

Index

Note: Page numbers set **bold** or *italic* indicate headings or figures, respectively.

A

AANP, *see* American Association of Nurse Practitioners (AANP)
AAPA, *see* American Academy of Physician Associates (AAPA)
Abdominal cutaneous reflex **134**
Abducens nerve **18, 20**
ABGs, *see* Arterial blood gases (ABGs)
ACDF, *see* Anterior cervical discectomy and fusion (ACDF)
Acoustic neuromas and neurofibromatosis type 2 **143**
– clinical presentation **143**
– complications **145**
– management options **144**
– multidisciplinary care **144**
– physical examination and diagnostic testing **144, 145**
– postoperative follow-up **146**
– risk factors **143**
Acute disk herniation **138**
Acute spinal cord injury **133**
– decision for surgery **139**
– diagnosis, making **136**
– acute disk herniation **138**
– American Spinal Injury Association (ASIA) impairment scale **137, 137**
– anterior cord syndrome **137**
– Brown–Séguard syndrome **138**
– cauda equina syndrome **138**
– central cord syndrome **137**
– complete lesion **137**
– epidural abscess **138**
– incomplete lesion **137**
– neoplastic disease **138**
– posterior cord syndrome **138**
– spinal cord hematoma **138**
– spinal cord infarction **138**
– spinal cord tracts **137**
– differential diagnosis **138**

– imaging and laboratory testing **136**
– computed tomography myelogram **136**
– computed tomography of the spine **136**
– laboratory **136**
– magnetic resonance imaging **136**
– X-ray **136**
– initial clinical evaluation and assessment **133**
– airway and breathing **133**
– circulation **133**
– postinjury care **139**
– chronic pain **139**
– nutrition **139**
– physical therapy or occupational therapy **139**
– venous thromboembolism prophylaxis **139**
– primary injury **133**
– secondary clinical evaluation and assessment **133**
– bowel regimen **136**
– comprehensive neurological examination **134**
– cranial nerve function **134**
– detailed history **133**
– foley catheter placement **136**
– mental status **134, 134**
– motor evaluation **134, 135**
– orogastric/nasogastric tube placement **136**
– reflex testing **134**
– sensory evaluation **134**
– steroids **136**
– secondary injury **133**
Adamantinomatous craniopharyngiomas **185**
ADH, *see* Antidiuretic hormone (ADH)
Advanced practice provider (APP) **9, 9, 117, 123, 203**
– graduate years **6**
– clinical year **6**
– core rotations **6**
– didactic year **6**
– elective rotations **6**
– end-of-rotation examinations **6**
– throughout the years **7**
– inpatient **10**
– onboarding process **8**
– supporting new APPs **8**

– operative **11**
– outpatient **11**
– undergraduate years **3**
– extracurricular activities **3**
– graduate school, applying to **4**
– health care experience **4**
– interview **5**
– nurse practitioner programs, standardized testing for **4**
– nurse practitioners, undergraduate education for **3**
– physician assistant programs, standardized testing for **4**
– physician assistants, undergraduate education for **3**
– shadowing **4**
AF, *see* Annulus fibrosus (AF)
Airway and breathing **133**
American Academy of Physician Associates (AAPA) **9**
American Association of Nurse Practitioners (AANP) **5**
American Nurses Credentialing Center (ANCC) **5**
American Spinal Injury Association (ASIA) impairment scale **137, 137**
Anaphylactic shock **35**
ANCC, *see* American Nurses Credentialing Center (ANCC)
Aneurysms
– cerebral **75**
– incidence **75**
– location **75**
– presentation **75, 76–77**
– risk factors **75**
– unruptured **75**
– mycotic aneurysms **76**
– orders **76**
– treatment **76**
– watchful waiting **75**
Annulus fibrosus (AF) **93**
Anterior cervical discectomy and fusion (ACDF) **97**
Anterior cord syndrome **137**
Anterior longitudinal ligament **59, 61**
Anticoagulation medication **121, 122**
Antidiuretic hormone (ADH) **33, 160**

