

6th Edition



Karen Fenstermacher | Barbara Toni Hudson

PRACTICE GUIDELINES for FAMILY NURSE PRACTITIONERS



COMMON CLINICAL ABBREVIATIONS

A1c	Hemoglobin A1c	CVD	Cardiovascular disease
AAA	Abdominal aortic aneurysm	CXR	Chest X-ray
Ab	Abortion	DDAVP	Synthetic vasopressin (posterior pituitary hormone)
ABG	Arterial blood gas	DI	Diabetes insipidus
ABI	Ankle-brachial index	DIC	Disseminated intravascular coagulation
AC	Acromioclavicular (joint)	DJD	Degenerative joint disease
ACE	Angiotensin-converting enzyme	DKA	Diabetic ketoacidosis
ACR	Albumin:creatinine ratio	DM	Diabetes mellitus
ACS	Acute coronary syndrome	DOE	Dyspnea on exertion
ADH	Antidiuretic hormone	DP	Dorsalis pedis (pulse)
ADHD	Attention deficit hyperactivity disorder	DPI	Dry powder inhaler
ADL	Activities of daily living	DPP-4	Dipeptidyl peptidase inhibitor (diabetes medication)
AGN	Acute glomerulonephritis	DRE	Digital rectal exam
ALS	Amyotrophic lateral sclerosis	DTR	Deep tendon reflex
ALT	Alanine aminotransferase (transaminase)	DVT	Deep venous thrombosis
AMI	Acute myocardial infarction	EBV	Epstein-Barr virus
ANA	Antinuclear antibody	ECG	Electrocardiogram (may also see as EKG)
anti HBe	Hepatitis B (e) antibody	EEG	Electroencephalogram
anti HBs	Hepatitis B antibody	eGFR	Estimated glomerular filtration rate
AOM	Acute otitis media	EMG	Electromyogram
AP	Anteroposterior	ENT	Ear-nose-throat (physician specialist)
ARB	Angiotensin receptor blocker	EOM	Extraocular movement
ASA	Aspirin	EPS	Extrapyramidal symptom
ASC-US	Atypical squamous cell of undetermined significance	ESR	Erythrocyte sedimentation rate
ASCVD	Arteriosclerotic cardiovascular disease	ETOH	Alcohol (drinking)
AST	Aspartate aminotransferase (transaminase)	FBG	Fasting blood glucose
AUB	Abnormal uterine bleeding	FOBT	Fecal occult blood test
AV	Atrioventricular	FSH	Follicle-stimulating hormone
BMD	Bone mineral density	GABHS	Group A <i>B</i> -hemolytic strep
BMI	Body mass index	GAD	Generalized anxiety disorder
BPH	Benign prostatic hypertrophy	GC/CT	Gonococcus and chlamydia trachomatis
BUN	Blood urea nitrogen	GER	Gastroesophageal reflux
BUS	Bartholin's-urethral-Skene's (glands)	GERD	Gastroesophageal reflux disease
BV	Bacterial vaginosis	GGT	Gamma-glutamyl transpeptidase
C&S	Culture and sensitivity	GI	Gastrointestinal
CABG	Coronary artery bypass graft	GLP-1	Glucagon-like peptide receptor agonist (diabetes medication)
CAD	Coronary artery disease	GTT	Glucose tolerance test
CAP	Community acquired pneumonia	GU	Genitourinary
CCB	Calcium channel blocker	H/A	Headache
CDC	Centers for Disease Control and Prevention	HBcAg	Hepatitis B core antigen
CF	Cystic fibrosis	HBsAg	Hepatitis B (e) antigen
CFU	Colony forming units	HBsAg	Hepatitis B surface antigen
CHD	Coronary heart disease	hCG	Human chorionic gonadotropin
CK	Creatine kinase	HDL	High-density lipoprotein
CKD	Chronic kidney disease	HF	Heart failure
CML	Chronic myelocytic leukemia	HIDA	Hepatobiliary scan (X-ray examination)
CMT	Cervical motion tenderness	HLA	Human leukocyte antigen
CMV	Cytomegalovirus	HPF	High-powered field
CN	Cranial nerve	HRT	Hormone replacement therapy
COC	Combined oral contraceptive	HSIL	High-grade squamous intraepithelial lesion
CP	Cerebral palsy	HSV	Herpes simplex virus
CPAP	Continuous positive airway pressure	HTN	Hypertension
Cr	Creatinine	I&D	Incision and drainage
CrCl	Creatinine clearance	IBD	Inflammatory bowel disease
CRF	Chronic renal failure	IBS	Irritable bowel syndrome
CRP	C-reactive protein	ICP	Intracranial pressure
CSF	Cerebrospinal fluid	ICS	Inhaled corticosteroid; intercostal space
CT	Computed tomography (X-ray examination)	IDA	Iron deficiency anemia
CTA	Clear to auscultation	Ig	Immunoglobulin
CTS	Carpal tunnel syndrome	IGT	Impaired glucose intolerance
CVA	Cerebrovascular accident	INR	International normalized ratio
CVAT	Costovertebral angle tenderness		

IUD	Intrauterine (contraceptive) device	POA	Power-of-attorney
IVP	Intravenous pyelogram	POP	Progestin only pill
JRA	Juvenile rheumatoid arthritis	PPI	Proton pump inhibitor
JVD	Jugular venous distention	PSA	Prostate-specific antigen
KOH	Potassium hydroxide	PT	Posterior tibialis (pulse); physical therapy
KUB	Kidney-ureter-bladder (X-ray examination)	PTCA	Percutaneous transluminal coronary angioplasty
LA	Left atrial		
LABA	Long-acting beta agonist	PTSD	Posttraumatic stress disorder
LAMA	Long-acting muscarinic agonist	PTT	Partial thromboplastin time
LBBB	Left bundle branch block	PUD	Peptic ulcer disease
LDH	Lactate dehydrogenase	PUVA	Psoralen plus ultraviolet A (light therapy)
LDL	Low-density lipoprotein	PVC	Premature ventricular contraction
LFT	Liver function test	PVR	Postvoid residual
LH	Luteinizing hormone	RA	Rheumatoid arthritis
LMP	Last menstrual period	RCA	Right coronary artery
LOC	Level of consciousness	RF	Rheumatoid factor
LSB	Left sternal border	RLS	Restless legs syndrome
LSIL	Low-grade squamous intraepithelial lesion	ROM	Range of motion
LV	Left ventricular	RMSF	Rocky Mountain Spotted Fever
LVH	Left ventricular hypertrophy	RPR	Rapid plasma reagin (test for syphilis)
MCH	Mean corpuscular hemoglobin	RSV	Respiratory syncytial virus
MCV	Mean corpuscular volume	S/S	Signs and symptoms
MDI	Metered dose inhaler	SABA	Short-acting beta agonist
MDR-TB	Multi-drug-resistant tuberculosis	SAMA	Short-acting muscarinic agonist
MI	Myocardial infarction	SBE	Subacute bacterial endocarditis
MRSA	Methicillin-resistant staphylococcus aureus	SCA	Sickle cell anemia
		SGLT₂	Sodium-glucose cotransporter-2 inhibitor (diabetes medication)
MS	Multiple sclerosis		
MVP	Mitral valve prolapse	SIL	Squamous intraepithelial lesion
N/V	Nausea and vomiting	SLE	Systemic lupus erythematosus
NAAT	Urine test for gonorrhea and chlamydia	SLR	Straight leg raise
NAFLD	Nonalcoholic fatty liver disease	SNRI	Selective norepinephrine reuptake inhibitor
NASH	Nonalcoholic steatohepatitis		
NSAID	Nonsteroidal antiinflammatory drug	SOB	Shortness of breath
NYHA	New York Heart Association	SSRI	Selective serotonin reuptake inhibitor
O&P	Ova and parasites	STI	Sexually transmitted infection
OA	Osteoarthritis	SVT	Supraventricular tachycardia
OB	Occult blood	T4	Thyroxine
OC	Oral contraceptive	TB	Tuberculosis
 OCD	Obsessive-compulsive disorder	TCA	Tricyclic antidepressant
OD	Overdose	TIA	Transient ischemic attack
OE	Otitis externa	TIBC	Total iron-binding capacity
OGC	Oral glucocorticoid	TMJ	Temporomandibular joint
OHA	Oral hypoglycemic agent	TMP-SMZ	Trimethoprim-sulfamethoxazole (Bactrim)
OME	Otitis media with effusion	TSH	Thyroid-stimulating hormone
OSA	Obstructive sleep apnea	TTP	Thrombotic thrombocytopenic purpura
OTC	Over-the-counter	U/S	Ultrasound
PAD	Peripheral arterial disease	UCG	Urine chorionic gonadotropin (pregnancy test)
PCOS	Polycystic ovarian syndrome		
PE	Pulmonary embolism	UGI	Upper gastrointestinal (X-ray examination)
PEF	Peak expiratory flow	URI	Upper respiratory (tract) infection
PFT	Pulmonary function test	UTI	Urinary tract infection
PHN	Postherpetic neuralgia	V/D	Vomiting and diarrhea
PID	Pelvic inflammatory disease	V/Q	Ventilation perfusion (ratio)
PMI	Point of maximal impulse	VDRL	Venereal Disease Research Laboratories (test for syphilis)
PMR	Polymyalgia rheumatica		
PMS	Premenstrual syndrome	VLDL	Very-low-density lipoprotein
PND	Paroxysmal nocturnal dyspnea; postnasal drainage	VT	Ventricular tachycardia
		WNL	Within normal limits

This page intentionally left blank

Practice Guidelines for Family Nurse Practitioners

This page intentionally left blank

SIXTH EDITION

Practice Guidelines for Family Nurse Practitioners

KAREN FENSTERMACHER, MS, RN, FNP-BC

Family Nurse Practitioner
Carthage, Missouri

BARBARA TONI HUDSON, MSN, RN, FNP-BC

Family Nurse Practitioner
Walnut Grove, Missouri



ELSEVIER

Elsevier
3251 Riverport Lane
St. Louis, Missouri 63043

PRACTICE GUIDELINES FOR FAMILY NURSE
PRACTITIONERS, SIXTH EDITION

ISBN: 978-0-323-88115-9

Copyright © 2024 by Elsevier, Inc. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher. Details on how to seek permission, further information about the Publisher's permissions policies and our arrangements with organizations such as the Copyright Clearance Center and the Copyright Licensing Agency, can be found at our website: www.elsevier.com/permissions.

This book and the individual contributions contained in it are protected under copyright by the Publisher (other than as may be noted herein).

Notice

Practitioners and researchers must always rely on their own experience and knowledge in evaluating and using any information, methods, compounds or experiments described herein. Because of rapid advances in the medical sciences, in particular, independent verification of diagnoses and drug dosages should be made. To the fullest extent of the law, no responsibility is assumed by Elsevier, authors, editors or contributors for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions, or ideas contained in the material herein.

Previous editions copyrighted 2020, 2015, 2004, 2000, 1997.

Executive Content Strategist: Lee Henderson
Director, Content Development: Ellen Wurm-Cutter
Senior Content Development Specialist: Kathleen Nahm
Publishing Services Manager: Deepthi Unni
Project Manager: Kamatchi Madhavan
Designer: Bridget Hoette

Printed in India

Last digit is the print number: 9 8 7 6 5 4 3 2 1



Working together
to grow libraries in
developing countries

www.elsevier.com • www.bookaid.org

REVIEWERS

Tamika Dowling, DNP, FNP-C, PCCN

Nurse Practitioner, Faculty, Urgent Care
Nurse Practitioner, Business Owner,
Advent Health, Orlando,
Florida

Jessica Gonzalez, DNP, NP-C, DCNP

Family Nurse Practitioner, Dermatology
Nurse Practitioner, Christus St. Vincent
Hospital, Santa Fe, New Mexico

**Yvette Lowery, DNP, MSN/Ed, FNP-C, CEN,
CCRN, PCCN**

Family Nurse Practitioner, North Florida
Regional Medical Center, Jacksonville,
Florida

Matthew Rodgers, MSN, APRN, FNP-C

Advanced Practice Registered Nurse,
PrimeCare Medical Clinic, Searcy,
Arkansas

ACKNOWLEDGMENTS

My thanks first to God, without whose help I would not be where I am now. Also, thank you to the nursing and NP colleagues and NP students who have challenged me with their questions and encouraged me with their comments.

Karen

My thanks to my family (David and Cody) for their support with the amount of time spent on this edition; they have been very supportive. My colleagues have challenged me and expanded my abilities in being able to make information easily understandable.

Toni

We have been very blessed over the years to have many collegial relationships with physicians, nurse practitioners, and physician assistants whom we worked with, consulted with, and referred to—too many to name individually, but we thank you all! We are also blessed to have earned the trust of our patients, and we have learned much from them.

