

Examination of the Mouth and Throat

Even though many disorders of the throat and mouth are common in older adults, this area is frequently less emphasized in primary care offices. Healthcare professionals should pay more attention to mouth examinations to screen for disorders related to dentition, gum disease, xerostomia (dry mouth), and oropharyngeal cancers.

Inspection

Inspect the lips for color, moisture, and ulcers. Oral mucosa should be moist and without lesions. Identify Stensen's and Wharton's ducts and the location of submandibular

and parotid glands. Inspect the condition of the teeth and gums (you may need to remove dentures). Inspect the tongue for lesions, contour, color, texture, and papillae. Inspect hard and soft palate for color and lesions. Inspect the throat, including the uvula, for erythema, swelling, or deviation. Inspect the tonsils, which may be surgically absent. If present, note any swelling, erythema, or exudates. Clinicians should also inspect the pharynx for color, drainage, and swelling. Common disorders of the mouth and throat include pharyngitis, tonsillitis, thrush, oropharyngeal cancers, aphthous ulcers, herpes simplex virus, leukoplakia, Kaposi's sarcoma (immunocompromised individuals), and hairy tongue.

Examination of the Neck and Thyroid Gland

Inspection

Inspect the neck for symmetry, masses, or scars. Look for enlargement of the parotid glands or any visible lymph nodes. Look at the trachea and inspect for any obvious deviation from the midline. Inspect the thyroid for any obvious enlargement. If an enlargement is noted, be sure to measure and further investigate any other related abnormalities. One quick trick to estimate the size of the thyroid is to apply a wide paper tape over the thyroid and outline the thyroid on the tape, making it easier to measure. Write the measurement on the tape. Take pictures and upload into the chat or, if still using a paper chart, print the picture and adhere it to the paper chart.

Palpation

Palpation of the neck should focus on lymph nodes, noting their size, shape, mobility, consistency, and any tenderness. Palpate the trachea, noting any deviation, tenderness, or masses. Palpate the thyroid gland, feeling enlargement, nodularity, or tenderness.

Auscultate the Thyroid Gland

Listen for any bruits. Common disorders of the neck and thyroid gland include goiter, hyperthyroidism/Graves' disease, hypothyroidism, thyroid cancer, thyroiditis, cystic hygroma, lymphadenopathy, and lymphadenitis.

Examination of the Eyes

Eye disorders are among the most prevalent disorders in older adults, with approximately one person in three having some form of vision-reducing eye disease by the age of 65.³ Common age-related eye problems include cataracts, glaucoma, presbyopia, dry eyes, macular degeneration, and retinopathy. These vision changes can dramatically affect the quality of life of older adults, leading to an increased risk for falls and an increased risk for mortality. It is important that the healthcare professional develop competencies in screening for these eye-related problems. The three vital signs of ophthalmology are visual acuity, pupils, and intraocular pressure.

Inspection

Inspect the external eye, noting the position and alignment of the eyes. Examine the eyebrows looking for hair distribution and scaliness. Next, inspect the eyelids, looking for edema, discoloration, lesions, eyelashes, and the adequacy with which eyelids close (lid lag, ptosis). Inspect the conjunctiva and sclera for color, vascular pattern, nodules, or swelling. Note the lacrimal ducts and if there is excessive tearing, dryness, or swelling. Next, inspect the pupils for size, shape, symmetry, and reaction to light (direct and consensual). Note the color of the iris and inspect the limbus surrounding the iris. For the cornea and lens, look for opacities, lesions, and corneal reflection. Next, assess extraocular muscles, looking for deviations, nystagmus, lid lag, or paralysis. There is a special test for convergence of the eyes. You may perform the cover test to assess for weak eye muscles and ocular deviations. In the cover and uncover test, one eye is covered with the occluder for approximately 1 to 2 seconds. During this time, the uncovered (unoccluded) eye is observed for any shift in fixation.

Visual Acuity

Assess visual acuity by using the Snellen or Rosenbaum eye chart.

Visual Fields

Assess visual fields through the technique of confrontation. In this technique, ask the patient to look directly at your (examiner) nose, and then test each quadrant in the patient's visual field by having them count the number of fingers or say yes when they first see a wiggling finger (or a moving target).

Ophthalmoscopic Examination of the Eye (Fundoscopic Examination)

To conduct a successful examination of the fundus, the examining room should be semi-darkened or completely darkened so that the pupil can become as dilated as possible. For examination of the patient's right eye, sit or stand at the patient's right side and vice versa. Clinicians should pay attention to the correct positioning of the patient as well as the correct technique when using the ophthalmoscope.

Note the optic cup and disc. The outline of the optic disc should be clear. It should be light yellow with a reddish-pink background. The optic disc represents the optic nerve head. The optic cup is the central portion of the disc. Normally, it should be less than half the diameter of the disc and be flat. Pallor of the optic disc may indicate optic nerve disease. Blurred disc margins or an elevated/edematous disc may indicate hypertensive retinopathy or papilledema. An enlarged or elevated cup may indicate hypertensive retinopathy, glaucoma, or papilledema. The presence of new blood vessels growing on the disc surface may indicate diabetic retinopathy.

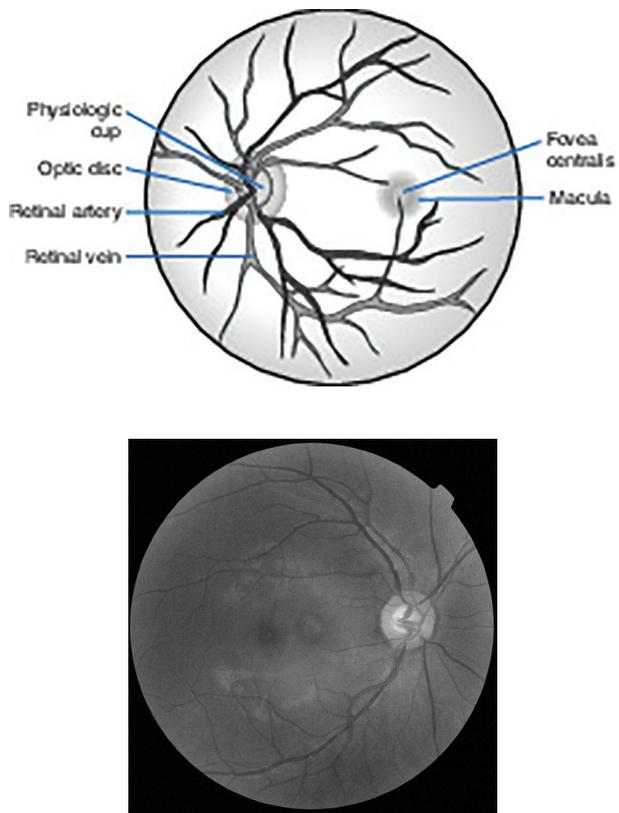


Figure 12.1: A normal ocular fundus

Source: Chiocca EM. *Advanced Pediatric Assessment*. Springer Publishing Company; 2020.

Examine the retina, which typically is red/orange in color with the macula being dark and avascular temporally (toward the ear). Prominent flame hemorrhages of the retina may indicate hypertensive or diabetic retinopathy, papilledema, neoplasm, increased intracranial pressure (ICP), or trauma. The presence of cotton wool spots (fluffy white patches of the retina) can signify hypertension, diabetes, AIDS, or blood dyscrasias.