Antiplatelet medication **121, 122**
AOD, *see* Atlanto-occipital dislocation (AOD)
Aphasia **26**
Apixaban **121**
APP, *see* Advanced practice provider (APP)
Arachnoiditis **108**
Arterial blood gases (ABGs) **31, 32, 119**
Arteriovenous malformation (AVM) **85, 87, 138, 207, 208**
– clinical presentation **87, 87**
– definition **87**
– diagnosis **87**
– management **88**
– patient education, key points for **208**
ASIA impairment scale, *see* American Spinal Injury Association (ASIA) impairment scale
Aspirin **85, 119**
Astrocytoma **100, 192**
– ependymomas **192**
Atlanto-occipital dislocation (AOD) **124, 125**
ATRT, *see* Atypical teratoid rhabdoid tumor (ATRT)
Atypical teratoid rhabdoid tumor (ATRT) **192**
AVM, *see* Arteriovenous malformation (AVM)
Axillary nerve **172**

B

Babinski sign **26**
Baclofen **168**
Basal skull fractures **122**
Benzodiazepines **36**
Bevacizumab (Avastin) **153**
Blood pressure **34**
Blood, fluid and **31, 32**
Bowel regimen **136**
Brachial plexus **67, 68**
Brain **45**
– brainstem **50, 51–53**
– cerebrum **45, 46, 49**
– frontal lobe **46, 47**
– occipital lobe **48**
– parietal lobe **47**
– temporal lobe **47, 48–49**
– cisterns **53**
– cranial anatomy for advanced practice provider **53**