We also thank the staff at Elsevier for all their help; our book would not be what it is without their input.

Karen and Toni

Practice Guidelines for Family Nurse Practitioners is a quick-reference book for practicing and student nurse practitioners in a variety of disciplines. Although not intended as a textbook, it is an excellent resource, providing protocols for treatment options for patients of varied ages in varied settings.

For ease of use, the expanded Table of Contents includes a list of the topics plus figures, tables, and boxes for each chapter. **Chapters 1** through **3** contain complete and detailed histories and physical examinations of adult, pediatric, and geriatric patients. Focused exams are included for each body system. Specialized physical examinations are included for sports physicals, child abuse and assessing functional status in geriatrics. **Chapter 4** covers laboratory and diagnostic pearls; **Chapter 14** discusses pain.

Chapters 5 through **17** (other than **Chapter 14**) are written in an easy-to-read and accessible format according to body systems. Common diseases are covered, including signs and symptoms, diagnostic methods, drug therapies, and treatment and adjunctive therapies. Some conditions (e.g., cognitive impairment, anemia, and diabetes) have been expanded. Updated national standard guidelines are used where available (e.g., asthma, diabetes, hypertension, Pap smears); new content has been added on unintentional weight loss, jaundice, fever of unknown origin, and restless legs. As new features to this edition, within each chapter the topics are listed alphabetically, not-to-be-missed conditions are now in **bold, italic** font with a blue square icon (■) in the margin, and all referrals are in **bold, italic** font with urgent referrals identified with a red triangle icon (▲) and non-urgent referrals identified with a gold circle icon (●) in the margin.

Special chapters include geriatric evaluation, pediatrics, and psychiatric conditions. There is also a section on the care of wounds resulting from vascular disease or peripheral pressure. Pain management guidelines have been expanded.

Appendices **A–D** provide information about dietary sources of different nutrients, a peak flow chart, and acetaminophen and ibuprofen dosing charts.

*Karen Fenstermacher
Barbara Toni Hudson*

CONTENTS

1 Adult Assessment 1

CONTENT

- Introduction 1
- History 1
- Physical examination 2
- Focused examinations 3
 - Eyes 3
 - Head, Ears, Nose, and Throat (HENT) 6
 - Respiratory 10
 - Cardiovascular 11
 - Abdominal 14
 - Genitourinary (male) 15
 - Genitourinary (female) 16
 - Musculoskeletal 20
 - Neurological (may be integrated with the rest of the examination) 20
 - Sports physical examination 24

FIGURES

- 1.1 Eyelid eversion technique 5
- 1.2 Right tympanic membrane 7
- 1.3 Rinne and Weber tests 8
- 1.4 Lymph nodes of the head and neck 9
- 1.5 Lung lobes and breath sounds 11
- 1.6 Heart auscultation sites 12
- 1.7 Peripheral pulses 13
- 1.8 Microscopic findings for wet prep 18
- 1.9 Cervix and uterus positions 19

TABLES

- 1.1 Eye signs 4
- 1.2 Ophthalmologic examination 6
- 1.3 Common causes of lymphadenopathy 9
- 1.4 Speech disturbances: characteristics and pattern 21
- 1.5 Cranial nerve examination 22
- 1.6 Distinguishing central and peripheral lesions 24

2 Pediatric Assessment 29

CONTENT

- Introduction 29
- Health history 29
- Guidelines for comprehensive assessment 33
 - General observations 33
- Focused examinations 35
 - Integumentary 35
 - Head, Ears, Eyes, Nose, and Throat (HEENT) 36
 - Respiratory system 40

- Cardiovascular system 41
- Abdominal system 42
- Genitourinary system 43
- Musculoskeletal system 46
- Neurologic system 47
- Child abuse 50

FIGURES

- 2.1 Dental chart 37
- 2.2 Normal and low-set ears 39

TABLES

- 2.1 Developmental milestones 31
- 2.2 Stages of growth and development 34
- 2.3 Vital Signs: approximate normal findings 35
- 2.4 Normal primitive reflexes 49

BOX

- 2.1 Tanner sexual maturity rating 44

3 Geriatric Assessment 52

CONTENT

- Health history 52
- Focused examinations 54
 - Integumentary system 54
 - Sensory system 55
 - Respiratory system 56
 - Cardiovascular system 57
 - Gastrointestinal system 58
 - Musculoskeletal system 60
 - Genitourinary system 61
 - Endocrine/Immune systems 62
 - Neurological system 63
 - Falls 64
- Assessing functional status 67

FIGURE

- 3.1 PHQ-9 patient depression questionnaire 68

TABLES

- 3.1 Physiologic changes and abnormal findings: integumentary system 55
- 3.2 Physiologic changes and abnormal findings: sensory system 56
- 3.3 Physiologic changes and abnormal findings: respiratory system 57
- 3.4 Physiologic changes and abnormal findings: cardiovascular system 58
- 3.5 Physiologic changes and abnormal findings: gastrointestinal system 59
- 3.6 Physiologic changes and abnormal findings: musculoskeletal system 60
- 3.7 Physiologic changes and abnormal findings: genitourinary system 61

- 3.8 Physiologic changes and abnormal findings: endocrine/immune systems 63
- 3.9 Physiologic changes and abnormal findings: neurological system 64
- 3.10 Tinetti balance and gait evaluation 66
- 3.11 The vulnerable elders survey 71

BOX

- 3.1 Short portable mental status questionnaire 70

4 Laboratory and Diagnostic Pearls 72

CONTENT

- Laboratory pointers 72
 - Introduction 72
 - Chemistries 72
 - Hematology (CBC) 74
 - Lab tests for arthralgias 76
 - Liver tests 77
 - Miscellaneous tests 79
 - Urine tests 80
- Radiology pointers 82
- Clinical conditions 84
 - Anemia 84
 - Fever of undetermined origin 89
 - Weight loss (unintentional) 92

FIGURE

- 4.1 Bilirubin in urine 78

TABLES

- 4.1 Urinalysis findings 80
- 4.2 CT and MRI scans 83

BOX

- 4.1 Laboratory findings with anemia of chronic disease 85
- 4.2 Laboratory findings with myelodysplastic anemia 86
- 4.3 Laboratory findings with iron deficiency 86
- 4.4 Laboratory findings with vitamin deficiency 87
- 4.5 Laboratory findings with thalassemia 88
- 4.6 Laboratory findings with sickle cell anemia 89

5 Skin Conditions 95

CONTENT

- Disorders causing inflammation 95
 - Acne 95
 - Atopic dermatitis (Eczema) 98
 - Contact dermatitis 101
 - Diaper dermatitis 103
 - Hyperhidrosis 104
 - Psoriasis 105
 - Rosacea 106

Seborrheic dermatitis	108
Urticaria (hives)	109
Xerosis (xeroderma)	111
Disorders caused by bacterial infections	114
Cellulitis/erysipelas	114
Folliculitis	116
Furuncle/carbuncle	117
Impetigo	119
Disorders caused by viral infections	121
Erythema infectiosum (fifth disease)	121
Hand, foot, and mouth disease (HFMD)	122
Herpes simplex (fever blisters)	123
Herpes zoster (shingles)	125
Molluscum contagiosum	126
Roseola	127
Varicella (chicken pox)	128
Verruca vulgaris (warts)	129
Disorders caused by fungal infection	130
Onychogryphosis	130
Onychomycosis	131
Tinea	132
Disorders of pigmentation	136
Acanthosis nigricans	136
Lichen sclerosis	136
Melasma	137
Vitiligo	138
Skin lesions	138
Actinic keratosis	138
Epidermoid cyst (also called sebaceous, keratin, or epithelial cyst)	139
Keratoacanthoma	140
Skin cancer	140
Skin tags	142
Wound care	143
Abrasions, scratches, skin tears	143
Bites	143
Burn care	145
Lacerations (including closure techniques)	146
Punch biopsy	148
Things that bite and sting	148
Mosquito-borne diseases	148
Parasitic infestation	150
Spider bites	153
Stinging injuries	155
Tick-borne diseases	156

FIGURES

5.1 Flexural atopic dermatitis with lichenification	99
5.2 Allergic contact dermatitis to Rhus	102
5.3 Diaper dermatitis	103

- 5.4 Candida dermatitis 103
- 5.5 Psoriasis vulgaris 105
- 5.6 The classic appearance of rosacea 107
- 5.7 Seborrheic dermatitis 108
- 5.8 Urticarial hive 110
- 5.9 Erysipelas 114
- 5.10 Abscess 117
- 5.11 Impetigo 120
- 5.12 Slapped-cheek appearance of a child with parvovirus B19 infection (erythema infectiosum) 121
- 5.13 Lacy pink eruption over the palms in erythema infectiosum 122
- 5.14 Hand-foot-and-mouth disease 122
- 5.15 Erosion of the tongue in a child with hand-foot-and-mouth syndrome 123
- 5.16 Herpes simplex labialis-recurrent lesions 124
- 5.17 Herpes zoster 125
- 5.18 Molluscum contagiosum 127
- 5.19 Chicken pox 128
- 5.20 Common warts on a child's fingers 129
- 5.21 A: Onychomycosis. B: Onychogryphosis 130
- 5.22 Tinea corporis 133
- 5.23 Tinea cruris 134
- 5.24 Tinea pedis 134
- 5.25 Lichen sclerosus 137
- 5.26 Multiple actinic keratosis 139
- 5.27 Basal cell carcinoma of nodular type with ulceration 140
- 5.28 Malignant melanoma 141
- 5.29 Squamous cell carcinoma 142

TABLES

- 5.1 Topical acne medications 96
- 5.2 Oral antibiotics for acne 97
- 5.3 Selected topical steroid potencies 102
- 5.4 Oral steroid equivalency 113
- 5.5 Postexposure tetanus prophylaxis for people who previously received tetanus toxoid doses 115
- 5.6 Suture points 147

6 Eye, Ear, Nose, and Throat Conditions 159

CONTENT

- Common eye conditions 159
 - Cataracts 160
 - Conjunctivitis 161
 - Corneal injuries/abnormalities 162
 - Eyelid abnormalities 164
 - Glaucoma (acute angle-closure) 166
 - Iritis (uveitis) 166
 - Periorbital cellulitis 166
 - Tear duct abnormalities 168

Common ENT conditions	169
Allergic rhinitis	170
Bacterial sinusitis	171
COVID-19—Acute respiratory syndrome	
Coronavirus 2 (SARS-CoV-2)	172
Influenza	175
Otitis externa (swimmer's ear)	176
Acute otitis media (AOM)	177
Otitis media with effusion	177
Pharyngitis	178
Tinnitus	179

FIGURE

6.1 Color, external photograph of left eye shows severe ciliary flush	167
---	-----

7 Respiratory Conditions 181

CONTENT

Assessing pulmonary function	181
Cough	183
Asthma (reactive airway disease)	187
Chronic obstructive pulmonary disease	197
Community-acquired pneumonia (CAP)	203
Obstructive sleep apnea (OSA)	206
Tuberculosis	207

FIGURE

7.1 Quick reference for COPD staging/treatment	200
--	-----

TABLES

7.1 How to read pulmonary function test/spirometry quickly	182
7.2 Drugs for asthma	193
7.3 Drugs for chronic obstructive pulmonary disease	195

8 Cardiovascular Conditions 209

CONTENT

Cardiac conditions	209
Ambulatory dysrhythmias	209
Bacterial endocarditis antibiotic prophylaxis guidelines	211
Coronary heart disease (CHD)	212
12-Lead ECG	218
Dyslipidemia	220
Heart failure	226
Heart murmurs	230
Hypertension	233
Metabolic syndrome	244
Peripheral vascular conditions	244
Peripheral arterial disease	244
Peripheral venous disease	248

- Anticoagulation therapy 252
- Compression stocking therapy 258
- Wound care (chronic) 259

FIGURES

- 8.1 12-Lead electrocardiogram 219
- 8.2 Anterior MI, acute 220
- 8.3 Inferior MI, acute 220
- 8.4 Classification of murmurs 231

TABLES

- 8.1 CHA₂DS₂-VASc score 210
- 8.2 Antibiotic prophylaxis regimens for bacterial endocarditis 212
- 8.3 Classification of angina 213
- 8.4 Medications for angina 215
- 8.5 Chest pain differential diagnosis 217
- 8.6 Acute changes on 12-lead ECG 219
- 8.7 Location of changes on 12-lead electrocardiogram 219
- 8.8 High-, moderate-, and low-intensity statin therapy 223
- 8.9 Nonstatin therapy 223
- 8.10 Additional recommended testing for signs and symptoms of heart failure 228
- 8.11 Medications for the treatment of heart failure 229
- 8.12 Classifications of murmurs 232
- 8.13 Classification of hypertension 233
- 8.14 The DASH diet 236
- 8.15 Suggested antihypertensive agents (based on comorbidities) 238
- 8.16 Antihypertensive medication and dosages 240
- 8.17 Cautions and contraindications for antihypertensive agents 242
- 8.18 Potassium supplementation 244
- 8.19 Ankle-brachial index (ABI) interpretation 248
- 8.20 Initiating warfarin after 5–7 days of LMWH therapy 254
- 8.21 Titrating warfarin 255
- 8.22 Drugs and indications for ambulatory anticoagulation/antiplatelet therapy (excluding warfarin) 256
- 8.23 Compression stockings 258