Examine the blood vessels of the retina, where the arterial-venous ratio is typically 2:3 (i.e., the veins are larger). The arteries appear bright red, the veins a slight purplish color. Dilated vessels, engorged veins, tortuosity, A-V nicking, and copper and silver wiring are all associated with long-standing hypertension and diabetic retinopathy. A normal eye fundus is shown in Figure 12.1.

CARDIOVASCULAR EXAMINATION

Cardiovascular disease continues to be a leading cause of mortality and morbidity among older adults.^{1,2} Both the anatomy and body physiology change with aging. For example, the stiffness of large arteries increases, and age-related changes in the contraction of myocardial tissue and the electrical system may lead to arrhythmias.³ Given

Table 12.1: Basic Elements of the Cardiovascular Examination

Examining the Heart: Patient Laying at 30° to 45° and Then Flat
Measure height of JVP.
Palpate carotid arteries bilaterally.
Auscultate carotids bilaterally.
Palpate precordium/PMI (when patient is sitting & lying).
Auscultate heart using diaphragm (when patient is sitting & lying).
Auscultate heart using bell (sitting & lying).
Auscultate for S3, S4, & mitral murmurs—supine & left lateral decubitus position.
Auscultate for aortic regurgitation murmur—with patient leaning forward.
Examining Lungs and Thorax: Patient Sitting
Inspect anterior-posterior diameter of thorax.
Inspect and palpate posterior chest.
Perform tactile fremitus posteriorly.
Test posterior chest expansion.
Percuss costovertebral angle tenderness bilaterally.
Percuss posterior chest.
Percuss diaphragmatic excursion bilaterally.
Auscultate lungs posteriorly at least 3 areas bilaterally.
Inspect/palpate anterior chest.
Perform tactile fremitus anteriorly.
Percuss anterior chest at least 3 areas bilaterally.
Auscultate lungs anteriorly at least 3 areas bilaterally.

JVP, jugular venous pressure; PMI, point of maximum impulse.

these epidemiologic and pathophysiologic factors, it is important that health professionals improve their competency in cardiovascular assessment, diagnosis, treatment, and appropriate referrals. Typically, the cardiovascular examination should include neck vessels, the heart, peripheral, vascular, and lymphatics systems (Table 12.1). The anatomic positioning of the heart is shown in Figure 12.2.

Examination of the Neck Vessels

Examining the Carotid Arteries

The clinician should start with inspecting the neck for pulsations. This is followed by palpating each carotid artery separately. During palpation, assess the amplitude of the pulse in the carotid arteries and compare both sides. A

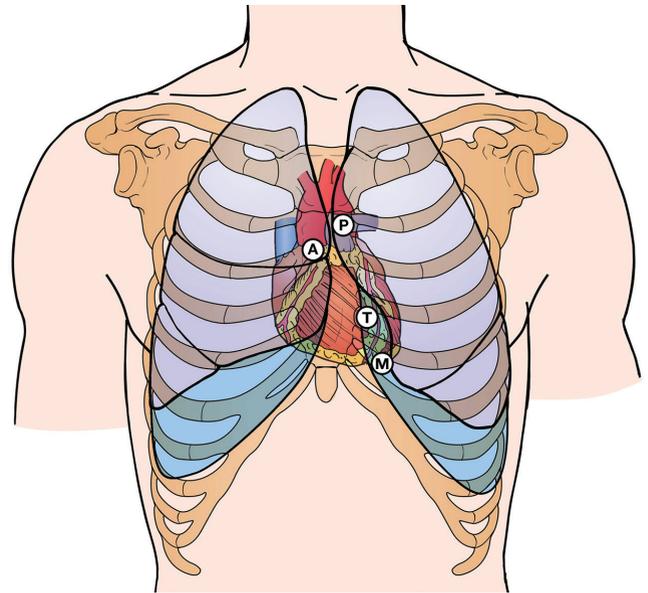


Figure 12.2: Anatomic locations for auscultating heart sounds associated with specific valves. A, aortic; M, mitral; P, pulmonary; T, tricuspid

Source: Tkacs N, Herrmann L, Johnson R, eds. *Advanced Physiology and Pathophysiology: Essentials for Clinical Practice*. Springer Publishing Company; 2020.

decreased pulsation may be reflective of decreased stroke volume or atherosclerotic narrowing of the carotid arteries. After palpation, auscultate for bruits using the bell of the stethoscope. In addition to atherosclerotic narrowing, carotid artery bruits may signal external carotid disease, aortic stenosis, hypervascularity of hyperthyroidism, or external compression from thoracic outlet syndrome.

Estimating the Jugular Venous Pressure

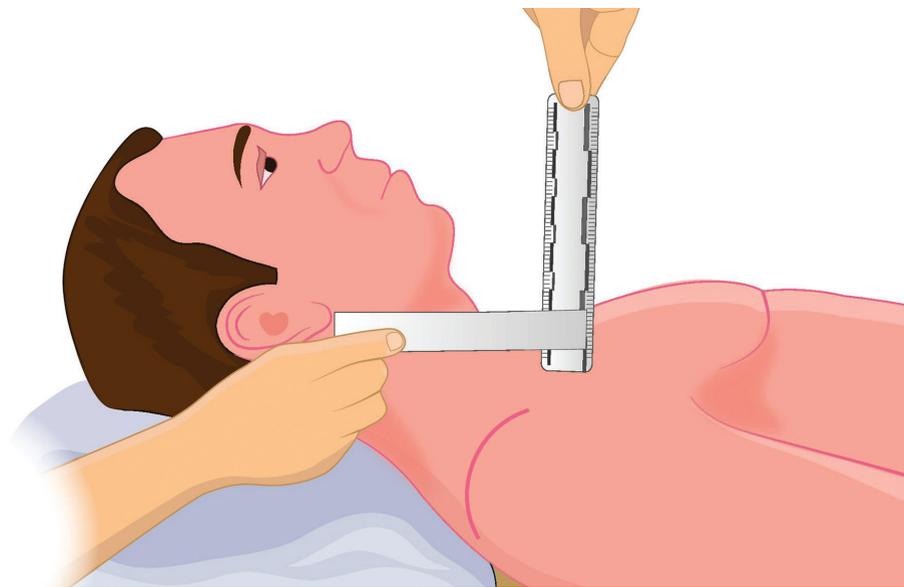
Estimating the jugular venous pressure (JVP) provides an estimate of the pressure in the right atrium. A JVP greater than 6 cm at 30° or greater than 4 to 5 cm at 45° above the sternal angle is abnormal and suggests right-sided heart failure (most common). Other causes of increased JVP may include pulmonary hypertension, pericardial tamponade, and pericarditis. The patient should be positioned with their head elevated 30° or 45° and turned slightly away from the side of the examiner (Figure 12.3). The examiner should use tangential (oblique) lighting to maximize visualization of the venous pulsations. With the patient properly positioned, identify the highest point of pulsation in the internal jugular vein. With a centimeter ruler, measure the vertical distance between this point and the sternal angle.