- metastases 206, 207
 - subcortical structures 48
 - internal capsule 49
 - ventricles of the brain 49, 50
 - ventricles of 49, 50
 - Brainstem 50, 51–53
 - Bromocriptine (Parlodel) 159
 - Brown–Séquard syndrome 138
 - Bulbocavernosus reflex 135
- C**
- C1 fractures 125, 126
 - Cabergoline (Dostinex) 159
 - Calcium gluconate 33
 - Caloric reflex testing 21
 - Carbamazepine 168
 - Cardiogenic shock 35
 - Carotid atherosclerosis, management of 85, 86
 - diagnosis and imaging 86
 - carotid angioplasty and stenting 86
 - carotid endarterectomy 86
 - management 86
 - transcarotid artery revascularization 87
 - Cauda equina syndrome 138
 - CBC, *see* Complete blood count (CBC)
 - CBF, *see* Cerebral blood flow (CBF)
 - Central cord syndrome 137
 - Central diabetes insipidus 155
 - classification and epidemiology 155, 156
 - clinical presentation 155
 - diagnostic testing 158
 - differential diagnoses of sellar masses 160
 - management options 159
 - multidisciplinary care 159
 - potential posttreatment complications and diabetes insipidus 160
 - Central nervous system (CNS) tumors 204
 - primary benign CNS tumors 204
 - clinical points to discuss with patients 205
 - meningiomas 204
 - pituitary tumors and skull base chordomas 205
 - vestibular schwannomas (VS) 205
 - Central neurocytomas 162
 - clinical presentation 162
 - diagnostic testing 162
 - treatment 163
 - Cerebellar testing 26
 - Cerebellopontine angle (CPA) 144
 - Cerebral aneurysms 75
 - incidence 75
 - location 75
 - presentation 75, 76–77
 - risk factors 75
 - Cerebral blood flow (CBF) 31
 - Cerebral salt wasting syndrome (CSWS) 33
 - Cerebral vascular conditions 207
 - arteriovenous malformations (AVMs) 207, 208
 - patient education, key points for 208
 - cavernous malformations 209
 - dural arteriovenous fistulas (DAVFs) 209
 - Gamma Knife radiosurgery (GKR) 209
 - Cerebrospinal fluid (CSF) 49, 95, 186, 194
 - CSF drainage 120
 - CSF leak 183, 188
 - Cerebrum 45, 46, 49
 - frontal lobe 46, 47
 - occipital lobe 48
 - parietal lobe 47
 - temporal lobe 47, 48–49
 - Cervical and cervicomedullary stimulation 112
 - Cervical spine 124
 - atlanto-occipital dislocation (AOD) 124, 125
 - C1 fractures 125, 126
 - degenerative disease of 93
 - anatomy and pathophysiology 93
 - history and physical examination 93
 - radiology and diagnostic testing 95, 96
 - treatments 96
 - Hangman's fracture 125, 127–128
 - injuries 126, 129
 - jumped facets 126, 128, 130
 - occipital condyle fractures 125
 - odontoid (dens) fractures 125, 127
 - CHANCE trial, *see* Clopidogrel in high-risk patients with acute nondisabling cerebrovascular events (CHANCE) trial
 - Charcot–Marie–Tooth disease 176
 - Chordomas 205
 - Cisterns 53
 - Clonazepam 168
 - Clopidogrel in high-risk patients with acute nondisabling cerebrovascular events (CHANCE) trial 85
 - Clostridium difficile infection 37
 - CMP, *see* Complete metabolic panel (CMP)
 - CNS tumors, *see* Central nervous system (CNS) tumors
 - Cobb angle 102
 - Collaborative dynamics 223
 - Compartment syndrome 176
 - Complete blood count (CBC) 119
 - Complete lesion 137
 - Complete metabolic panel (CMP) 119
 - Complex regional pain syndrome (CRPS) 107
 - Computed tomography (CT) 36, 96, 99, 103, 120, 136, 144, 195
 - Contusions 119
 - Core rotations 6
 - CPA, *see* Cerebellopontine angle (CPA)
 - Cranial anatomy, for advanced practice provider 53
 - Cranial nerves 17, 134
 - facial nerve 21, 22
 - glossopharyngeal nerve 22
 - hypoglossal nerve 23
 - oculomotor, trochlear and abducens nerves 18, 20
 - olfactory nerve 17
 - optic nerve 18, 19
 - spinal accessory nerve 23
 - trigeminal nerve 21
 - vagus nerve 23
 - vestibulocochlear nerve 21
 - Craniopharyngiomas, pediatric 185
 - diagnosis 186
 - clinical presentation 186
 - imaging 186
 - postoperative management 188
 - endocrine dysfunction 188
 - hypothalamic obesity 188
 - long-term complications. 188
 - recurrence 189
 - visual disturbance 188
 - treatment 186
 - radiation 187
 - surgery 187
 - Cremasteric reflex 135
 - CRPS, *see* Complex regional pain syndrome (CRPS)
 - CSF, *see* Cerebrospinal fluid (CSF)
 - CSWS, *see* Cerebral salt wasting syndrome (CSWS)
 - CT, *see* Computed tomography (CT)
 - Cushing's disease 155
- D**
- Dabigatran 121
 - DAVFs, *see* Dural arteriovenous fistulas (DAVFs)
 - DBS, *see* Deep brain stimulation (DBS)
 - Death by neurological criteria 37
 - Deep brain stimulation (DBS) 210
 - Deep tendon reflexes (DTRs) 23, 25, 134
 - grading system 25
 - Deep vein thrombosis (DVT) prophylaxis 36
 - Degenerative disease of cervical spine 93
 - anatomy and pathophysiology 93
 - history and physical examination 93
 - radiology and diagnostic testing 95, 96
 - treatments 96
 - Depressed skull fractures 122
 - Dermatomes 25, 70, 71, 72
 - DI, *see* Diabetes insipidus (DI)
 - Diabetes insipidus (DI) 33
 - Diastematomyelia 181
 - Digital subtraction angiography (DSA) 85
 - Distributive shock 35, 35
 - Dorsal root ganglion stimulation 110
 - Douloureux, *see* Trigeminal neuralgia (TN)
 - DSA, *see* Digital subtraction angiography (DSA)
 - DTRs, *see* Deep tendon reflexes (DTRs)
 - Dural arteriovenous fistulas (DAVFs) 209
 - DVT prophylaxis, *see* Deep vein thrombosis (DVT) prophylaxis
- E**
- EDH, *see* Epidural hemorrhage (EDH)
 - EEA, *see* Endoscopic endonasal approach (EEA)