9 Abdominal Conditions 264

CONTENT

- Abdominal pain 264
- Upper abdominal conditions 269
 - Bariatric surgery 269
 - Cholecystitis 270
 - Gastroenteritis (acute viral) 271
 - Gastroesophageal reflux disease (GERD) 273
 - Helicobacter pylori*-induced gastritis 277
 - Pancreatitis 278
 - Peptic ulcer disease 279
- Lower abdominal conditions 281
 - Appendicitis 281
 - Colon cancer 282
 - Constipation 283

- Diarrhea 286
- Diverticulitis 293
- Inflammatory bowel diseases 294
- Irritable bowel syndrome (IBS) 295
- Liver disease 297
 - Jaundice 297
 - Alcoholic liver disease (ALD) 300
 - Cirrhosis 301
 - Hepatitis 302
 - Nonalcoholic fatty liver disease (NAFLD) 307

FIGURE

- 9.1 Differential diagnosis of abdominal problems depending on pain location 265

TABLES

- 9.1 Differential diagnoses of abdominal pain in young patients 266
- 9.2 Oral rehydration solution mixtures 272
- 9.3 H₂ blockers and proton pump inhibitors 276
- 9.4 Causes of diarrhea 290
- 9.5 Interpretation of hepatitis serologic test results 306

BOXES

- 9.1 Factors that worsen symptoms by relaxing the lower esophageal sphincter 274
- 9.2 Factors that aggravate reflux symptoms 274

10 Gynecologic Conditions 308

CONTENT

- Screenings and pap smears 308
 - Screening guidelines for women's services 308
 - Interpretation and management of Pap smears 308
- Contraception 308
 - Contraceptive methods 308
- Menstrual disorders 317
 - Abnormal bleeding patterns 317
 - Amenorrhea 321
 - Dysmenorrhea 325
 - Menopause 326
 - Polycystic ovarian syndrome (PCOS) 330
 - Premenstrual syndrome (PMS)/premenstrual dysphoric disorder (PMDD) 332
- Gynecologic infections 333
 - Bacterial vaginosis (BV) 333
 - Candidiasis (vulvovaginal) 335
 - Sexually transmitted infections 336
- Breast disorders 346
 - Breast pain (mastalgia) 346
 - Mastitis 347
 - Nipple discharge 349

FIGURES

- 10.1 Evaluation of secondary amenorrhea 324
- 10.2 Genital warts (female) 338
- 10.3 Genital warts (male) 338
- 10.4 Primary vulvar herpes 342
- 10.5 Genital herpes on male 342

TABLES

- 10.1 Screening guidelines for healthy women: Pap smear, mammography, and bone mineral density (BMD) 309
- 10.2 Common contraception for selected conditions 310
- 10.3 Emergency contraception 315
- 10.4 Hormone replacement therapy 327

11 Urinary Tract Conditions 351**CONTENT**

- Disorders in men and women 352
 - Bladder cancer 352
 - Chronic kidney disease 352
 - Glomerulonephritis, acute poststreptococcal (PSGN) 354
 - Incontinence 355
 - Renal calculi (kidney stones) 358
 - Urinary tract infection 360
- Common disorders in men 363
 - Benign prostatic hypertrophy 363
 - Epididymitis 364
 - Erectile dysfunction 365
 - Prostate cancer 368
 - Prostatitis, acute bacterial 368
 - Testicular cancer 369
 - Testicular torsion 369

BOX

- 11.1 Common causes of transient incontinence 358

12 Neurologic Conditions 370**CONTENT**

- Equilibrium disturbances 370
- Focal neurologic deficit 373
- Headaches 375
- Meningitis 383
- Movement disorders 383
- Neuromuscular disorders 385

FIGURE

- 12.1 Bell's palsy 374

TABLES

- 12.1 Potential migraine triggers 380
- 12.2 Suggested preventative migraine agents 381

13 Musculoskeletal Conditions 386

CONTENT

Introduction	386
General musculoskeletal disorders	388
Fibromyalgia syndrome	388
Gout	392
Leg cramps	393
Osteoarthritis (OA)	394
Osteoporosis	395
Restless leg syndrome	397
Rheumatoid arthritis (RA)	399
Location-specific musculoskeletal disorders	400
Neck	400
Shoulder	401
Elbow	405
Wrist and hand	407
Hip and low back pain	409
Knee	413
Foot and ankle	416
Strains and sprains	420

FIGURES

13.1 Dermatomes	387
13.2 AAPT diagnostic criteria for fibromyalgia (2019)	390
13.3 Upper spine and landmarks	402
13.4 Anatomy of shoulder	402
13.5 Shoulder range of motion	403
13.6 Elbow range of motion test	406
13.7 Anatomy of hand and nerve distribution	407
13.8 Left knee	414
13.9 Areas of foot	417
13.10 Medial and lateral ligaments	418

TABLES

13.1 Comparison of structural and inflammatory joint conditions	386
13.2 Possible causes of fatigue and malaise	387
13.3 Evaluating muscle strength	388
13.4 Neck pain	401
13.5 Referred shoulder pain	403
13.6 Common elbow disorders	406
13.7 Common hand and wrist disorders	409
13.8 Common hip disorders	412
13.9 Common low back pain examination findings	412
13.10 Comparison of lumbar nerve roots	412
13.11 Common knee disorders	415
13.12 Common foot and ankle disorders	419
13.13 Comparison of sprains	420

14 Pain 421

CONTENT

- Introduction 421
- Acute pain 421
- Chronic pain 422
- Therapies for pain 424
 - Nonpharmacological therapies 424
 - Pharmacological therapies 425
 - Prescribing opioids for chronic pain 428

TABLES

- 14.1 Suggested therapies for pain 425
- 14.2 Morphine milligram equivalent 430
- 14.3 Possible false-positive test 432

BOX

- 14.1 PEG scale 423

15 Endocrine Conditions 433

CONTENT

- Adrenal conditions 433
 - Acute adrenal insufficiency (adrenal crisis) 433
 - Chronic adrenal insufficiency (Addison's disease) 433
 - Cushing's syndrome and disease 434
 - Pheochromocytoma 434
- Diabetes mellitus 435
 - Screening 435
 - Diagnosis 436
 - Comprehensive medical evaluation (initial visit) 438
 - Current dietary recommendations 440
 - Exercise and diabetes 443
 - Monitoring 444
 - Follow-up and treatment 445
 - Acute complications of DM 459
 - Chronic complications of DM 463
- Thyroid disorders 467
 - Goiter 468
 - Hyperthyroidism 468
 - Hypothyroidism 469
 - Thyroid cancer 470

FIGURES

- 15.1 Acanthosis nigricans of the neck 437
- 15.2 Acanthosis nigricans 437
- 15.3 The plate method. (Using a standard size dinner plate.) 442
- 15.4 Monofilament testing sites on feet 465

TABLES

- 15.1 Criteria for diabetes, prediabetes, and gestational diabetes 436
- 15.2 Overview of type 1 and type 2 diabetes 438

- 15.3 Food and insulin adjustments for exercise 444
- 15.4 Pharmacokinetics of insulin 448
- 15.5 Noninsulin hypoglycemic agents 452
- 15.6 Treatment of hypoglycemia 461
- 15.7 Laboratory findings in thyroid disorders 468

BOX

- 15.1 Foods allowed on sick days 463

16 Pediatric Conditions 471

CONTENT

- Generalized conditions 471
 - Dehydration 471
 - Failure to thrive 472
 - Fever 475
- Upper respiratory tract conditions 477
 - Allergic rhinitis 477
 - Bacterial sinusitis, acute 479
 - Influenza 480
 - Mononucleosis 481
 - Otitis externa (swimmer's ear) 482
 - Otitis media (OM) 483
 - Pharyngitis 486
- Lower respiratory tract conditions 488
 - Bronchiolitis 488
 - Community-acquired pneumonia 488
 - Croup 491
 - Epiglottitis 492
- Cardiac conditions 493
 - Heart murmurs 493
 - Hypertension 494
- Abdominal conditions 495
 - Colic 495
 - Constipation 497
 - Encopresis 499
 - Gastroenteritis 501
 - Gastroesophageal reflux disease (GERD) 502
 - Intussusception 504
 - Pyloric stenosis 504
- Genitourinary tract conditions 504
 - Cryptorchidism (undescended testicle) 504
 - Enuresis 505
 - Urinary tract infection 506
- Gynecological conditions 508
 - Labial adhesions 508
 - Vulvovaginitis 509
- Hematopoietic system conditions 510
 - Iron-deficiency anemia 510
- Musculoskeletal system conditions 512
 - Limping child 512

Osgood-schlatter disease 514

Scoliosis 514

Neurological conditions 515

Attention-deficit hyperactivity disorder (ADHD)/attention-deficit disorder (ADD) 515

Migraine headache 516

TABLE

16.1 Clinical signs and treatment of dehydration in children 472

17 Psychiatric Conditions 519

CONTENT

Initial office visit 519

Anxiety 520

Bipolar disorder 525

Cognitive impairment/dementia 528

Depression 536

Insomnia 540

Serotonin syndrome 542

FIGURE

17.1 The pain assessment in advanced dementia scale (PAINAD) 534

TABLES

17.1 Common antidepressants 521

17.2 Common anxiolytics 523

17.3 Common antipsychotics 526

17.4 Disorders of cognition 530

17.5 Common dementias (also known as neurocognitive disorders) 531

BOX

17.1 Clock test 529

APPENDICES

A: Food sources for selected nutrients 544

B: Predicted peak expiratory flow rate 546

C: Acetaminophen dosing chart 548

D: Ibuprofen dosing chart 549

INDEX 551

Adult Assessment

INTRODUCTION

- I. The following guidelines assume that the patient is in a stable condition. The order should be modified as the patient's condition warrants.
- II. In cases of acute illness, the initial focus is on the affected and related body systems, with emphasis on the history of the present illness (HPI).
- III. The Focused Exams include more specific details.

HISTORY

- I. Patient profile
 - A. Marital status and relationship with spouse
 - B. Phone number(s), including name and number of who can be contacted if needed; email address, if desired
 - C. Living arrangements
 1. With whom?
 2. Where (e.g., an apartment or home, homeless)?
 - D. Education, occupation, and current employment
 - E. Adequacy of finances and health insurance
 - F. Transportation (e.g., has a vehicle or relies on friend/family member or taxi)
- II. Chief complaint (CC)
 - A. State in the patient's own words
 - B. Note if the patient's actions agree with or contradict the stated CC
- III. History of the present illness (HPI)
 - A. Chronic condition(s) visit: focus on how the patient has been doing
 1. Current treatment and changes
 2. Review any home monitoring results (e.g., blood pressure or blood glucose readings)
 - B. Acute illness: focus on the specific reason for the visit
 1. Try to obtain a clear account of the patient's CC, including what treatments have been tried before (what worked and what did not)
 2. Focus on affected and related body systems, with regard to the following:
 - (a) Onset (e.g., when, where)
 - (b) Characteristics (e.g., description of the quality of discomfort, radiation, associated symptoms such as N/V)
 - (c) Course (e.g., length of the event, alleviating or aggravating factors)
 - (d) What does the patient think is wrong?
 3. Also note pertinent negative responses (e.g., absence of cough or fever)
- IV. Past medical history (PMH)
 - A. Significant childhood and adult illnesses; surgeries (including gender transition), hospitalizations, or Emergency Department visits: any changes since last seen (including Urgent Care or other hospital system visit(s) not part of the currently used electronic health record [EHR])