Examination of the Heart

Inspection

Assess for skin color changes that may indicate abnormal blood supply. With the patient in a supine position or

(a)



(b)

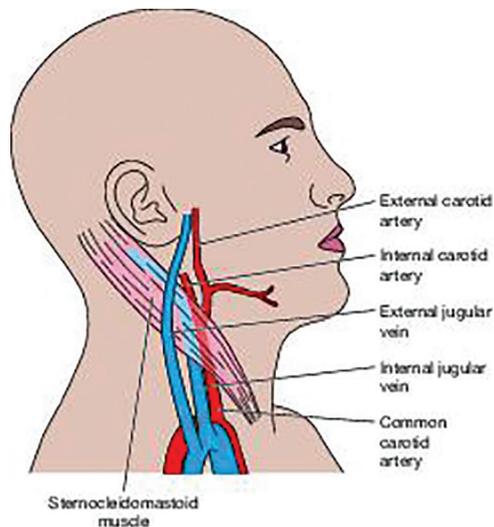


Figure 12.3: Estimating the jugular venous pressure (JVP): Patient should be positioned with head elevated 30° or 45° and head turned slightly away from the side of the examiner

Sources: (a) Gawlik KS, Melnyk Mazurek B, Teal AM, eds. *Evidence-Based Physical Examination: Best Practices for Health and Well-Being Assessment*. Springer Publishing Company; 2021; (b) Myrick K, Karosas L, Smeltzer S, eds. *Advanced Health Assessment and Differential Diagnosis: Essentials for Clinical Practice*. Springer Publishing Company; 2021.

at a 30° or 45° angle, inspect the precordium and chest for any deformities and for the point of maximum impulse (PMI), which is usually in the fourth or fifth intercostal space at the midclavicular line (see Figure 12.2).

Palpation

Palpation of the heart should focus mainly on three things:

1. **Palpate for the PMI:** This provides an estimate of the heart size and it is best assessed in the left lateral

decubitus position. Examiners should assess the location, diameter, amplitude, and duration of the impulse. Palpation for the apical impulse can provide clues on strength of LV contraction and stroke volume. Patients with chronic obstructive pulmonary disease (COPD) may have a displaced PMI due to right ventricular hypertrophy. Lateral displacement from cardiac enlargement is seen in heart failure, cardiomyopathy, and ischemic heart disease.

2. **Palpate for Heaves/Lifts:** These are palpable movements of localized areas of the precordium due to increased intensity of the sustained systolic contraction.
3. **Palpate for Thrills:** Assess for any palpable murmur. A thrill is best felt through bone, so examiners should use the ulnar surface of their hands to increase the sensitivity of the examination. A palpable thrill is more likely to be present if a murmur is grade IV or above.

Percussion

Not routinely performed but may be done to estimate heart size.

Auscultation

Cardiac auscultation determines the HR, rhythm regularity, murmurs, rubs, gallops, and clicks. It is important for the examiner to identify the normal heart sounds, S1 and S2, which represent ventricular systole and ventricular diastole, respectively. The examiner should auscultate at the following locations:

- a. Right second interspace close to the sternum (aortic)
- b. Left second interspace close to the sternum (pulmonic)
- c. Along the left sternal border at each interspace from the third to the fifth (tricuspid)
- d. At the apex (mitral)

The examiner should also listen at each site with the diaphragm of the stethoscope, then with the bell.

- a. **Diaphragm:** Able to hear S1 and S2 better, which are relatively high-pitched sounds. Also, murmurs due to mitral and aortic regurgitation and pericardial friction rubs are heard best with the diaphragm.
- b. **Bell:** Able to better hear S3 and S4, if present, with the bell. Also, the murmur of mitral stenosis is a lower-pitched sound heard better with the bell. The examiner should use light pressure when using the bell because it allows better appreciation of S3 and S4. It is important to note that certain patient positions may help to bring out abnormal heart sounds, which may not otherwise be heard. For example, leaning forward can be helpful in accentuating the murmur of aortic insufficiency.

Auscultatory Sounds

Normal Heart Sounds

1. S1 heart sound indicating closure of the mitral (and tricuspid) valves
2. S2 heart sound indicating closure of the aortic (and pulmonic) valves
3. Physiologic split S2 can be heard during inspiration only.

Abnormal Heart Sounds

Split S1 may be physiologic or could indicate a right bundle branch block. Increased intensity of S1 could indicate hypertension, hyperthyroidism, and mitral stenosis. Diminished S1 may occur with weak ventricular contraction, first-degree heart block, aortic insufficiency, and/or calcified mitral valve leaflets. "Splitting of S2 may be harder to hear in older people as its pulmonic component becomes less audible."⁴ Increased intensity of S2 may occur with ascending aortic aneurysm or pulmonary hypertension. Diminished S2 can indicate arterial hypotension, aortic stenosis, or pulmonic stenosis.

Gallops

1. S3 gallop commonly associated with mitral regurgitation
2. S4 gallop commonly associated with left ventricular hypertrophy

Other Sounds

1. **Friction Rub:** Caused by inflammation of the pericardial sac (pericarditis, cardiac tamponade)
2. **Opening Snap:** Can be heard in mitral stenosis
3. **Mid-systolic Click:** Significant for mitral valve prolapse

Murmurs

Murmurs are categorized by timing (early, mid, or late systolic vs. diastolic), location on precordium, intensity (Grade II–XI), pattern (crescendo–decrescendo, holosystolic, etc.), pitch (high, low), and posture (supine, erect, left lateral decubitus). The common murmurs follow:

1. Mid-systolic murmur of aortic stenosis
2. Early diastolic murmur of aortic regurgitation
3. Mid-diastolic murmur of mitral stenosis
4. Holosystolic murmur of mitral regurgitation
5. Late systolic murmur of mitral valve prolapse
6. Continuous murmur of patent ductus arteriosus

Systolic Murmurs

- **Systolic Ejection Murmurs:** May indicate vascular atherosclerosis
- **Aortic Valve Sclerosis:** Common in the older adult and not hemodynamically significant. Peaks during early systole and does not radiate to the carotids. May develop into aortic stenosis causing outflow obstruction of the left ventricle.
- **Aortic Stenosis:** Peaks in late systole, pulse pressure narrowed. May see slowed carotid upstroke, but this is not always the case, especially in the older adult, due to diminished vascular compliance.

- **Mitral Regurgitation:** Holosystolic, loudest at apex, radiates to axilla
- **Hypertrophic Obstructive Cardiomyopathy (HOCM):** Intensifies with valsalva
- **Diastolic Murmurs:** Pathologic and indicate some alteration of normal structure or function of the cardiovascular system.
- **Aortic Regurgitation:** Aortic valve leaflets fail to close completely during diastole. A blowing decrescendo murmur is best heard with the patient sitting and holding breath after exhalation.
- **Pulmonary Regurgitation:** Pulmonic valve fails to completely close during diastole. Commonly associated with hypertension and can be asymptomatic.
- **Mitral Stenosis:** Mitral valve fails to open completely in diastole. Can hear decrescendo murmur, opening snap.
- **Tricuspid Stenosis:** Narrowing of the tricuspid valve which may limit blood flow from the right atrium to the right ventricle. Commonly caused by rheumatic fever.