- EEG, *see* Electroencephalogram (EEG)
- Elective rotations **6**
- Electrical stimulation **110**
- cervical and cervicomedullary stimulation **112**
 - dorsal root ganglion stimulation **110**
 - peripheral nerve stimulation **110**
 - spinal cord stimulation (SCS) **111**
 - stimulator complications **111**
 - stimulator implant **111**
 - stimulator trial **111**
- Electroencephalogram (EEG) **36**
- Electrolytes **33**
- hyponatremia **33**
 - hyponatremia **33**
- End-of-rotation examinations **6**
- Endocrine dysfunction **188**
- Endoscopic endonasal approach (EEA) **187**
- Endoscopic third ventriculostomy (ETV) **195, 196**
- failure **197, 198**
- Enoxaparin **121**
- Ependymoma **192**
- and myxopapillary ependymoma **100**
- Epidural abscess **138**
- Epidural hemorrhage (EDH) **117**
- Erb's palsy **174**
- ETV, *see* Endoscopic third ventriculostomy (ETV)
- EVD, *see* External ventricular drain (EVD)
- External ventricular drain (EVD) **29, 30, 120**
- Extradural tumors **99**
- spinal chordomas **99**
 - spine metastases **99**
- F**
- Facial nerve **21, 22**
- Failed back surgery syndrome (FBSS) **105**
- Failed back surgery **108**
- Fast imaging employing steady-state acquisition (FIESTA) **168**
- FBSS, *see* Failed back surgery syndrome (FBSS)
- Femoral nerve **175**
- Femoral triangle **70**
- Fentanyl **36**
- FFP, *see* Fresh frozen plasma (FFP)
- FIESTA, *see* Fast imaging employing steady-state acquisition (FIESTA)
- Filum terminale lipoma **181**
- Fisher scale **78**
- Fluid and blood **31, 32**
- fMRI, *see* Functional MRI (fMRI)
- Foley catheter placement **136**
- Fractionated radiotherapy (FRT) **206**
- Fresh frozen plasma (FFP) **121**
- Frontal lobe **46, 47**
- FRT, *see* Fractionated radiotherapy (FRT)
- Functional MRI (fMRI) **147**
- G**
- GABA receptors, *see* Gamma-aminobutyric acid (GABA) receptors
- Gabapentin **168**
- Gait **25**
- Gamma Knife radiosurgery (GKR) **153, 203, 209–210**
- Gamma Knife, indications for **203, 204**
- central nervous system (CNS) tumors **204**
 - cerebral vascular conditions **207**
 - arteriovenous malformations (AVMs) **207, 208**
 - cavernous malformations **209**
 - dural arteriovenous fistulas (DAVFs) **209**
 - Gamma Knife radiosurgery (GKR) **209**
 - functional disorders **209**
 - tremors **210, 211**
 - trigeminal neuralgia (TN) **209**
 - malignant brain neoplasms **206**
 - brain metastases **206, 207**
 - glioblastomas **206**
 - patient education, valuable information for **207**
 - patient education, importance of **204**
 - primary benign CNS tumors **204**
 - clinical points to discuss with patients **205**
 - meningiomas **204**
 - pituitary tumors and skull base chordomas **205**
- vestibular schwannomas (VS) **205**
- Gamma-aminobutyric acid (GABA) receptors **35–36**
- GBM, *see* Glioblastoma (GBM)
- GCS, *see* Glasgow Coma Scale (GCS)
- Germ cell tumors **192**
- GKR, *see* Gamma Knife radiosurgery (GKR)
- Glasgow Coma Scale (GCS) **17, 17, 28, 119, 134**
- Glioblastoma (GBM) **147, 206**
- clinical presentation **147**
 - diagnostic testing **147, 148**
 - isocitrate dehydrogenase status/classification **147, 149**
 - management options and challenges **148**
 - multidisciplinary care **147**
 - prognosis **149**
 - risk factors **147**
- Glossopharyngeal nerve **22**
- Gonadotroph tumors **158**
- Grading scales **78, 78, 79**
- Graduate Record Examinations (GRE) **4**
- Graduate school, applying to **4**
- Granulomas **109**
- GRE, *see* Graduate Record Examinations (GRE)
- GSWs, *see* Gunshot wounds (GSWs)
- Guillain-Barré syndrome **176**
- Gunshot wounds (GSWs) **117, 122**
- H**
- H2RA, *see* Histamine-2 receptor antagonist (H2RA)
- Hangman's fracture **125, 127–128**
- Health care experience **4**
- Hemineglect **26**
- Hemoglobin **119**
- Hemorrhages, types of **117, 118**
- contusions **119**
 - epidural hemorrhage (EDH) **117**
 - intraparenchymal hemorrhage (IPH) **118**
 - intraventricular hemorrhage (IVH) **118**
 - subarachnoid hemorrhage (SAH) **117**
 - subdural hematoma (SDH) **117**
- Histamine-2 receptor antagonist (H2RA) **37**
- Horner's syndrome **158**
- Hunt and Hess scale **78**
- Hydrocephalus **183, 194**
- Hydrocephalus, pediatric **194**
- diagnosis **194**
 - clinical presentation **194**
 - imaging **194**
 - postoperative management **196**
 - endoscopic third ventriculostomy failure **197, 198**
 - long-term follow-up **198**
 - shunt malfunction **197, 197**
 - treatment **195**
 - endoscopic third ventriculostomy (ETV) **196**
 - postinfectious hydrocephalus **196**
 - shunts **195**
 - tumor-related hydrocephalus **196**
- Hyperkalemia **33**
- Hyponatremia **33**
- Hypertrichosis **181**
- Hypoglossal nerve **23**
- Hypokalemia **33**
- Hypomagnesemia **33**
- Hyponatremia **33**
- Hypothalamic obesity **188**
- Hypovolemic shock **34, 34, 35**
- I**
- IAC, *see* Internal auditory canal (IAC)
- ICP, *see* Intracranial pressure (ICP)
- ICUs, *see* Intensive care units (ICUs)
- Idarucizumab **121**
- Ligaments **59**
- anterior longitudinal ligament **59, 61**
 - interspinous ligament **59**
 - ligamentum flavum **60**
 - posterior longitudinal ligament **59**
 - supraspinous ligament **59**
- Incomplete lesion **137**
- Inferior gluteal nerve **175**
- Inpatient advanced practice provider **10**
- INR, *see* International normalized ration (INR)
- Intensive care units (ICUs) **9**
- Intermittent pneumatic compression (IPC) device **36**
- Internal auditory canal (IAC) **144**