- B. Current medications and treatments, including over-the-counter (OTC) preparations, oral contraceptives (OCs), inhalers, eye drops, herbal supplements or vitamins, and customs (e.g., home remedies, cultural treatments)
- C. Immunization status, including influenza, pneumococcal vaccine(s), shingles vaccines (Zostavax, Shingrix), COVID-19 vaccines, and tuberculosis (TB) test. See www.cdc.gov/vaccines or the Shots Immunizations app for the current immunization schedules
- D. Allergic reactions or sensitivities to medications, including what occurs when the medicine is taken (common side effects such as nausea are often perceived as an allergy)
- E. Street drug, alcohol, and tobacco use (specific types, amounts, and routes; include vaping)
- V. Family history (FH)
 - A. FH is important for the identification of risk factors; gather information about grandparents, parents, and siblings
 - B. Focus on cardiovascular disease, diabetes mellitus (DM), cancer, autoimmune diseases, peripheral vascular disease (PVD), seizure disorders, asthma, and psychiatric disorders
 - C. The phrase “significant FH” indicates that several family members from different generations have had a specific disease
- VI. Psychosocial history
 - A. Dietary and rest patterns
 - B. Types and frequency of exercise
 - C. Spiritual assessment
 - 1. Faith or beliefs and the importance and influence in the patient’s life
 - 2. Involvement in a religious/spiritual community and if it is a source of support to the patient
 - D. Depression screening (if indicated)
- VII. Review of systems (ROS)
 - A. Chronic conditions(s) visit: questions pertaining to affected body systems and current treatments (i.e., possible medications side effects)
 - B. Acute illness visit: questions about various body systems to obtain any additional information to help arrive at an accurate diagnosis
 - C. Also see [Focused Examinations](#), later in this chapter

PHYSICAL EXAMINATION

- I. General observations
 - A. General appearance
 - 1. Grooming and dressing, facial expressions, symmetry of movement
 - 2. *Not to be missed*
 - (a) *Appears acutely ill/toxic appearing*
 - (b) *Signs of dehydration (e.g., dry mucous membranes, tachycardia, dizziness)*
 - (c) *Cyanosis or pallor*
 - (d) *Shortness of breath (SOB) or use of accessory muscles to breathe*
 - (e) *Drooling* (consider epiglottitis; see [Chapter 16](#))
 - B. Vital signs (VS): temperature, pulse, respiration, blood pressure (BP) (including postural VS with dizziness or syncope), weight, height, and body mass index (BMI)
 - 1. Postural VS changes: initially determine the VS with the patient lying quietly; next have the patient sit (and then stand, if indicated), and within 2 min of position change(s), recheck the VS. With postural changes, one or more of the following will happen:
 - (a) ≥ 20 mmHg drop in systolic BP or ≥ 10 mmHg drop in diastolic BP

- (b) Increase in heart rate of > 30 bpm
- (c) Patient becomes symptomatic (e.g., dizzy)
- 2. A low diastolic BP (<65 mmHg) implies decreased peripheral resistance or aortic valve regurgitation (which is significant, even if the heart sounds are not loud).
- C. Skin inspection
 - 1. Color and turgor
 - 2. ***Not to be missed***
 - (a) ***Fingernail clubbing***
 - (b) ***Suspicious or unusual lesions***

Focused Examinations

EYES

- I. Emphasis on HPI and ROS
 - A. Change in vision (e.g., blurred or double vision or visual field deficit in one or both eyes) or sudden, painless, total or near total loss of vision in one eye
 - B. Possible injury (e.g., “something in my eye,” tanning without protective eye wear)
 - C. Photophobia
 - D. Headache
- II. PMI
 - A. Glaucoma
 - B. History of eye surgery (e.g., cataracts or retinal surgery, laser surgery)
 - C. Wears contacts or glasses
- III. Examination (also see [Chapter 6, Common Eye Conditions](#))
 - A. Check for the best visual acuity, if indicated: right eye, left eye, and both eyes (note with/without corrective lenses).
 - 1. Distance (e.g., Snellen chart)
 - 2. Newsprint (document how far away it is held to read; e.g., 6 inches)
 - 3. Counting fingers
 - 4. Hand motion
 - 5. Light perception
 - 6. No light perception
 - B. External: observe lid symmetry.
 - C. Pressure: gently press on closed eyes for symmetry.
 - D. Check for pupil reactivity: shine light first in the unaffected eye (both pupils should constrict) and then in the affected eye; if pupils dilate, the optic nerve in the affected eye is not working (see Marcus Gunn pupil, [Table 1.1](#)).
 - E. Anterior: examine the conjunctiva, sclera, and cornea; fluorescein staining is used to detect injuries to the surface of the cornea (e.g., abrasion, foreign body). This is done easily with minimal discomfort and is a good tool for determining further care and/or referral for care.
 - 1. Make sure the patient is not wearing a contact lens.
 - 2. Instill 1 to 2 local anesthetic eye drops. *Do not let patient touch eyes for the next 60 min*; this can injure the cornea because the corneal reflex is now absent.
 - (a) If anesthetic eye drops give immediate relief, the problem is most likely caused by surface pain.
 - (b) If pain remains, the pain is most likely deep in the eye itself (more serious).

TABLE 1.1 ■ Eye Signs

Eye Sign	Characteristics	Pathology
Normal findings	Pupils 3–4 mm, symmetric, round, and reactive to light and accommodation Palpebral fissure 8–12 mm and symmetric	
Adie pupil	Unilateral, large pupil Sluggish constriction to prolonged light exposure Direct light reflex absent	Post viral infection Loss of parasympathetic reactions
Anisocoria	Unequal pupil size Reactive to light and accommodation	May be a normal variant if the difference is <1 mm Compression of CN III (e.g., aneurysm, cerebral herniation)
Argyll Robertson pupil	Pupils smaller than normal in dim light Minimal dilation, often unequal Pupils may appear irregular Visual disturbance	Neurosyphilis, viral encephalitis Lesion in midbrain DM
Dysconjugate gaze	Inability to follow a moving finger in all eye fields Deviation of eye Lack of gaze coordination	Space-occupying lesion Neuromuscular disorders (e.g., MS) Frontal lobe dysfunction (dementia or trauma) DM
Marcus Gunn pupil	Pupils equal, with positive direct light reflex Pupil dilates when direct light is moved from the intact eye to the eye with the abnormal pupil	Optic nerve involved (e.g., with multiple sclerosis)
Nystagmus*	Involuntary, oscillating eye movements May occur at rest or during eye field examination May be vertical or lateral	May be associated with strain secondary to poor lighting Side effect of certain drugs (e.g., phenytoin, alcohol, barbiturates) Bilateral nystagmus may indicate myasthenia gravis
Ptosis	Palpebral fissure <5 mm Asymmetric	CN III palsy Myopathy Neuromuscular disorders (e.g., myasthenia gravis) Atonic eyelid muscles Inflammatory lesion of the eyelid

* Marked nystagmus on lateral gaze or any nystagmus on vertical gaze suggests a peripheral or central nervous system (CNS) lesion.
CN, cranial nerve; DM, diabetes mellitus; MS, multiple sclerosis.

3. Put a drop of saline on a fluorescein paper and touch the paper to the inner lower eyelid. The conjunctiva will turn orange immediately (if it does not, remoisten the fluorescein strip and touch to eye again). Have the patient open and close the eyes a few times.
4. Using a cobalt blue pen light, inspect the cornea and under the eyelids; if there is an injury or foreign object (FO), the dye will enhance the area. Possible findings:
 - (a) “Ice rink sign”: scratches on the cornea from blinking due to FO in the upper eyelid
 - (b) Dendrite appearance: possibly herpes zoster or other virus

- (c) Abrasions seen at the 3 and 9 o'clock positions on the cornea are common with contact lens wearers
- (d) Isolated dots across the cornea from poorly fitted contact lenses or dry eyes
- (e) Lesion(s) located in the central vision (over the pupil) will decrease visual acuity and depth perception (may not be seen with the dye, but patient will report this during exam)
- 5. After examination, irrigate the eye(s) with saline solution until clear and reevaluate in the same manner; injury or FO will be seen.
- 6. If an abrasion is noted, refer to Corneal Abrasion, in [Chapter 6, CORNEAL INJURIES/ABNORMALITIES](#).
- 7. Remind patient to not touch eye if the anesthetic drops are used; an eye patch may be needed if concern for touching is present.
 - (a) Explain to patient that orange drainage may be present after “blowing the nose” for the next hour; this is due to dye running down tear ducts.
 - (b) Anesthetic eye drops are for examination purposes only and not for continued relief; do not send home with patient.
- F. Eversion of upper eyelid is an important tool for inspecting under the upper lids for injury, FO, or swelling (see [Fig. 1.1](#)).
- G. Peripheral visual fields: sit/stand at eye level directly in front of the patient to check peripheral field vision.
- H. Alignment
 - 1. Have the patient look straight ahead toward the light—the light reflection should be symmetric.
 - 2. Test extraocular muscles (EOMs).
- I. Perform ophthalmoscopy, if possible (see [Table 1.2](#)).

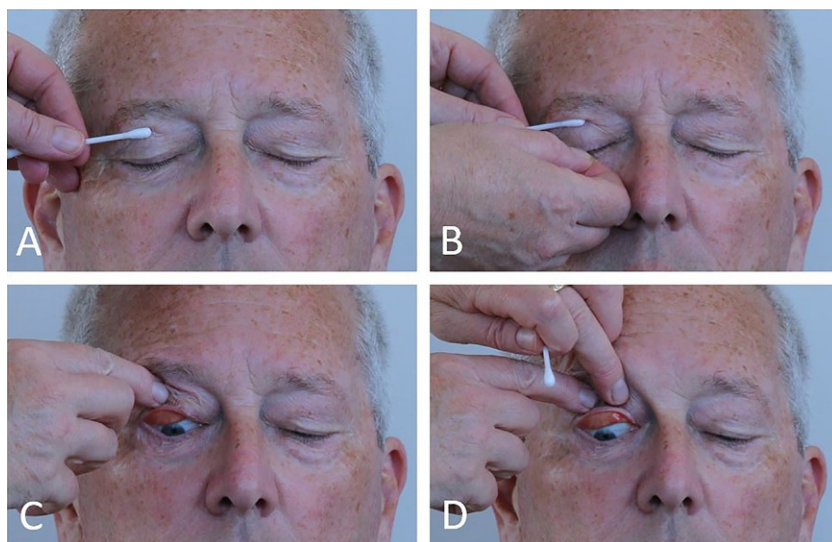


Fig. 1.1 Eyelid eversion technique. (A) With the patient looking down, place the end of a cotton tip applicator in the center of the upper eyelid fold. (B) Grab the eyelashes of the upper lid with the other hand. (C) Gently pull the eyelashes slightly outward and upward until the upper lid everts over the cotton tip applicator, and then remove the applicator. (D) To fully reveal the tarsal conjunctiva, gently pull back the eyelashes at the nasal aspect of the lid margin with a finger of the other hand. When finished, gently pull the eyelashes of the upper lid outward and downward until the lid flips back to its normal position. (From Efron, N. (2019). *Contact lens complications* (4th ed.). Philadelphia: Elsevier.)

TABLE 1.2 ■ Ophthalmologic Examination

Finding	Characteristics	Possible Causes
Normal	Yellow-white disc Well-defined disc margins Arteries (smaller) enter and veins (larger) leave at the optic disc	
Papilledema	Edema of the optic disc: unilateral if inflammatory (may have a sudden loss of vision in the inflammatory state); usually bilateral if noninflammatory Impaired visual acuity in the chronic stage	Lesions that increase intracranial pressure Encephalopathy Optic artery aneurysm or cavernous sinus thrombosis Guillain-Barre syndrome
Optic atrophy	Decreased vision Optic disc white or gray-white The cup may be absent	Optic neuritis Neurosyphilis Trauma to the orbit Toxins or poisons Diabetes mellitus

■ IV. Examination findings *not to be missed*

■ A. *Nystagmus, strabismus*

■ B. *Red eye(s)*

■ C. *Foreign body in eye*

■ D. *Retinal artery occlusion* (e.g., sudden, painless, total or near total loss of vision in one eye); also, see [Chapter 6, PRACTICE PEARLS FOR EYES](#)

▲ V. Referral

▲ A. *To ED with foreign body in eye that cannot be removed*

▲ B. *To ED or ophthalmologist*

1. *Immediately with sudden, painless, total or near total loss of vision*

2. *Urgently with acute onset eye pain, diminished visual acuity, and photophobia*

HEAD, EARS, NOSE, AND THROAT (HENT)

I. Emphasis on HPI and ROS

A. Onset and changes (e.g., new or chronic, worsening or more constant)

B. Associated symptoms

1. Fever, nausea/vomiting (N/V), or diarrhea, loss of taste/smell, cough

2. Possible exposure to contagious illness (e.g., influenza, COVID-19, strep throat)

3. Fatigue, tachycardia or palpitations, thinning hair

II. PMH (as indicated by chief complaint)

A. Seasonal or perennial allergies, including if treatments are PRN (as needed) or routine

B. Recurrent sinus issues

C. Gastroesophageal reflux disease (GERD)

D. Tinnitus

E. Vertigo

F. Hard of hearing or deaf or wears hearing aids; history of recurrent cerumen impaction

G. Hair loss

H. History of head injuries

III. Examination

A. Inspect the face and head (includes noticing hair patterns and irregularities from past head injury)

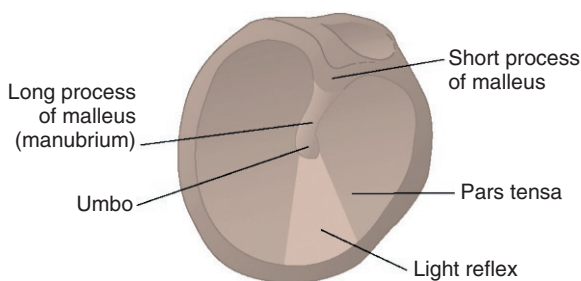


Fig. 1.2 Right tympanic membrane. (From Black, J., & Hawks, J. H. (2009). *Medical-surgical nursing* (8th ed.). Philadelphia: Elsevier.)