THE PERIPHERAL VASCULAR AND LYMPHATIC SYSTEMS

Examining the Peripheral Vascular System in the Upper Extremities

The clinician should start with inspecting both arms from the fingertips to the shoulders for size, symmetry, swelling, venous patterns, color, and other skin, nail, and hair changes. Assess capillary refill (should be less than 2 seconds) to evaluate perfusion. This is followed by palpating the brachial, radial, and ulnar pulses. The ulnar pulses are not always palpable. Pulses should be assessed for amplitude, contour, and intensity. Remember, pulses are graded on a scale of 0 to 4:

- 0 = *absent*
- 1 = *diminished*
- 2 = *normal*
- 3 = *increased*
- 4 = *bounding*

Perform the Allen Test if you suspect arterial insufficiency in the radial or ulnar arteries.⁴

For the lymphatic system, palpate the epitrochlear lymph nodes, which are located distal to the medial epicondyle. If a node is present, note its size, consistency, and tenderness.

Examining the Peripheral Vascular System in the Lower Extremities

The clinician should start with inspecting both legs from toenails to the hip for size, symmetry, swelling, venous

patterns, color, and other skin, nail, and hair changes, as well as assessing capillary refill.

This is followed by palpating femoral pulse in each leg. The examiner should then palpate the popliteal pulse behind the knee (in the popliteal fossa), then palpate the dorsalis pedis (sometimes congenitally absent) and the posterior tibial pulses in each foot. Palpate the legs for tenderness and palpable cords that might signify a thrombosis.

Lymphatic System

Palpate the superficial inguinal nodes for size, consistency, and tenderness. The clinician should assess for edema in the extremities, which could be localized (e.g., trauma, tumor, local lymphatic, or venous obstruction) or systemic (heart failure, renal disease). Sometimes the degree of edema can lead to pitting of the skin (pitting edema). As shown in Figure 12.4; the degree of pitting edema is based on a 4-point scale:

- 1+ = *trace pitting (2-mm depression)*
- 2+ = *mild-moderate (4-mm, depression)*
- 3+ = *significant (moderate-severe, 6-mm depression)*
- 4+ = *marked (severe, 8-mm depression)*

The presence of edema may signal peripheral vascular system abnormalities such as a recent or ongoing deep venous thrombosis, chronic venous insufficiency due to incompetent valves or history of DVTs, or lymphedema.

Examining the Peripheral Vascular System in the Abdomen

The clinician should start with inspecting the abdomen for abnormal or hyperdynamic pulsations. This should be followed by palpating the aortic and femoral pulses. Try to approximate the size of the aortic pulsation. For auscultation, the examiner should listen for bruits over the abdominal aorta, renal, iliac, and femoral arteries.

THORAX AND PULMONARY EXAMINATION

Anatomic and physiologic changes related to the respiratory system commonly occur with aging; therefore, your physical examination should be tailored toward these changes. For example, exercise capacity typically decreases with age. The chest wall can become more rigid, respiratory muscles may weaken, and the lungs may lose some elasticity. Lung mass reduces while residual volume increases. Older adults are at increased risk for atelectasis, respiratory infections (such as pneumonia), COPD, lung cancer, interstitial lung disease, and pulmonary embolism.⁵ Coughing becomes less effective at removing toxins and irritants from our airways and the speed of breathing out with maximal effort

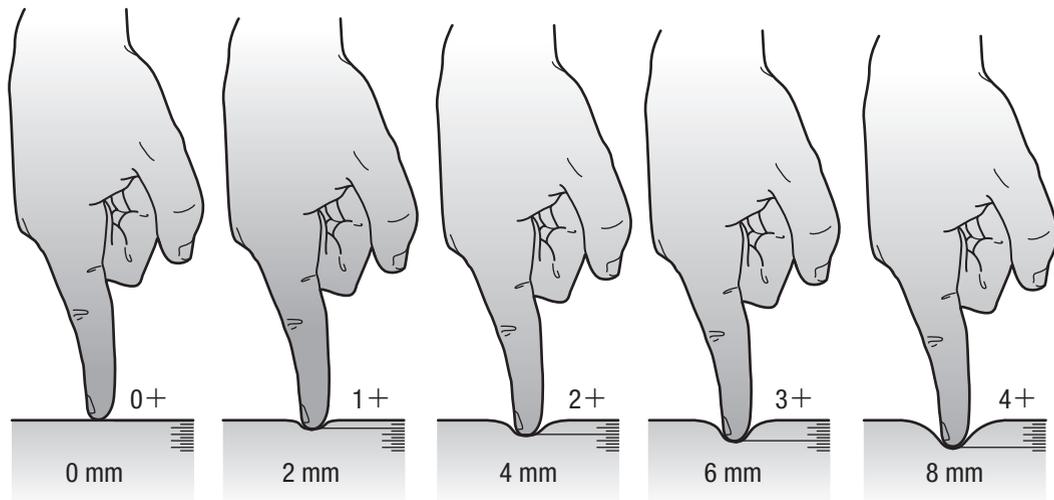


Figure 12.4: Assessing edema

gradually diminishes with age. A thorough lung examination should include anterior, posterior, and lateral fields (Table 12.1). It is helpful to examine the posterior field with the patient seated and with their arms crossed in the front.

Inspection

Examination of the thorax should start with an assessment of breathing effort, noting if the patient is in respiratory distress. Accessory muscle use typically indicates difficulty breathing and may be present in the patient with respiratory distress. Patients with COPD may also be found in a tripod position with lips pursed during exhalation to relieve dyspnea. Inspection should also include assessment for asymmetry or deformities, as well as noting AP diameter. Barrel chest (enlarged AP diameter of the chest) may indicate COPD. Inspect both anterior and posterior aspects of the chest wall. Spinal deformities such as kyphosis should clue you in to the potential for osteoporosis and vertebral fractures. Both kyphosis and scoliosis may diminish lung volumes and lead to breathing difficulties. The clinician should inspect for blue/gray discoloration of the skin, nails, and lips, as cyanosis can indicate hypoxia. Nail clubbing (loss of the normal angle between the fingernail and nail bed) may be noted in older adults with bronchiectasis, congenital heart disease, pulmonary fibrosis, cystic fibrosis, lung abscess, and malignancy.

Palpation

Palpate for any tenderness or masses of the chest. Tenderness at the costosternal joints may aid in the diagnosis of costochondritis. The clinician should evaluate for tactile fremitus (Figure 12.5), which are palpable vibrations transmitted to the chest wall during speech. The examiner places the ulnar edge of their hands on the patient's anterior and posterior thorax and asks the patient

to say, "Ninety-nine," in various lung fields, noting any dissimilarities in the vibrations. Decreased tactile fremitus may be found with COPD, pleural effusion, fibrosis, or tumors. During palpation, the clinician evaluates the ability of the chest to expand and contract (Figure 12.6), which may be diminished in aging individuals or if pathology is present. Unilateral decrease of chest expansion could hint toward lobar pneumonia, pleural effusion, and/or chronic fibrosis.

Percussion

Percussion is useful to determine whether underlying structures are air-filled, fluid-filled, or solid (Table 12.2). Examiners should percuss both the anterior and posterior lung fields in at least three areas bilaterally. The examiner places the left hand firmly on the chest wall and hits the distal interphalangeal joint of the left middle finger with the tip of your right middle finger with a striking wrist motion to elicit a percussive sound. Healthy lungs will produce a resonant sound with percussion. Dullness to percussion could indicate lobar pneumonia, pleural effusion, hemothorax, or empyema. Hyperresonance with percussion is typically found in hyper-inflated lungs and can be indicative of COPD or asthma.