- Internal capsule 49
 International normalized ratio (INR) 119
 Interspinous ligament 59
 Intervertebral disks (IVDs) 93
 Intracerebral hemorrhage score 83, 83
 Intracranial pressure (ICP) 28, 28–29, 30–31
 – monitoring 120
 Intradural extramedullary 100
 – nerve sheath tumors 100
 Intradural intramedullary 99
 Intradural tumors 99
 – ependymoma and myxopapillary ependymoma 100
 -- astrocytoma 100
 – intradural extramedullary 100
 -- nerve sheath tumors 100
 – intradural intramedullary 99
 Intraparenchymal hemorrhage (IPH) 118
 – management 85
 -- acute treatment 85
 Intrathecal pump therapy 108, 109, 109
 – pain syndromes recommended for 107
 -- arachnoiditis 108
 -- complex regional pain syndrome (CRPS) 107
 -- failed back syndrome 108
 -- phantom limb syndrome 108
 -- postherpetic neuralgia 108
 -- trigeminal neuralgia (TN) 108
 Intravenous thrombolytic therapy 83
 Intraventricular hemorrhage (IVH) 118
 IPC device, *see* Intermittent pneumatic compression (IPC) device
 IPH, *see* Intraparenchymal hemorrhage (IPH)
 Ischemic stroke subtypes 83
 Ischemic stroke therapeutic management 83
 – acute treatment 83
 – intravenous thrombolytic therapy 83
 – mechanical thrombectomy 84
 – secondary prevention 85
 – subacute treatment 84
 Isocitrate dehydrogenase status/classification 147, 149
 IVDs, *see* Intervertebral disks (IVDs)
 IVH, *see* Intraventricular hemorrhage (IVH)
- J**
 Jumped facets 126, 128, 130
- K**
 Klumpke's palsy 174
 Kyphosis 103, 103
- L**
 L cervical vertebrae 55, 58
 Lactotroph PitNETs 155
 Lamotrigine 168
 Lanreotide 159
 Lateral femoral cutaneous nerve 176
 Leadership 218
 Ligamentum flavum 60
 LMN, *see* Lower motor neuron (LMN)
 LMWH, *see* Low-molecular-weight heparin (LMWH)
 Long thoracic nerve injury 174
 Lordosis 103, 103
 Low-molecular-weight heparin (LMWH) 36, 121
 Lower extremity, peripheral nerves of 175
 – femoral nerve 175
 – inferior gluteal nerve 175
 – lateral femoral cutaneous nerve 176
 – obturator nerve 176
 – sciatic nerve 175
 – superior gluteal nerve 175
 Lower motor neuron (LMN) 21, 24
 Lumbar puncture and lumbar drain 40
 Lumbar spine injuries 128, 130, 131, 131
 Lumbar vertebrae 59, 60
 Lumbosacral plexus 69
 – plexus injuries 70
- M**
 Magnetic resonance imaging (MRI) 36, 62, 95, 99, 103, 108, 120, 136, 144, 182, 195, 205
 Malignant brain neoplasms 206
 – brain metastases 206, 207
 – glioblastomas 206
 – patient education, valuable information for 207
 Malignant peripheral nerve sheath tumors (MPNSTs) 100
 MCA, *see* Middle cerebral artery (MCA)
 Mechanical thrombectomy 84
 Mechanical ventilation 29
 Median nerve 172, 173
 Medulloblastomas 191
 – astrocytomas 192
 -- ependymomas 192
 – atypical teratoid rhabdoid tumor (ATRT) 192
 – classifications 191
 – diagnosis 191
 – epidemiology 191
 – management and treatment 191
 – pineal tumors 192
 Meningiomas 101, 151
 – clinical presentation 152
 – diagnostic testing 152
 – management options 152
 – multidisciplinary care 153
 – posttreatment surveillance 153, 153
 – risk factors 151
 – subtypes and common locations 151
 Mental status 17
 – examination 17
 – Glasgow Coma Scale (GCS) 17, 17
 Mental status examination (MSE) 17
 – Glasgow Coma Scale (GCS) 17, 17
 Mentorship 217
 – becoming a mentor 217
 – finding mentors 217
 – leadership 218
 Microvascular decompression (MVD) 168
 Middle cerebral artery (MCA) 18
 Mononeuritis multiplex 176
 Motor vehicle accidents (MVA) 117
 MPNSTs, *see* Malignant peripheral nerve sheath tumors (MPNSTs)
 MRI, *see* Magnetic resonance imaging (MRI)
 MRI spectroscopy (MRS) 147
 MRS, *see* MRI spectroscopy (MRS)
 MSE, *see* Mental status examination (MSE)
 Muscle strength 23, 24
 Musculocutaneous nerve 172
 MVA, *see* Motor vehicle accidents (MVA)
 MVD, *see* Microvascular decompression (MVD)
 Mycotic aneurysms 76
 Myelograms 96, 136
 Myotomes 24
- N**
 National Commission for Certification Physician Assistants (NCCPA) 5
 NCCPA, *see* National Commission for Certification Physician Assistants (NCCPA)
 Negative doll's eyes 21
 Neoplastic disease 138
 Nerve sheath tumors 100
 Neuroaugmentative surgery for chronic pain 107
 – electrical stimulation 110
 -- cervical and cervicomedullary stimulation 112
 -- dorsal root ganglion stimulation 110
 -- peripheral nerve stimulation 110
 -- spinal cord stimulation (SCS) 111
 -- stimulator complications 111
 -- stimulator implant 111
 -- stimulator trial 111
 – intrathecal pump therapy 108, 109
 – neurostimulation/intrathecal pump therapy, pain syndromes recommended for 107
 -- arachnoiditis 108
 -- complex regional pain syndrome (CRPS) 107
 -- failed back syndrome 108
 -- phantom limb syndrome 108
 -- postherpetic neuralgia 108
 -- trigeminal neuralgia (TN) 108
 – pain pathway 107
 -- modulation 107
 -- perception 107
 -- transduction 107
 -- transmission 107
 – pump therapy 109
 -- complications of pump therapy 109
 -- indications for pump therapy 109
 -- pump implant and refills 110
 -- pump trial 110