B. Ears

1. Palpate the auricle and tragus.
2. Perform otoscopy (Fig. 1.2).
3. Administer appropriate hearing tests: Weber test, Rinne test (Fig. 1.3), and 5-foot whisper.
4. If the patient is hard of hearing, ask the patient to hum.
 - (a) Conductive defect: hum is louder in the affected ear.
 - (b) Sensorineural defect: hum is louder in the unaffected ear.

C. Nose: examine the nasal septum and nares for mucosal color, polyps, perforations, and presence of swelling

D. Oropharynx: inspect the lips, gums, teeth, tongue, buccal mucosa, uvula, and pharynx

1. Determine the “grade” of tonsils.
 - 1+: barely extend beyond the tonsillar pillars
 - 2+: extend halfway to the uvula
 - 3+: touch the uvula
 - 4+: tonsils touch each other
2. Note the presence of partial plates, full dentures, caries, if any.

E. Palpation

1. Over sinuses (e.g., over maxillofrontal areas, mastoids, C2) for pain or pressure
2. Neck for lymph nodes (Fig. 1.4) or thyroid abnormalities

IV. Examination findings *not to be missed*

A. Ears

1. **Redness, bulging, perforation, retraction, or decreased mobility of tympanic membrane (TM)**
2. **Bullae on TM (mycoplasma infection)**
3. **Pain on palpation of the auricle or tragus**

B. Oropharynx

1. **Peritonsillar abscess** (see Chapter 6, PHARYNGITIS)
2. **Exudative pharyngitis**
3. **Palatine petechiae**
4. **Postnasal drainage**

C. Neck

1. **Lymphadenopathy with or without tenderness** (Fig. 1.4 and Table 1.3)
2. **Thyroid abnormalities**

V. Referral

- A. **To ENT or ED urgently with peritonsillar abscess**
- B. **To ENT with recurrent ear or sinus infections**

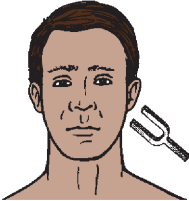
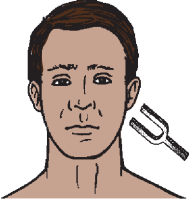
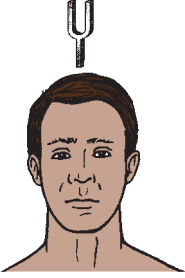
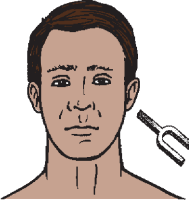
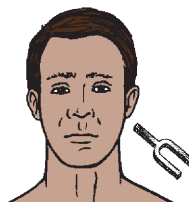
Rinne	Weber	Hearing Status
 Air conduction > bone conduction	 Sound equal to both ears	Either no hearing loss or symmetric hearing loss
 Air conduction > bone conduction	 Sound lateralizes to right ear	Sensorineural hearing loss in left ear
 Bone conduction > air conduction	 Sound lateralizes to left ear	Conductive hearing loss in left ear
 Bone conduction > air conduction	 Sound lateralizes to right ear	Severe sensorineural hearing loss in left ear

Fig. 1.3 Rinne and Weber tests.

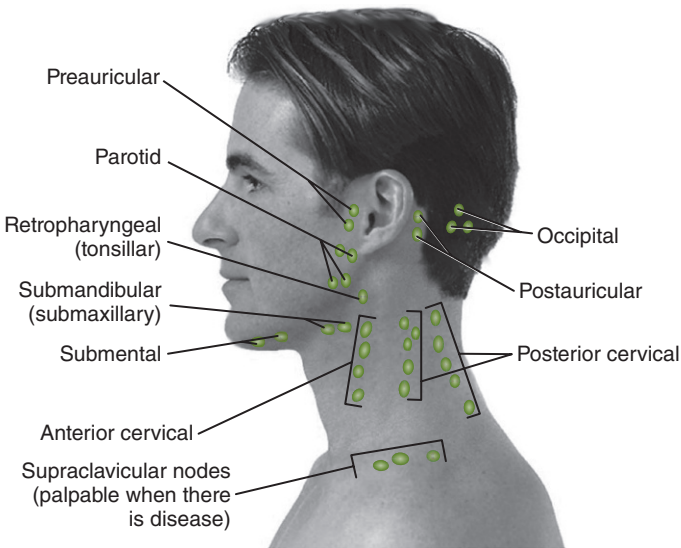


Fig. 1.4 Lymph nodes of the head and neck. (From Seidel, H. M., Stewart, R. W., Ball, J. W., Dains, J. E., Flynn, J. A., Solomon, B. S., & Stewart, R. W. (2011). *Mosby's guide to physical examination* (7th ed.). Philadelphia: Elsevier.)

TABLE 1.3 ■ Common Causes of Lymphadenopathy

Auricular Anterior: viral conjunctivitis, trachoma Posterior: scalp infection, rubella	Axillary Breast cancer or infection Upper extremity infection	Cervical (unilateral), Submandibular Buccal cavity infection Pharyngitis (may be bilateral) Nasopharyngeal tumor Thyroid cancer
Cervical (bilateral) Mononucleosis (especially posterior nodes) Toxoplasmosis pharyngitis	Epitrochlear Syphilis (bilateral) Hand infection (unilateral)	Hilar area (unilateral or bilateral) Sarcoidosis Lymphoma Bronchogenic cancer Tuberculosis Fungal infection (e.g., histoplasmosis, coccidioidomycosis)
Inguinal Syphilis, genital herpes Lymphogranuloma venereum chancroid Lower extremity or local infection	Supraclavicular Right: cancer (pulmonary, mediastinal, or esophageal) Left: cancer (intraabdominal, renal, testicular, or ovarian)	Any area Cat scratch fever Hodgkin's disease, leukemia Metastatic cancer Sarcoidosis

RESPIRATORY

- I. Emphasis on HPI and ROS
 - A. SOB, dyspnea, orthopnea, wheezing, and nocturnal dyspnea
 - B. Fever (when, how high?)
 - C. Cough, sputum, and hemoptysis
 - D. Sore throat, sneezing, congestion
 - E. Earache
- II. PMH
 - A. Asthma (include ED visits and hospitalizations)
 - B. Bronchitis or COPD
 - C. Pneumonia or TB
 - D. COVID-19 infection (when; did all symptoms resolve?)
 - E. Frequent strep throat or ear infections
 - F. Sleep apnea; use of CPAP or BiPAP machine
 - G. Occupational exposure and tobacco use (current or past use of any type, including vaping)
 - H. Chest trauma or spontaneous pneumothorax
 - I. Last influenza or pneumonia vaccine, COVID-19 vaccines (if any); TB test
- III. FH
 - A. Asthma
 - B. Chronic airway disease
- IV. Examination (include cardiovascular and abdominal examinations in case of respiratory complaints)
 - A. Observe the chest for AP and lateral diameter and deformities.
 - B. Auscultate the anterior and posterior chest and right lateral chest (Fig. 1.5).
 1. For symmetry of breath sounds throughout all lung fields
 2. Listen for bronchial, bronchovesicular and vesicular breath sounds, as well as abnormal breath sounds
 - (a) Crackles: fine, crackle sounds that can be associated with fluid in the airways or with fibrosis
 - (b) Rhonchi: coarser sounds, as with someone who needs to cough; often clears with cough
 - (c) Stridor: high-pitched inspiratory sound associated with laryngeal spasm
 - (d) Wheeze: low-pitched inspiratory or expiratory sound associated with bronchospasm or pulmonary congestion
 - C. Examine the chest, including respiratory excursion, and perform bronchophony, egophony, and whispered pectoriloquy, if indicated.
 - D. Percuss posterior lung fields for symmetry and normal/abnormal sounds.
 - E. Percuss diaphragmatic excursion and palpate for vocal fremitus, if indicated.
 - F. Examine capillary refill in the nail beds; also examine the fingernail beds for shape (e.g., clubbing).
- V. Examination findings *not to be missed*
 - A. *Fingernail clubbing, capillary refill >3 sec*
 - B. *Cyanosis*
 - C. *SOB or use of accessory muscles to breathe, prolonged expiration*
 - D. *Hypoxemia (pulse ox <90%)*
 - E. *Tachypnea at rest and/or hypotension and tachycardia*
 - F. *Abnormal, absent, or decreased breath sounds (e.g., crackles, rhonchi, stridor, wheeze) or abnormal percussion*

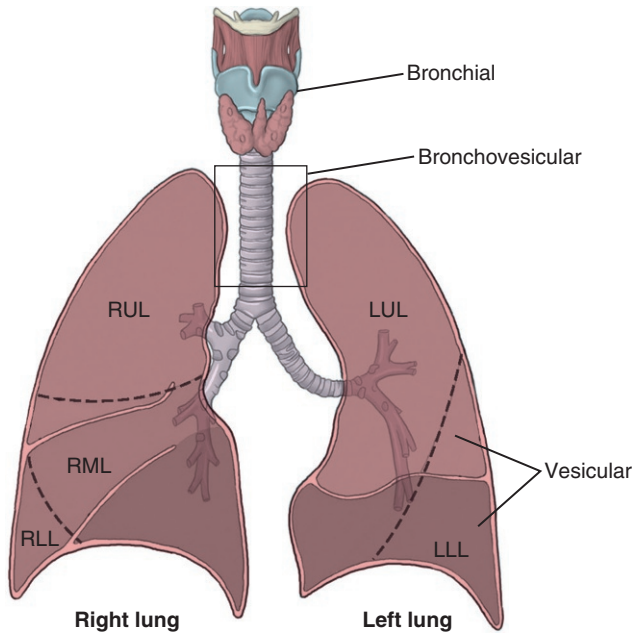


Fig. 1.5 Lung lobes and breath sounds. (From Bontrager, K. (2009). *Textbook of radiographic positioning and related anatomy* (7th ed.). Philadelphia: Elsevier.)

- 1. **Dullness indicates consolidation** (e.g., pneumonia, pleural effusion)
- 2. **Hyperresonance** (consider emphysema or pneumothorax)
- G. **Unequal inspiration/expiration contours of the right and left sides of the chest**
- H. **Pleural friction rub**
- ▲ VI. **Referral: emergency transfer to ED with acute respiratory distress**

CARDIOVASCULAR

- I. Emphasis on HPI and ROS
 - A. Cardiac (e.g., chest pain, palpitations, dysrhythmias, tachycardia, cyanosis, cough, exertional dyspnea, orthopnea, nocturnal dyspnea, edema, dizziness, syncope, diaphoresis)
 - B. Vascular (e.g., phlebitis, intermittent claudication, skin color changes, cold or painful extremities)
- II. PMH
 - A. Rheumatic fever; COVID-19 infection (when; did all symptoms resolve?)
 - B. Murmurs, mitral valve prolapse (MVP)
 - C. Ischemic heart disease (e.g., angina, MI, stent placement, PTCA, heart surgery)
 - D. Dysrhythmia (e.g., atrial fibrillation)
 - E. Hypertension (HTN)
 - F. Heart failure (HF)
 - G. Deep venous thrombosis (DVT)
 - H. Venous stasis (including presence/absence of ulcers)
 - I. Prior peripheral vascular surgery (stent or “bypass”)
 - J. Dyslipidemia
 - K. cerebral vascular accident (CVA) or transient ischaemic attack (TIA)

- L. DM
- M. Gallbladder disease, peptic ulcer
- N. Marfan syndrome
- O. Women with a history of breast cancer (some treatments are cardiotoxic)

III. FH

- A. Sudden death of a family member before 50 yr of age
- B. Coronary artery disease (CAD) or cardiomyopathy
- C. HTN
- D. Raynaud disease or other peripheral vascular disease (PVD)
- E. DM

IV. Examination (include respiratory and abdominal examinations in case of cardiovascular complaints)

- A. Palpate the precordium
- B. Auscultation (Fig. 1.6)
 1. Using both the bell and the diaphragm, listen over the precordium with the patient seated upright and leaning forward, in the supine position, and in the left lateral position.
 2. Listen for S_1 and S_2 (including splits); to identify S_1 , time it with the carotid pulse (see also V. Examination findings **not to be missed**, below).
 - (a) Split S_1 is usually normal; best heard in the tricuspid area
 - (b) S_2 findings
 - (i) Split S_2 is physiologic (normal) if it resolves with deep expiration (i.e., it is “blown away”).
 - (ii) Paradoxical split S_2 : consider left bundle branch block (LBBB) or aortic stenosis.
 - (iii) **Loud S_2 means increased peripheral resistance, regardless of BP measurement; requires aggressive treatment.**
 3. Listen over the carotid arteries, abdominal aorta, and renal and femoral arteries.
- C. Inspect the neck (with the head of the bed at a 45-degree angle) for carotid and internal jugular venous pulsations and jugular venous distention (JVD).
- D. Palpation
 1. Check the carotid pulses (individually).
 2. Check the abdomen for hepatjugular reflux and aortic pulsation.
 3. Check the peripheral pulses for rate, rhythm, and amplitude (Fig. 1.7).
 4. Check the lower extremities for edema.
 - (a) Nonpitting edema: consider lymphatic obstruction or hypothyroidism.