Auscultation

Auscultation of the lungs is a key part of the respiratory physical examination. We typically use the diaphragm of the stethoscope. Patients should preferably be in the seated position with their arms crossed. Auscultation should be done directly to the skin rather than through clothes or a gown. A systematic approach should include auscultation of all lung fields bilaterally in at least three areas, comparing left and right as well as upper and lower lung fields in the anterior, lateral, and posterior aspects.



Figure 12.5: Tactile fremitus technique

Source: Gawlik KS, Melnyk Mazurek B, Teal AM. *Evidence-based Physical Examination: Best Practices for Health and Well-Being Assessment*. Springer; 2020.

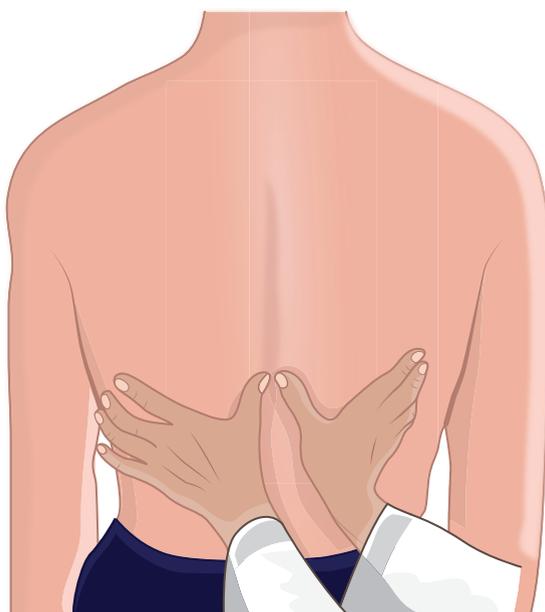


Figure 12.6: Assessing chest expansion

Source: Gawlik KS, Melnyk Mazurek B, Teal AM. *Evidence-based Physical Examination: Best Practices for Health and Well-Being Assessment*. Springer; 2020.

Table 12.2: Percussion Notes and Characteristics

	Relative Intensity	Relative Pitch	Relative Duration	Location	Potential Pathology
<i>Flat</i>	Soft	High	Short	Thigh	Pleural effusion
<i>Dull</i>	Medium	Medium	Medium	Liver	Lobar pneumonia
<i>Resonant</i>	Loud	Low	Long	Healthy lung	Chronic bronchitis
<i>Hyper-resonant</i>	Very Loud	Lower	Longer	Usually none	COPD, pneumothorax
<i>Tympanic</i>	Loud	High	Longer	Gastric air bubble	Large pneumothorax

Abnormal (adventitious) lung sounds may include the following:

- **Rales (Crackles):** Basilar rales may be auscultated in a healthy individual but typically resolve after a few deep breaths. Rales could also point toward atelectasis, lung pathology (pneumonia, fibrosis, early heart failure), or airway disease (bronchitis, bronchiectasis).
- **Rhonchi:** These coarse and low-pitched breath sounds are found when there are secretions in the larger airways.
- **Wheezing:** This can be expiratory or inspiratory and typically found in asthma, COPD, and bronchitis.

ABDOMINAL EXAMINATION

Abdominal complaints are very common in older adults and may include acute or chronic conditions such as constipation, organomegaly, small/large bowel obstruction, inflammatory bowel diseases, diverticulitis, cancers, and abdominal aortic aneurysm (AAA), among others.⁶ Unlike other organ systems, the sequence of the abdominal physical examination is as follows: inspection, auscultation, percussion, palpation. Auscultation is now performed before palpation because palpation may alter what was auscultated. It is preferred that the abdominal examination is performed with the individual in a supine position with the knees flexed as this relaxes the abdominal muscles and allows for a more accurate examination (Table 12.3).

Inspection

The clinician should inspect the abdomen for hernias, deformities, scars, skin color changes, and masses. Common abdominal hernias include epigastric, incisional, and umbilical.

Auscultation

First, the clinician will auscultate for bowel sounds in all four quadrants. The absence of bowel sounds may indicate small bowel obstruction or ileus. Next, the clinician will auscultate the abdominal aortic, renal, iliac, and femoral arteries for bruits. Older adults with atherosclerotic arterial disease may present with abdominal bruits. A

Table 12.3: Examining the Abdomen: Patient Lying Flat With Knees Flexed

Inspect abdomen (comment on three things).
Auscultate for bowel sounds in all four quadrants.
Auscultate aortic, iliac, renal, and femoral bruits.
Percuss over abdomen in all four quadrants.
Percuss liver span in midclavicular line (MCL) and note liver size.
Percuss spleen for dullness.
Palpate abdomen superficial in all four quadrants & epigastrium.
Palpate abdomen deep in all four quadrants & epigastrium.
Palpate kidneys bilaterally.
Palpate liver edge.
Palpate spleen tip.
Palpate aortic width.
Palpate inguinal lymph nodes bilaterally.
Palpate femoral arteries bilaterally.
Elicit abdominal reflex.
Perform rectal/pelvic examination as needed.

renal artery bruit may suggest renal artery stenosis while a bruit over the liver suggests hepatic carcinoma or alcoholic hepatitis.

Percussion

With the individual in a supine position and the knees flexed, the examiner percusses the abdomen in all four quadrants. A diffuse tympanic sound can indicate intestinal obstruction while dull areas can indicate things like ovarian tumors, hepatomegaly, or distended bladder. Next, percuss the liver span at the midclavicular line

(normally 6–12 cm) and the midsternal line (normally 4–8 cm). Percussion can be particularly useful for evaluating liver masses and ascites (accumulation of fluid in the peritoneal cavity). Ascites can be seen with cirrhosis, heart failure, constrictive pericarditis, or inferior vena cava or hepatic vein obstruction, nephrotic syndrome, ovarian cancer, and malnutrition. In addition to percussing the liver, the examiner should percuss the spleen to estimate the size.

Palpation

There are some important points to remember when palpating the abdomen. We first start with light (superficial) palpation then progress to deeper palpation in all four quadrants, leaving tender areas for last. Next, palpate the kidneys, bilaterally. Following this, palpate the liver edge and the spleen tip for tenderness, masses, and estimation of size. If organomegaly is noted, it could suggest infection, tumor, metabolic disorders, and/or alcohol abuse. Palpation of the abdomen can reveal weak abdominal musculature, which is a risk factor for hernia development. Involuntary guarding (rigidity) is typical with peritoneal inflammation. Palpate the abdominal aorta for aortic width. A widened diameter (≥ 3 cm) and/or pulsatile mass may indicate aneurysm, of which age older than 65 is a risk factor. Other risk factors for AAA include a history of smoking, male gender, and a first-degree relative with a history of AAA repair.

If a clinician suspects AAA, patients should be recommended for imaging and/or referred to a specialist for further evaluation.⁷

EXAMINING THE MUSCULOSKELETAL AND NERVOUS SYSTEM

Aging is associated with significant changes in the structure and function of the musculoskeletal and nervous systems. Muscle weakness, reduced motor performance, poor coordination, and gait abnormalities are all very common in older adults.^{8–10} A common approach to the musculoskeletal examination includes the following: (a) inspecting surrounding skin, color, swelling, deformity, muscle atrophy, alignment, symmetry, size, spasms, limb length, and circumference; (b) palpating muscle tone, heat, tenderness, swelling, crepitus, underlying structures, and ligament laxity; (c) assessing the active and passive range of motion (ROM) of joints bilaterally; (d) testing for muscle strength bilaterally (0–5 scale); (e) performing special tests as indicated for a given patient encounter. It is advisable to always examine the joint above and below the affected area. A systematic and sequential approach to the physical examination of the musculoskeletal and nervous systems of older adults is summarized in Tables 12.4 to 12.7 and Box 12.1.

Table 12.4: Examining the Musculoskeletal System: Patient Sitting/Standing

Assess active range of motion in the neck (in four positions).
Inspect and palpate upper extremity joints.
Assess shoulder flexion/extension.
Assess internal/external rotation shoulder.
Assess abduction/adduction shoulder.
Perform shoulder strength testing (in four positions).
Assess flexion/extension elbow strength.
Flexion/extension, ulnar, radial deviation wrist (+ wrist extension strength).
Assess supination and pronation of wrist.
Evaluate for grip strength.
Evaluate abduction of finger strength.
Elicit biceps reflex bilaterally.
Elicit triceps reflex bilaterally.
Elicit brachioradialis reflex bilaterally.
Inspect and palpate lower extremity joints.
Assess active range of motion in the hip (in six positions).
Perform strength testing of the hip (four positions).
Assess flexion/extension/internal rotation of the knee.
Perform strength testing of the knee (quadriceps and hamstrings).
Assess active range of motion ankle (dorsi/plantar/inversion/eversion).
Perform strength testing of ankle (dorsi/plantar).
Assess flexion/extension first toe.
Elicit patella reflex bilaterally.
Elicit Achilles reflex bilaterally.
Elicit plantar reflex bilaterally.

The Shoulder Examination

The shoulder bony anatomy consists of the humerus, scapula, and clavicle. Rotational strength and range of motion of the shoulder are supported by the rotator cuff muscles (supraspinatus, infraspinatus, teres minor, and subscapularis). Shoulder pathologies are very common in the older adult and include, but are not limited to, rotator cuff arthropathy, adhesive capsulitis, impingement syndrome, and bicipital and calcific tendonitis.

Table 12.5: Examining Cranial Nerves

Test sense of smell bilaterally (CN I)
Assess visual acuity bilaterally (CN II)
Extra-ocular movements (verbalize CN III, IV, VI)
CN V (sensory on face)
CN V (motor—TMJ, masseter muscles)
CN VII (comment: taste of ant 2/3 tongue)
CN VII (motor: facial expressions: raise eye brows, frown)
CN VII (resist opening eyes, show teeth, smile, puff cheeks)
Test auditory acuity bilaterally (CN VIII)
CN IX and X (gag and/or swallow)
CN XI (shoulder shrug + head turning against resistance)
CN XII (tongue movements)

CN, cranial nerve; TMJ, temporomandibular joint.

Table 12.6: Examining Mental Status

Registration short-term recall (three words)
Attention and calculation (WORLD backward)
Language naming (name three words)
Language three-step command
Language repetition (no ifs, ands, or buts)
Language construction (what does that mean?)
Written command (perform a written task)
Language writing (write sentence)

Table 12.7: Sensory and Cerebellar Testing

Rapid alternating movements in upper extremity bilaterally
Rapid alternating movements in lower extremity bilaterally
Finger to nose bilaterally
Heel to shin bilaterally
Proprioception upper/lower bilaterally hands and feet
Vibration sense upper/lower bilaterally hands and feet
Sensory: light touch C5-T1, L3-S1
Sensory: sharp/dull C5-T1, L3-S1—alternating different spots

Box 12.1: Gait Examination

- Gait assessment
- Heel-to-toe walking
- Walk on heels and then on toes
- Shallow knee bend/hop on one foot
- Romberg (articulate 30 seconds)
- Pronator drift (articulate 20–30 seconds)
- Inspect curvatures of the spine
- Range of motion in the spine (six positions)

Figure 12.7 shows the three key joints in the shoulder:

- The glenohumeral (GH) joint, often referred to as a ball-and-socket joint
- The acromioclavicular (AC) joint
- The sternoclavicular (SC) joint

Inspection

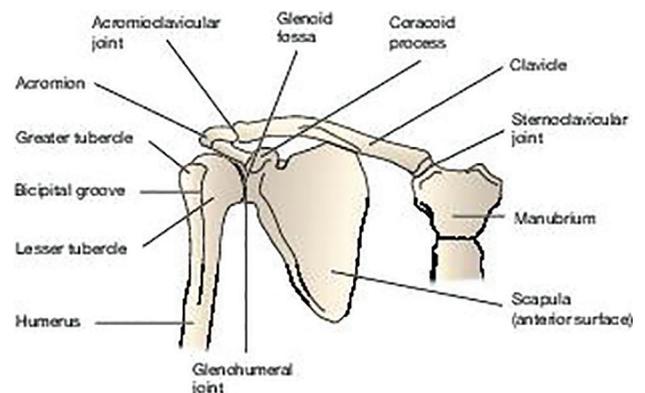
Examine the shoulder for swelling, deformity, asymmetry, or muscle atrophy.

Palpation

Beginning medially at the SC joint, the clinician should trace the clavicle laterally with fingers. Palpate the scapula, acromion, the acromioclavicular joint, and the coracoid process. The clinician should also palpate the greater tuberosity, biceps tendon in the bicipital groove, the deltoid and four rotator cuff muscles, and bursae. During palpation, the clinician should note any tenderness, muscular weakness, warmth, effusion, crepitus, deformities, and shoulder instability.

Range of Motion

The ROM of the shoulder is assessed as shown in Figure 12.8. When performing passive or active ROM, it is

**Figure 12.7: Shoulder joints**

Source: Myrick K, Karosas L, Smeltzer S. *Advanced Health Assessment and Differential Diagnosis: Essentials for Clinical Practice*. Springer; 2020.

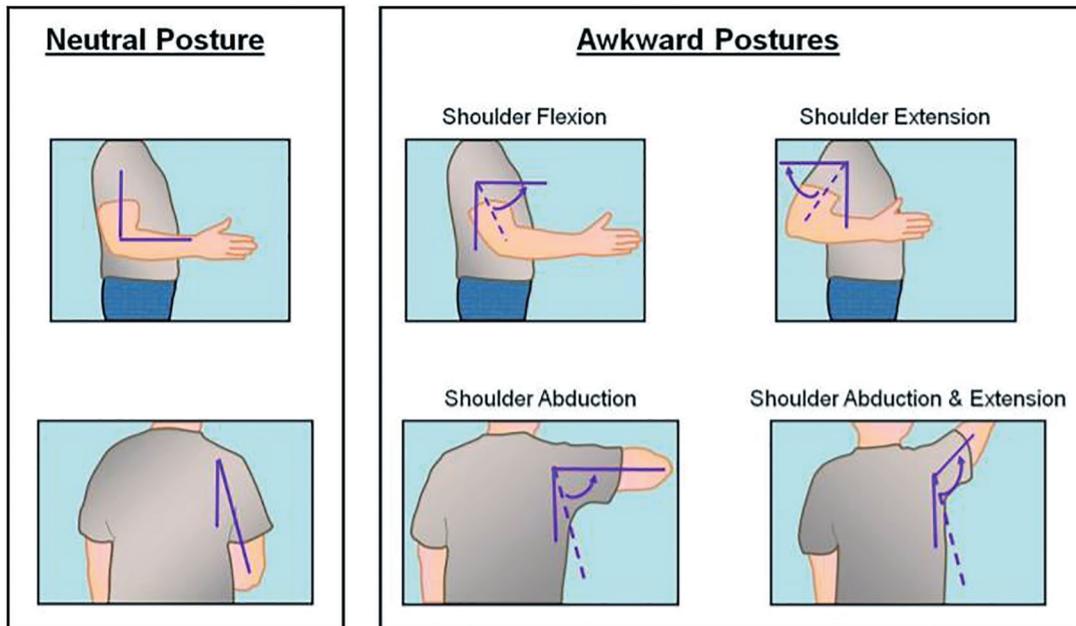


Figure 12.8: Shoulder range of motion technique

Source: Moore SM, Torma-Krajewski J, Steiner LJ. *Practical Demonstrations of Ergonomic Principles*. U.S. Department of Health and Human Services; 2011. <https://www.cdc.gov/niosh/mining/userfiles/works/pdfs/2011-191.pdf>