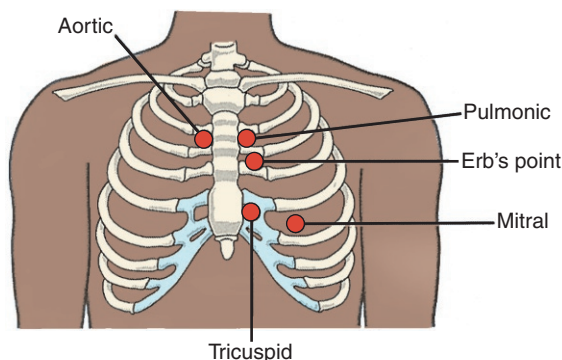


Fig. 1.6 Heart auscultation sites.

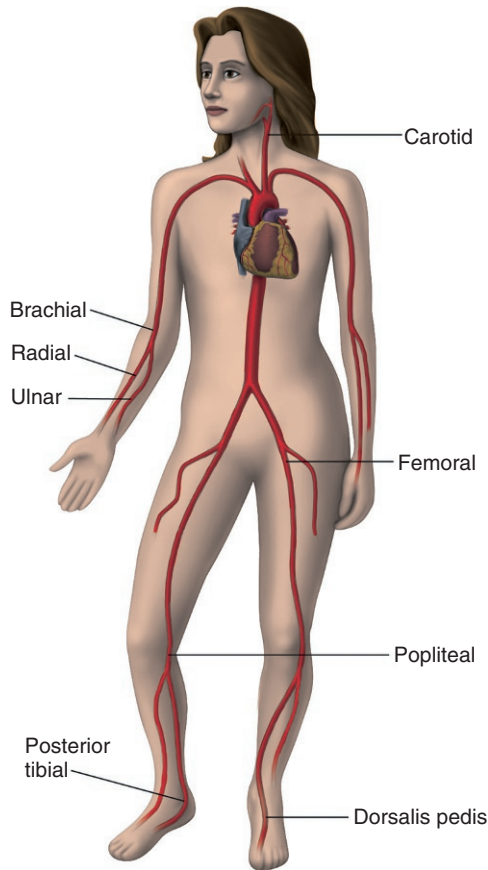


Fig. 1.7 Peripheral pulses. (From Harkreader, H., Hogan, M., & Thobaben, M. (2007). *Fundamentals of nursing* (3rd ed.). Philadelphia: Elsevier.)

(b) Pitting edema: consider right-sided HF, cirrhosis, renal disease, or venous insufficiency (edema may be asymmetric with venous insufficiency); press with fingertips firmly on area of edema for 5 sec.

1+: Mild pitting, slight indentation; rapid return to normal

2+: Moderate pitting (4 mm deep); rebounds in a few seconds

3+: Deep pitting (6 mm deep); takes 30 sec to resolve

4+: Very severe pitting (8 mm deep); takes >30 sec to resolve

V. Examination findings *not to be missed*

A. **Chest pain indicating possible MI, pulmonary embolism (PE), or aneurysm** (see Table 8.5)

B. **Dyspnea on exertion**

C. Jugular veins (see IV., C above)

1. **JVD elevated >2 cm above the clavicle** (would mean a pressure of >7 cm because the clavicle is approximately 5 cm above the right atrium)

2. **Visible jugular veins that do not collapse with inspiration** (Kussmaul sign)

D. **Change in the usual heart rhythm or rate or blood pressure**

E. Abnormal heart sounds

1. *New or worsening murmur* (see Chapter 8, HEART MURMURS, Table 8.12)
2. *S₃ or S₄* (see unnumbered figure with Chapter 8, HEART MURMURS)
3. *Fixed split S₂* (consider atrial septal defect)
4. *Clicks* (consider mitral valve prolapse [MVP])
5. *Opening snap* (consider mitral valve stenosis)
6. *Friction rubs* (consider pericarditis)

F. Palpation

1. *Thrills, heaves (left ventricular [LV] dysfunction: apical; right ventricular [RV] or left atrial [LA] dysfunction: parasternal)*
2. *Displacement of point of maximal impulse (PMI)*
3. *Widened aortic pulsation >2.5 cm* (consider abdominal aortic aneurysm)
4. *Hepatomegaly*
5. *Exaggerated, widened femoral pulse* (consider femoral aneurysm)
6. *Absence of peripheral pulse(s)*

G. **Bruits, especially new ones:** record presence or absence (presence may indicate renal artery stenosis or abdominal aortic aneurysm)H. *Swelling and pain in one leg only*

VI. Referral

A. *Emergency transfer to ED with*

1. *Chest pain of cardiac origin (e.g., suspected MI or new angina)*
2. *Suspected aortic dissection*
3. *Pulmonary embolism*
4. *New or refractory HF*
5. *Acute arterial insufficiency*

B. *To Cardiologist: symptomatic childhood or adult murmurs*

ABDOMINAL

I. Emphasis on HPI (also see Chapter 9, ABDOMINAL PAIN, if indicated) and ROS

- A. Location (see Fig. 9.1 and Table 9.1 for pain sites)
- B. Onset and changes (e.g., worsening, more constant)
- C. Characteristics (e.g., sharp, crampy, dull)
- D. Associated symptoms (e.g., nausea, vomiting, diarrhea)
- E. Presence or absence of appetite and fever; unexpected weight loss or gain
- F. Review of 24-h dietary intake and presence of similar symptoms in the patient's family

II. PMH

- A. Usual elimination patterns
- B. Ulcer or gallbladder disease
- C. Irritable bowel syndrome or inflammatory bowel disease
- D. Abdominal operations (open and laparoscopic)
- E. Women: date of last menstrual period (LMP), type of contraception used
- F. Recent travel or exposure to known sick individuals

III. FH of GI tract disorders

IV. Examination (include respiratory and cardiovascular examinations in case of abdominal complaints)

A. Inspection

1. For contours, scars, striae
2. Have the patient raise their head and shoulders off the table; look for localized abdominal swelling (possible hernia or mass)

3. For engorged veins (consider hepatic cirrhosis or inferior vena cava obstruction)
4. For abdominal distention (consider ascites or abdominal tumor)
- B. Auscultate for bowel sounds
- C. Percussion
 1. Liver and splenic borders
 2. Other areas as necessary
 3. Costovertebral angle tenderness (CVAT): the patient must sit for this test
- D. Palpation
 1. Light for generalized tenderness
 2. Deep
 - (a) For masses, palpable or tender liver or spleen border, for width of aorta
 - (b) For rebound tenderness or guarding
 3. Inguinal nodes
- E. Rectal examination (if indicated)
 1. Check for rectal masses, fecal retention, abnormal prostate
 2. Consider obtaining stool sample for occult blood
- V. Examination findings *not to be missed*
 - A. *“Acute abdomen”* (also see [Chapter 9, ABDOMINAL PAIN](#))
 - B. *Pulsating mass or aorta > 2.5 cm*
 - C. *Hernia*
 - D. *Hepatosplenomegaly (whether tender or not), abdominal distention* (consider ascites or abdominal tumor)
 - E. *Engorged veins* (consider cirrhosis or inferior vena cava obstruction)
 - F. *Abnormal bowel sounds*
 - 1. *High pitched, tinkling* (consider intestinal obstruction)
 - 2. *Decreased or absent* (consider paralytic ileus or peritonitis)
 - G. *New bruits*
 - H. *Palpable inguinal lymph nodes* (consider infection or malignancy, [Table 1.3](#))
 - I. *Pregnancy*
 - J. *Purple striae indicative of Cushing syndrome* (see [Chapter 15](#))
- VI. Referral
 - ▲ A. *Transfer to ED with symptoms suggestive of an acute abdomen or aortic aneurysm*
 - ▲ B. *Patients with an initial diagnosis of hepatic cirrhosis or Cushing disease*
 - ▲ C. *Any abdominal bruit* (may obtain appropriate ultrasound first)
 - ▲ D. *Rectal mass or inguinal lymphadenopathy*

GENITOURINARY (MALE)

- I. Emphasis on HPI and ROS
 - A. Penile pain, discharge, or abnormal lesions
 - B. Pain or swelling of scrotum/testicles
 - C. Difficulty with urination, increased frequency or abnormal stream
 - D. Difficulty with intercourse (e.g., ejaculation, pain, erection)
 - E. Abnormal discoloration or lesions in the “boxer area”
- II. PMH
 - A. Prostatitis, benign prostatic hyperplasia (BPH), sexually transmitted infections (STIs) (which ones and last treated), genital warts
 - B. Urinary stream difficulties and/or nocturia, incontinence
 - C. Sexual dysfunction
 - D. Penile or testicular injuries or infections

- E. Circumcision, phimosis
- F. Gynecomastia
- G. genitourinary (GU)-related surgeries (e.g., for injuries, trauma, prostate) or treatments

III. FH

- A. Genital cancers
- B. Low testosterone
- C. Osteoporosis
- D. Abnormal sexual development

IV. Examination (should include general observation for secondary sexual characteristics)

- A. Penis
 1. Skin around base of penis for nits or lice
 2. Skin lesions, pain or deformity of the penis (e.g., induration in ventral surface could indicate urethral stricture)
 3. Note location of urethra and any redness or discharge
 4. If uncircumcised, retract the foreskin and note any lesions (e.g., syphilitic chancre); be sure to replace foreskin
- B. Scrotum and testicles
 1. Inspect scrotum for contour, note any abnormal swelling; transilluminate if needed. Lift up scrotum and inspect the posterior surface.
 2. Note symmetry of scrotal sac; normally the left testis is slightly longer than the right. If the right is significantly longer than the left, suspect situs inversus or renal cell cancer and obtain renal ultrasound (U/S).
 3. Gently palpate testis, noting size and any lumps, swelling, or tenderness.
 4. If area of swelling is noted in supine position, listen with stethoscope over the area for bowel sounds (this indicates a hernia); in supine position, the mass may resolve.
- C. Hernias
 1. Inspect inguinal and femoral areas for bulges; ask patient to bear down or strain and note any bulges.
 2. Manually check for inguinal hernias: ask patient to bear down to see if a bulge/hernia is felt.

V. Examination findings *not to be missed* and *referral to urologist*

- A. *Phimosis, balanitis, epispadias*
- B. *Peyronie's disease, suspected urethral stricture*
- C. *Undescended testicle or right testis lower than left*
- D. *Painless nodule on testicle*
- E. *Hydrocele, varicocele*
- F. *Large or painful hernias*
- G. *Abnormal lesions, inguinal lymphadenopathy* (see Table 1.3)

VI. *Referral to ED with sudden onset testicular pain* see Chapter 11, Common Disorders in Men, **TESTICULAR TORSION**)

GENITOURINARY (FEMALE)

I. Emphasis on HPI and ROS

- A. Menstrual history (age at menarche, last menstrual period (LMP), age at menopause)
- B. Sexual history
 1. Age at first intercourse, number of sexual partners
 2. STIs (which ones and last treated), genital warts
- C. Obstetric history (number of pregnancies, live births, abortions/miscarriages)
- D. Use of contraception (ask: "What do you do to prevent pregnancy?")