recommended to assess shoulder forward flexion, extension, internal rotation (determined by the highest spinal level reached by the thumb), external rotation, abduction, and cross-body adduction. Perform shoulder strength testing in at least four positions.

The Hand and Wrist Examination

The wrist and hands are a complex network of bones, muscles, nerves, tendons, and joints. The bony anatomy of small, ring, long, and index fingers are comprised of distal phalanx, middle phalanx, and metacarpals. However, the thumb is comprised of a distal phalanx and metacarpal. The joints of the fingers include the distal interphalangeal joint (DIPJ), proximal interphalangeal joint (PIPJ), and the metacarpal phalangeal joint (MCPJ). The thumb is composed of the interphalangeal joint (IP), metacarpophalangeal joint (MP), and the carpometacarpal (CMC) joint.

The hand is innervated by the median, ulnar, and radial nerves. The radial nerve supplies the first dorsal web space of the thumb and radial aspect of the dorsum of the hand. The small finger and ulnar half of the ring finger are supplied by the ulnar nerve. The median nerve supplies the index long fingers, the radial side of the ring finger, and the skin on the palmar side of the thumb.

The wrist has eight carpal bones: the scaphoid, pisiform, trapezoid, trapezium, hamate, triquetrum, lunate,

and capitate. Proximal to the carpal bones are the radiocarpal joint and distal radial ulnar joint, and these are synovial joints that connect to the radius and ulna bones.

Inspection

Observe for any lesions, excoriations, bony asymmetry, scars, malrotation, and scissoring of the digits. Assess the nail plates for any pitting, spooning, clubbing, or discoloration. Assess intrinsic, thenar, or hypothenar atrophy.

Palpation

When palpating, start distally and move proximally assessing the bony anatomy with corresponding joints. Note any bony or soft tissue irregularities. Assess grip strength.

Range of Motion of Digits

Recommend goniometer when assessing the ROM of digits (Table 12.8). As shown in Figure 12.9, instruct the patient to form a full composite fist. Assess for popping, triggering, or tenderness of the digits.

Provocative Testing

Phalen's test is performed by applying compression over the median nerve or instructing the patient to perform volar flexion of the wrist for 30 to 45 seconds. Tinel's test over carpal tunnel is performed by applying percussion over the median nerve; a negative test does not exclude

Table 12.8: Range of Motion

Range of Motion of the Wrist Is Expressed in Degrees, Right/Left/Normal
Flexion: 60/60
Extension: 60/60
Ulnar deviation: 35/35
Radial deviation: 20/20

carpal tunnel syndrome. Tinel's over cubital tunnel is performed by applying percussion over the ulnar nerve just proximal to the cubital tunnel. Assess sensation in the median nerve distribution using a 2-point discrimination wheel or paperclip. Finkelstein's test is performed by having the patient tuck in the thumb (with clenched fist) coupled with ulnar deviation of the wrist. A positive test will solicit irritation of the abductor pollicis longus (APL)

and extensor pollicis brevis (EPB) tendons, indicating de Quervain's tenosynovitis.¹¹

Knee Examination

The bony anatomy of the knee is composed of the patella, distal femur, and proximal tibia. Additionally, the knee includes the medial, lateral, and patellofemoral compartments. The four collateral ligament structures supporting the knee are the anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), medial collateral ligament (MCL), and lateral collateral ligament (LCL). The nerve innervation to the knee joint is complex and branches from the femoral, tibial, common peroneal, and obturator nerves; it is responsible for sensory/motor function of the extremity.¹²

Inspection

Observe for effusion, skin lesions, or abrasions. While in the standing position, assess the patient for excessive varus or valgus alignment. Assess gait pattern.

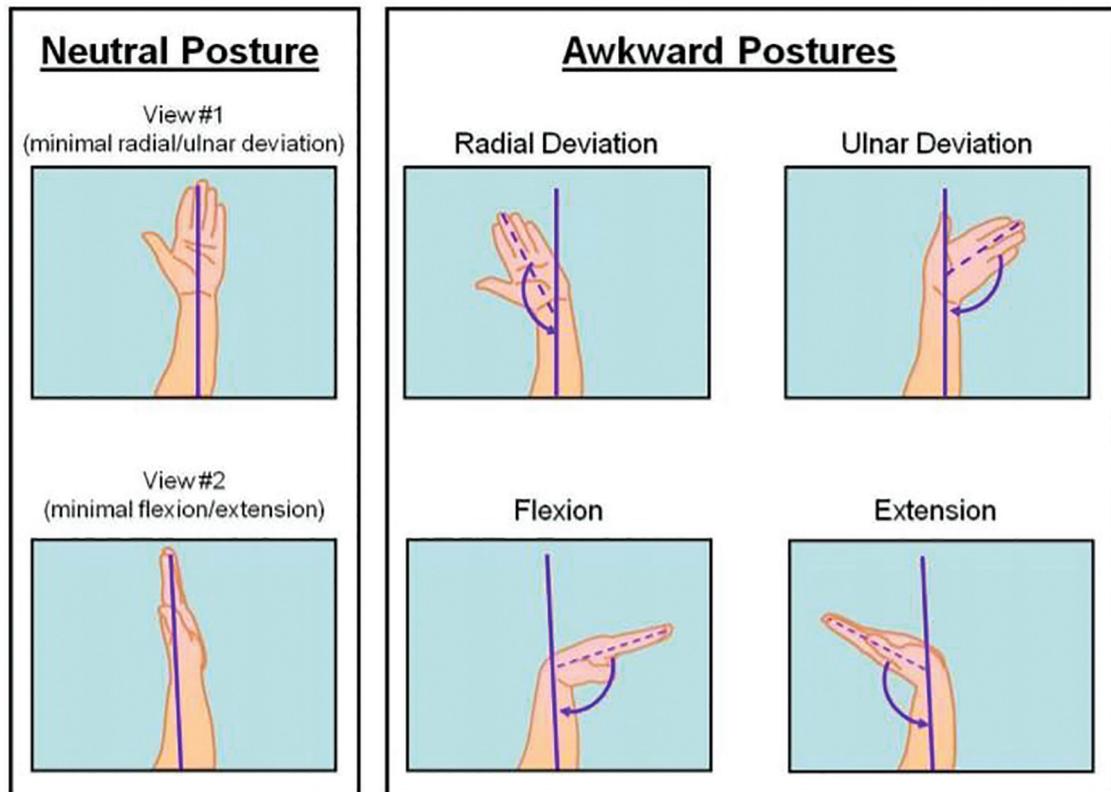


Figure 12.9: Wrist range of motion technique

Source: *Practical Demonstrations of Ergonomic Principles*. U.S. Department of Health and Human Services; 2011. <https://www.cdc.gov/niosh/mining/userfiles/works/pdfs/2011-191.pdf>

Palpation

Palpate the anterior lateral and anterior medial joint lines (front of the knee), which may indicate meniscal pathology. Palpate the patella, tibial tubercle, and patellar tendon. Palpate the distal quadriceps muscle, which attaches to the patella. Palpate the posterior knee, the MCL, and the LCL for tenderness and soft tissue swelling.