II. PMH

- A. Date of last Pap smear and results; history of abnormal Pap smears
- B. Menopausal symptoms, dyspareunia, vaginal discharge, lesions
- C. Urinary incontinence
- D. Last mammogram (and bone mineral density (BMD), if indicated)
- E. Gallbladder disease
- F. Heart disease
- G. Varicose veins
- H. Nutritional history

III. FH

- A. Breast or reproductive tract cancer
- B. Heart disease, HTN
- C. DM
- D. Osteoporosis
- E. Thyroid problems

IV. Examination

- A. Breast (if patient has concerns, e.g., lump, pain, nipple discharge)
 - 1. Inspect for skin redness, dimpling, or puckering; specifically, inspect while the woman:
 - (a) Places her hands on her hips and shrugs her shoulders backward
 - (b) Presses her palms together over her head
 - 2. Palpate breasts and axillary, supraclavicular, and epitrochlear nodes (with patient supine)
- B. Urethra: check for discharge and erythema
- C. External genitalia
 - 1. Inspect hair pattern and observe for lesions
 - 2. Determine the presence and condition of the hymen
 - 3. Perineal support: spread the labia and have the patient “bear down”; inspect for drainage and rectocele or cystocele
- D. Palpate Bartholin, urethral, and Skene glands for pain, swelling, drainage
- E. Perform vaginal examination
 - 1. Insert a speculum to visualize the cervix and vaginal walls (lubricate speculum if needed with warm water; may use K-Y jelly if not obtaining Pap smear).
 - 2. Inspect vaginal walls for color, discharge, rugae and lesions.
 - 3. Inspect cervix
 - (a) For color, parity, lesions, discharge, friability
 - (b) Note the cervical os for size and position and any lesions
 - 4. Obtain indicated cultures and Pap smear
 - (a) Gonorrhea/Chlamydia (GC/CT) culture can also be done with the Pap smear.
 - (b) GC/CT culture can also be done with a swab or with a urine specimen.
 - (c) Perform a wet prep, if indicated (see the following section, “How to do a wet prep”).
- F. How to do a wet prep
 - 1. Items needed: three cotton-tipped applicators; two capped test tubes, one with 1–2 mL of saline and one with 1–2 mL of potassium hydroxide (KOH) solution; nitrazine paper; two slides with slide covers.
 - 2. Obtain specimens from the lateral wall of the vagina; place one of the applicators in each of the test tubes.
 - 3. Use third applicator to check vaginal pH with nitrazine paper (normal is <5).
 - 4. Perform a “whiff” test by smelling the applicator in the KOH tube; the result is considered positive if there is an “amine” or fishy odor.

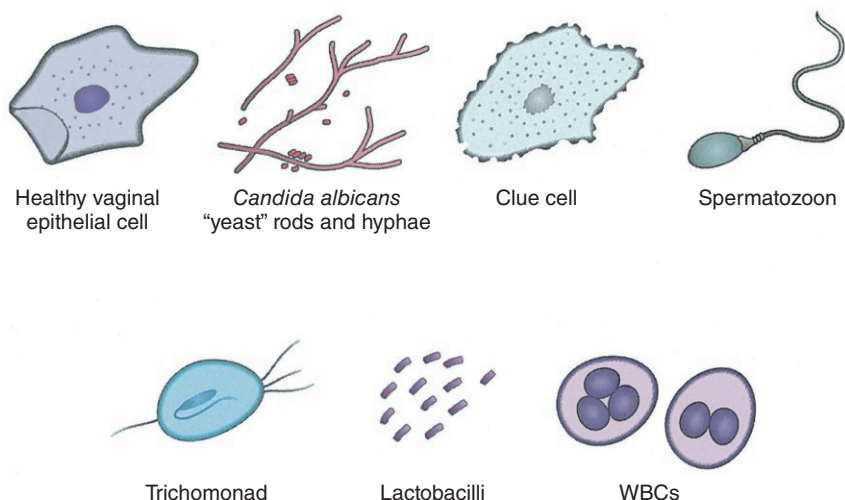


Fig. 1.8 Microscopic findings for wet prep.

5. If pH is normal and whiff is negative, no further testing may be needed for bacterial vaginosis (BV).
6. Microscopic evaluation
 - (a) Prepare the slides: using the applicator, place a few drops from the saline tube on one slide and top with a slide cover; repeat with the KOH tube applicator on the other slide.
 - (b) View under high power to look for (Fig. 1.8):
 - (i) Saline slide: epithelial cells, white blood cells (WBCs), clue cells, lactobacilli, or trichomoniasis
 - (ii) KOH slide: yeast buds and hyphae

G. Bimanual examination (palpation)

1. Cervix for contour, smoothness, cervical motion tenderness
2. Uterus for size, shape, position, and consistency (Fig. 1.9)
3. Adnexa for size, presence of masses, and tenderness; if unable to palpate, document such (it is often difficult to palpate adnexa in larger women)

V. Examination findings **not to be missed**

- A. **Skin lesions, abnormal discharge**
- B. **Cervical motion tenderness** (consider pelvic infection or inflammation)
- C. **Enlarged or tender uterus**
- D. **Adnexal fullness or tenderness**
- E. **Breast mass or nipple discharge**
- F. **Lymphadenopathy in axilla, supraclavicular or epitrochlear areas** (see Table 1.3)

VI. Referral

- A. **To ED: abdominal pain with suspected ectopic pregnancy** (may/may not have spotting)
- B. **To OB/GYN urgently: suspected malignancy** (e.g., uterine, ovarian, vulvar)

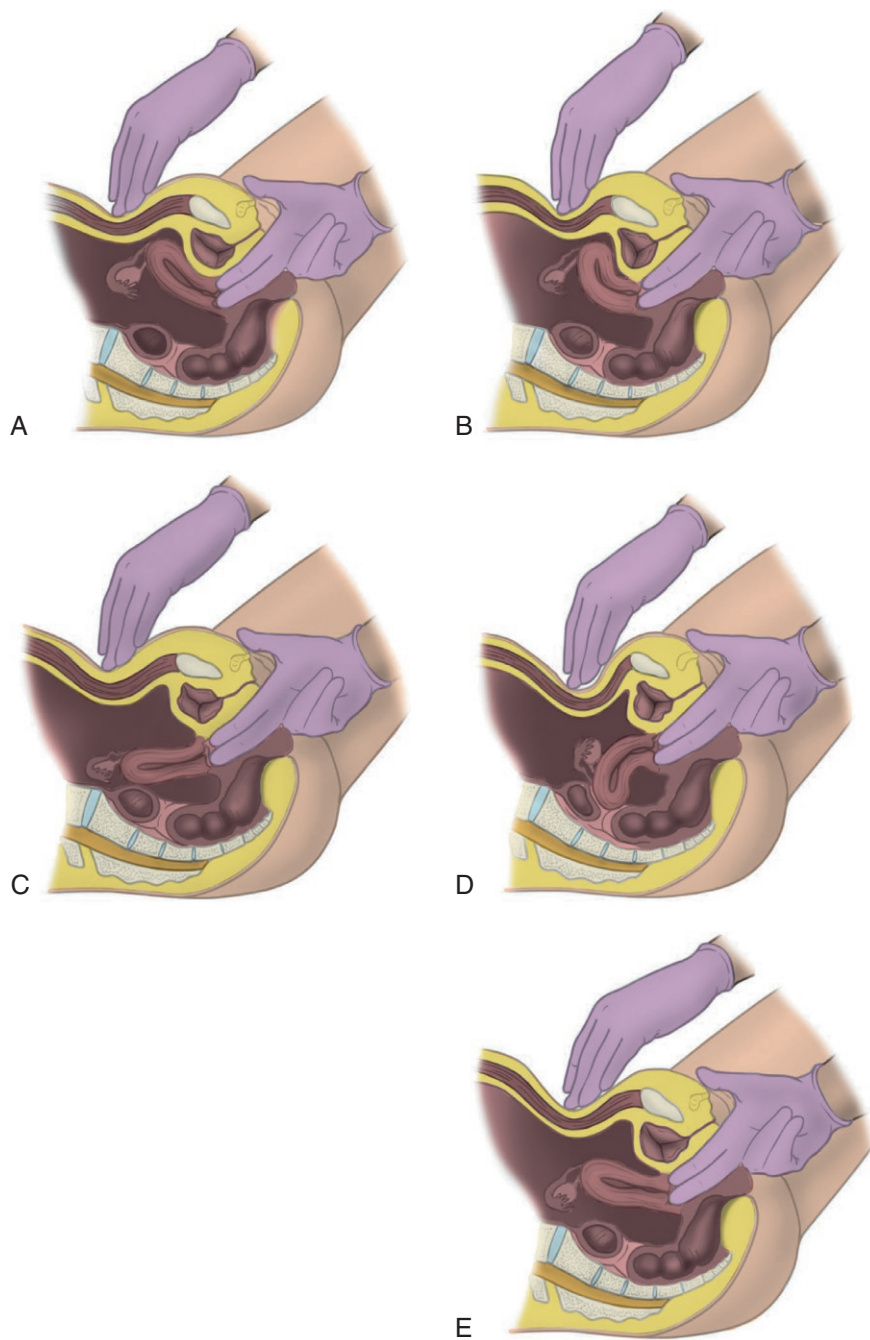


Fig. 1.9 Cervix and uterus positions. (A) Anteverted; (B) anteflexed; (C) retroverted; (D) retroflexed; and (E) midposition. (From Seidel, H. M., Stewart, R. W., Ball, J. W., Dains, J. E., Flynn, J. A., Solomon, B. S., & Stewart, R. W. (2011). *Mosby's guide to physical examination* (7th ed.). Philadelphia: Elsevier.)

MUSCULOSKELETAL

- I. See [Chapter 13](#) for specific joint examinations.
- II. For overall MS examination
 - A. Inspect joints for redness, increased heat, ROM
 - B. Examine the back for abnormal curvatures and document if present
 - C. Observe gait
- III. May be combined with neurological system

NEUROLOGICAL

(MAY BE INTEGRATED WITH THE REST OF THE EXAMINATION)

- I. Focus on HPI and ROS
 - A. Dizziness, vertigo, loss of consciousness
 - B. Vision or hearing changes, tinnitus
 - C. Fever, sinus drainage, allergy symptoms
 - D. Nausea or vomiting
 - E. Headache (also see [Chapter 12, HEADACHES](#))
 - F. Paresthesias or numbness in extremities
 - G. Confusion or mental status changes (also see [Chapter 17, COGNITIVE IMPAIRMENT/DEMENTIA](#))
- II. PMH
 - A. Past CVA or TIA(s)
 - B. HTN
 - C. DM
 - D. Diagnosis of cognitive impairment or dementia
 - E. Migraine or cluster headaches
 - F. Past head injuries or intracranial surgery
- III. FH
 - A. CVA
 - B. HTN
 - C. DM
 - D. Migraine headaches
- IV. Examination
 - A. Cognitive status (for further evaluation, see [Chapter 17, COGNITIVE IMPAIRMENT/DEMENTIA](#))
 - 1. Evaluate for orientation to person, place, and time.
 - 2. Determine judgment and problem-solving abilities: ask, “If you smell smoke in the house, what do you do?”
 - 3. Test abstract thinking: ask the patient to explain a proverb such as “A stitch in time saves nine.”
 - 4. Evaluate affect: behaviors that may signify depression or mood lability (see [Chapter 3, Fig. 3.1](#) for an example).
 - B. Language
 - 1. Test verbal abilities—namely, speech patterns, fluency, and content ([Table 1.4](#)).
 - 2. Test the ability to write and copy.
 - 3. Check gestures and the ability to follow serial and three-step commands; for example, ask the patient, “Hold up your right hand, stick out your tongue, and close your eyes.”

TABLE 1.4 ■ Speech Disturbances: Characteristics and Pattern

Speech Disturbance	Characteristics
Fluent aphasia (Wernicke area)	Lacks content Unable to comprehend spoken words and phrases Unable to repeat or name objects
Nonfluent aphasia (Broca area)	Slow, scanning speech Intact comprehension Impaired writing ability Inability to verbally express thoughts
Global aphasia (both Broca and Wernicke areas)	Nonfluent speech Unable to comprehend, read, or write Unable to name objects

- 4. Check whether the patient has appropriate recognition skills (i.e., the ability to name common objects).
- 5. Check reading ability and comprehension.
- C. Vision
 - 1. See EYE section for description of visual acuity examination.
 - 2. Ophthalmologic examination (Tables 1.1 and 1.2).
- D. Sensory: head and neck
 - 1. Always test right and left separately.
 - 2. Check tactile ability: ask the patient to identify the body part being touched.
 - 3. Test auditory ability: Rinne and Weber tests (see Fig. 1.3) and sound comprehension.
- E. Motor
 - 1. Gait and any assistive devices (e.g., walker, quad cane)
 - 2. Test muscle strength
 - (a) Upper extremities: shoulder abduction, elbow and wrist flexion and extension
 - (b) Lower extremities: hip and knee flexion and extension, ankle dorsiflexion, and plantar flexion
 - 3. Grading scale for motor (muscle) strength:
 - 5 = normal
 - 4 = weak but able to resist the examiner
 - 3 = moves against gravity but cannot resist the examiner
 - 2 = moves but unable to resist gravity (passive range of motion (ROM) only)
 - 1 = has muscle contraction but limited or no joint motion
 - 0 = no movement
- F. Cranial nerve (CN) examination (Table 1.5)
 - 1. Central nervous system (CNS) lesions cause contralateral facial weakness below the eyes (the forehead is spared).
 - 2. Peripheral CN VII lesions may cause complete facial weakness (including the forehead).
- G. Coordination
 - 1. Ability to perform rapid alternating movements—have the patient alternately pronate and supinate the hand against a stable surface (e.g., a table or patient’s own thigh).
 - 2. Finger-to-nose: ask the patient to touch their nose and the examiner’s finger alternately with rapid repetition; observe for accuracy and tremor.