Range of Motion

Assess knee (ROM), which is from 0 degrees of knee extension to 140 degrees of knee flexion. If available, use a goniometer when assessing ROM. Assess for patellofemoral crepitus.

Provocative Testing

The Lachman's test is used for assessing ACL insufficiency; a positive test is when the tibia moves anteriorly without an abrupt endpoint. The Apley compression test is used to assess meniscal pathology. The patient is placed in a prone position, with the knee flexed at 90 degrees coupled with axial loading and rotation of the knee. A positive test is pain with this maneuver.

Spine Examination

The adult spinal column is composed of 24 vertebrae, 7 cervical vertebrae, 12 thoracic vertebrae, and 5 lumbar vertebrae. Spinal nerves control motor and sensory function of the extremities, including the bowel and bladder. Compression or irritated nerve roots can lead to radicular symptoms affecting the extremities.

Inspection

Assess for cutaneous lesions, bruising, swelling, atrophy, and costovertebral angle (CVA) tenderness. Assess spinal alignment (excessive lordosis, kyphosis, or scoliosis).

Palpation

Assess for midline spinal tenderness, paraspinal tenderness, and sacroiliac joint tenderness, and spasm. Assess sensation to light touch and 2-point discrimination in L3–S1 dermatomes. Assess reflexes in the patellar and the Achilles. Assess the bulbocavernosus reflex (BCR) if spinal injury or spinal shock is suspected.

Range of Motion

Assess the ROM of both the neck and the spine according to Boxes 12.2 and 12.3.

STRENGTH TESTING

Strength testing should be done during the physical examination of any extremity. Strength testing is stratified based on the following criterion (Box 12.4).¹³

Grade 0: No movement is observed.

Grade 1: Only a trace or flicker of movement.

Grade 2: Muscle can move only if the resistance of gravity is removed.

Box 12.2: Cervical Range of Motion Is Expressed in Degrees, Actual/Normal

Flexion: 50/50 Bend neck forward to touch sternum with chin.

Extension: 60/60 Bend neck backward so chin points upward.

Rotation (R/L): 80/80 Turn head with chin pointing right and left.

Lateral Tilt (R/L): 40/40 Tilt the head so the ear bends toward shoulder.

Box 12.3: Lumbosacral Spine Range of Motion Is Expressed in Degrees, Actual/Normal

Flexion: 90/90 Bend the body forward, bending at the waist.

Extension: 30/30 Bend the body back without bending the knees.

Lateral Bend Right: 40/40 Bend the body to the right side, bending at the waist.

Lateral Bend Left: 40/40 Bend the body to the left side, bending at the waist.

Grade 3: Movement against gravity but not resistance.

Grade 4: Movement against at least some resistance supplied by the examiner.

Grade 5: The muscle contracts normally against full resistance.

Provocative Testing

Spurling's Test (Highly specific with only mild to moderate overall sensitivity):¹⁴ The examiner has the patient extend the neck and laterally bends to the affected side as axial compression is applied. A positive test is suggestive of cervical radiculopathy.

Straight Leg Test (High sensitivity but low specificity):¹⁵ The patient is supine while the examiner stands on the affected side. The examiner lifts the patient's leg in full knee extension, causing flexion of the hip. A positive test is suggestive of lumbar radiculopathy.

DOCUMENTATION

Once the physical examination has been completed, it is critical to document it as soon as possible. Delays in documentation may lead to errors in the documentation. Documentation serves as a permanent record of your examination, which can be used by subsequent providers to understand the patient's physical status at that point in time. It also records that you performed the comprehensive examination.

Box 12.4: Motor Examination/Lower Extremities, Actual (Right/Left)/Normal

- Hip Flexion: 110-130/110-130 Flex knee to bring the thigh closer to the abdomen.
- Hip Extension: 30/30 Move thigh backward without leaning trunk forward.
- Abduction: 45-50/45-50 Move thigh away from the midline.
- Adduction: 20-30/20-30 Move the thigh inward and across the midline.
- Internal Rotation: 40/40 With flexed knee, swing lower leg away from midline.
- External Rotation: 45/45 With flexed knee, swing lower leg toward midline.
- Knee Flexion: 130/130 Bend knee with calf toward hamstring.
- Knee Extension: 15/15 Straighten knee to the maximum possible.
- Internal Rotation: 10/10 Twist the lower leg toward the midline.
- Ankle Flexion: 45/45 Bend the ankle so toes point up as far as possible.
- Ankle Extension: 20/20 Bend ankle so toes point down as far as possible.
- Ankle Eversion: 20/20 Bend ankle so bottom of foot faces out away from midline.
- Ankle Inversion: 30/30 Bend ankle so bottom of foot faces toward the midline (see Figure 12.10).

Documentation can be through a written document or, more likely now, as part of an electronic health record. In most office practices, whether paper or electronic, there is a template for the physical that helps the provider to document appropriately. There are times that you cannot complete all elements of the examination due to extenuating circumstances. In those cases, you should document “not examined” for the elements that were not examined.

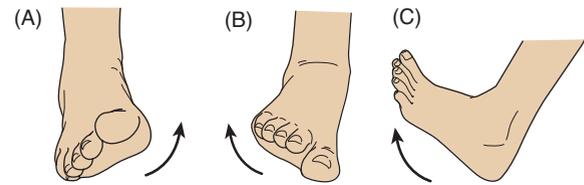


Figure 12.10: Ankle and foot range of motion technique (A) Inversion: Movement of the sole of the foot medially at the intertarsal joints; (B) Eversion: Movement of the sole of the foot away from the midline at the intertarsal joints; (C) Dorsiflexion: Flexion of the ankle, which brings dorsum of foot closer to leg, as when walking on the heel.

Source: Tkacs N, Herrmann L, Johnson R, eds. *Advanced Physiology and Pathophysiology: Essentials for Clinical Practice*. Springer Publishing Company; 2020.

CONCLUSION

The physical examination is a key component in the clinician’s toolbox for assessing a patient’s health, in offering preventative advice, making a diagnosis, and formulating management plans. Adult-gerontology nurse practitioners (AGNPs) need to master this skill and be able to correlate physical examination findings with the patient history and laboratory tests. Older adults display heterogeneous changes in anatomy and physiology, which affect the sensitivity and specificity of various physical examination techniques. AGNPs should develop a systematic approach to examining older adults starting with evaluating the general appearance and assessing functional status while maximizing function in older adults. Geriatric-tailored physical examinations should assess physical, cognitive, psychologic, social, and environmental domains of health. Irrespective of a patient’s complaints, assessment of the older adult calls for enhanced focus on functional assessment during the physical examination.

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PART IV

Preparation for Practice