TABLE 1.5 ■ Cranial Nerve Examination

Cranial Nerve	Type and Function	Tests	Abnormal Findings
Olfactory	Sensory: Smell	Do not use ammonia Test each nostril separately with alcohol preparation, mint, and coffee	Obstructive nasal passage Lesions of the frontal lobe, pituitary uncus, or hippocampal gyrus
Optic	Sensory: Central and peripheral vision	Snellen chart Newspaper print Color vision Count fingers in peripheral fields Ophthalmoscopic examination	Amaurosis (loss of vision); refer immediately Cataracts Cortical blindness Papilledema Optic atrophy
Oculomotor	Motor: Pupillary constriction Eyelid elevation	Pupil size, symmetry, shape, and accommodation	Ptosis Nonreactive pupil Anisocoria Optic nerve lesions
Trochlear	Motor: Eye movements	Follow a finger or object in all planes (EOMs)	Nystagmus* Diplopia Dysconjugate gaze
Trigeminal	Sensory and motor: Tongue and facial sensation Corneal reflex	Pinprick to face with eyes closed Have the patient open and close the jaw Corneal reflex (use a drop of saline)	Loss of sensation, paresthesia, or pain Deviation of jaw Lack of blink reflex
Abducens	Motor: Lateral eye movement	(Test with CN III and IV)	
Facial	Sensory and motor: Facial expression Salivary and lacrimal glands Taste	Have the patient wrinkle the forehead, grimace, raise eyebrows, smile, and frown Taste: sweet, sour, and bitter substances to the anterior tongue	Asymmetry of face Deviation of mouth Weakness of forehead Inability to close eyes Loss of taste Excessive tearing
Acoustic [†]	Sensory: Hearing Equilibrium	Rinne and Weber tests Whisper Ticking watch Equilibrium	Unilateral deafness Tinnitus Lateralization Vertigo, dizziness, or ataxia
Glossopharyngeal	Sensory and motor: Taste on the posterior tongue Gag or swallow	Taste: sweet, sour, and bitter substances to the posterior tongue Gag and swallow	Loss of taste Loss of gag or swallow Dysphagia
Vagus	Sensory and motor: Gag or swallow	Inspect the soft palate Uvula in the midline Stimulate the pharyngeal wall Voice quality	Loss of voice or hoarseness Deviation of uvula Coughing and choking
Accessory	Motor: Fluid movement of the head and neck in flexion, extension, and rotation	Palpate trapezius and sternocleidomastoid muscles Have the patient turn the head against resistance Have the patient shrug the shoulders against resistance	Paralysis or weakness Atrophy Spasticity

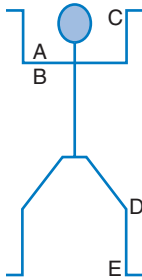
TABLE 1.5 ■ Cranial Nerve Examination—cont'd

Cranial Nerve	Type and Function	Tests	Abnormal Findings
Hypoglossal	Motor: Tongue movement	Have the patient move the tongue side to side Observe for symmetry and rhythmicity	Spastic paralysis Deviation from the midline Dysarthria Spastic speech
* Marked nystagmus on lateral gaze or any nystagmus on vertical gaze suggests a peripheral or CNS lesion.			
† Ask the patient to hum if he or she has decreased hearing: if the hum is louder in the affected ear, this would be a conductive defect; if the hum is louder in the unaffected ear, this indicates a sensorineural defect.			
CN, cranial nerve; EOMs, extraocular muscles.			

3. Heel-to-shin: have the patient place his or her heel on the opposite knee and slide the heel down the shin to the foot; observe for accuracy and tremor.
 4. Romberg test: have the patient stand with the feet together and eyes open for 20–30 sec and then with eyes closed for 20–30 sec (there should be minimal, if any, swaying). Then check pronator drift: while continuing to stand with eyes closed, have the patient raise the arms straight forward with the palms up and hold for 30 sec (both arms should remain in position); then gently press down on each wrist and the arm should return to the previous position.
- H. Gait
1. Ask the patient to walk forward on heels and backward on tiptoes.
 2. Observe tandem gait (ability to walk a straight line, as if on a tightrope).
- I. Sensory: peripheral
1. Compare right and left sides with the patient's eyes covered or closed
 2. Definitions
 - (a) Hyperesthesia: excessively sensitive to touch
 - (b) Paresthesia: sensations without stimulation from the examiner
 3. Evaluate the patient's ability to discern the following:
 - (a) Vibration: use a tuning fork on the distal interphalangeal (DIP) joints of both thumbs and both big toes.
 - (b) Light touch: use a wisp of cotton.
 - (c) Stereognosis: patient recognizes an item placed in the hand (e.g., a quarter).
 - (d) Two-point discrimination: touch the patient in various places at the same time using sharp and dull objects and note any differences; if felt on only one side, CNS sensory deficit is present on the opposite side of the brain.
 - (e) Temperature: blow gently on the patient's skin (medial wrist is best) with lips apart (warm) and lips pursed (cool); may also use very warm and cold water in test tubes.
- J. Reflexes (also see figure on next page)
1. Assess for symmetry.
 2. Check for deep tendon reflexes (DTRs): the joint being tested should be at approximately 90 degrees and fully relaxed.
 3. In patients with altered level of consciousness (LOC) or possible CVA or paralysis, the following reflexes may also be checked:
 - (a) Abdominal: stroke the skin above and below the umbilicus; normally, the umbilicus moves toward the side stimulated.
 - (b) Plantar: stroke the sole of the foot from the heel to the big toe with a blunt object; normally, the toes flex; a positive (abnormal) Babinski sign occurs when the big toe moves up and the toes fan out.
 4. Comparison of central and peripheral nervous system lesions (Table 1.6).

TABLE 1.6 ■ Distinguishing Central and Peripheral Lesions

	Upper Motor Neuron (central nervous system)	Lower Motor Neuron (peripheral)
Deep tendon reflexes	Increased	Decreased
Muscle tone	Increased	Decreased
Atrophy	Not usually	Yes
Fasciculations	No	Yes
Babinski reflex	Present	Absent

	<i>Reflex</i>	<i>Level</i>	<i>Normal Response</i>
	Biceps, A	C5–C6	Elbow flexion
	Triceps, B	C7	Elbow extension
	Brachioradialis, C	C6–C7	Wrist flexion
	Patellar, D	L3–L4	Knee extension
	Achilles, E	S1	Foot extension

Scoring: 0, absent; 1 +, weak; 2 +, normal; 3 +, exaggerated; 4 +, clonus.

- V. Examination findings *not to be missed*
 - A. *Cognitive or mental status changes*
 - B. *Speech disturbances* (Table 1.4)
 - C. *Inability to write* (agraphia)
 - D. *Inability to read, if the patient previously able to read* (alexia)
 - E. *Inability to execute volitional activity* (apraxia)
 - F. *Inability to complete coordination tests*
 - G. Gait abnormalities
 - 1. *Staggering, unsteady, wide-based* (ataxia)
 - 2. *Spasticity or bradykinesia*
 - 3. *Shuffling or Parkinson-like gait*
 - 4. *Foot drop*
- ▲ VI. Referral
 - ▲ A. *To ED via ambulance with suspected CVA or TIA*
 - B. *To Neurologist with gait abnormalities, inability to perform the coordination tests, or new tremor*

SPORTS PHYSICAL EXAMINATION

- I. Goals of the examination include the following:
 - A. To identify problems carrying risks of life-threatening complications during participation (e.g., hypertrophic cardiomyopathy)
 - B. To maximize safe participation in sports

■ = not to be missed; ● = non-urgent referral; ▲ = urgent referral

- C. To identify conditions requiring a treatment plan (e.g., HTN)
 - D. To identify and treat old musculoskeletal injuries
 - E. To identify and treat conditions that can interfere with performance (e.g., exercise-induced bronchospasm)
 - F. To remove unnecessary restrictions on participation
- II.** The emphasis of history and examination is on cardiovascular, respiratory, and musculoskeletal systems. The medical history is the most sensitive and specific part of the examination for detecting possible condition(s) that would restrict or exclude participation.
- A. Each school or organization will have an evaluation form to be completed for sports participation.
 - 1. The history section is completed by the athlete or parent/guardian; the provider reviews this with the athlete and writes comments on any positive answers.
 - 2. The history section includes questions about symptoms/signs suggesting possible serious medical conditions.
 - 3. The physical examination section is completed by the provider (or providers if the examination is completed by more than one person).
 - B. For the history of past injuries, ask about the following:
 - 1. Previous exclusion from sports for any reason
 - 2. Length of time lost from participation
 - 3. Current sequelae of the injury
 - 4. Any loss of consciousness or amnesia after a head injury
 - C. Most children and teens with chronic medical conditions can participate in sports at some level after evaluation and treatment. (see IV. Referral for conditions requiring a treatment plan, later in this section).
 - D. The cardiovascular history questions are aimed at identifying conditions that predispose to sudden death. Sudden cardiac death (SCD) is disproportionately more common in males. Cardiovascular conditions that predispose individuals to SCD are rare and difficult to treat.
- III.** Physical examination is directed by the form used; components listed below are included for evaluation, because if present, further evaluation is required.
- A. Musculoskeletal
 - 1. Pain or restriction of movement with full neck ROM
 - 2. Asymmetric shoulder height
 - 3. Swelling of any extremity
 - 4. Limited shoulder ROM
 - 5. Asymmetry or loss of motion with elbow ROM (especially if the student is involved in throwing sports)
 - 6. Inability to “duck walk”
 - 7. Inability to hop five times on each foot without ankle pain or instability
 - B. Cardiovascular
 - 1. Vital signs (“normal” range depends on the age of the athlete; some states also have guidelines)
 - 2. Ideal body weight (<85th percentile)
 - 3. ECG if an FH of atrial fibrillation, SCD, or arrhythmia is present, or if the athlete has a history of tachycardia that does not resolve with rest
 - C. Concussions
 - 1. The return to play plan for each athlete should be personalized, gradual, and progressive; a provider with experience in evaluating and managing sports-related concussion should make the final decision.

2. Although most athletes will be able to return to play within a month, the full progression may take days, weeks, or even months.
3. Worrisome signs of possible permanent brain injury include the following:
 - (a) Prolonged recovery time
 - (b) Shorter intervals between concussions
 - (c) Progressively less force needed to cause a concussion
4. Providers may check for current guidelines at www.cdc.gov/concussion/clinician.html. Consider SCAT5 form for assessment of concussions.

● **IV. Referral: athletes with the following symptoms or conditions should be evaluated by a specialist before participation in sports activities:**

■ **A. Cardiac**

1. HTN (see [Table 2.3](#))
2. Undiagnosed systolic heart murmur louder than grade 2/6
3. Any bruits
4. Complaints of dyspnea on exertion, fatigue, atypical or angina chest pain, presyncope or syncope (especially during or immediately following exertion), palpitations, lightheadedness; these can be symptoms of hypertrophic cardiomyopathy (formerly called idiopathic hypertrophic subaortic stenosis [IHSS]), coronary artery anomalies, dysrhythmias, or Wolff-Parkinson-White syndrome
5. Personal history or FH of Marfan syndrome
6. FH of death from heart problems or of sudden death before 50 yr of age (including drowning or unexplained car accident)

■ **B. Musculoskeletal**

1. Restriction/limitation of joint ROM or painful ROM of joint; inability to “duck walk”
2. Down syndrome with atlantoaxial instability
3. Cerebral palsy or muscular dystrophy

■ **C. Neurologic**

1. History of head or spinal trauma, craniotomy
2. Severe or repeated concussions, including the following:
 - (a) Persistent symptoms lasting 21 days or longer after injury
 - (b) Repeated concussions that occur with less force and/or are associated with more intense symptoms or more cognitive dysfunction
3. Poorly controlled seizure disorder

■ **D. Miscellaneous**

1. Loss of an eye or the best vision in the good eye is worse than 20/40
2. History of detached retina, previous eye surgery, or serious eye injury
3. Absent kidney or testicle
4. Enlarged liver or spleen
5. Malignancy
6. Organ transplant recipient
7. Sickle cell disease
8. Bleeding disorders
9. Uncontrolled DM
10. Pregnancy
11. Eating disorders (e.g., anorexia nervosa or bulimia)

V. Conditions requiring a treatment plan before or during exercise

- A. Exercise-induced bronchoconstriction
- B. HTN

VI. Return to play after recovery from COVID-19 illness or following a positive test