- types of pain 107
 - neuropathic pain 107
 - nociceptive pain 107
 - Neurocritical care 28
 - blood pressure 34
 - death by neurological criteria 37
 - deep vein thrombosis (DVT) prophylaxis 36
 - electrolytes 33
 - hypernatremia 33
 - hyponatremia 33
 - other electrolytes 33
 - external ventricular drain (EVD) 29, 30
 - fluid and blood 31, 32
 - intracranial pressure (ICP) 28, 28–29, 30–31
 - respiratory dynamics 29
 - arterial blood gas analysis 31, 32
 - mechanical ventilation 29
 - sedation 35
 - seizures and status epilepticus 36
 - shock 34
 - cardiogenic 35
 - distributive 35, 35
 - hypovolemic 34, 34, 35
 - obstructive 35
 - stress ulcer prophylaxis 37
 - Neurofibromas 100
 - Neurofibromatosis type 1 (NF1) 100
 - Neurofibromatosis type 2 (NF2) 143
 - clinical presentation 143
 - complications 145
 - management options 144
 - multidisciplinary care 144
 - physical examination and diagnostic testing 144, 145
 - postoperative follow-up 146
 - risk factors 143
 - Neurogenic shock 35
 - Neurological criteria, death by 37
 - Neurological examination
 - aphasia 26
 - cerebellar testing 26
 - cranial nerves 17
 - facial nerve 21, 22
 - glossopharyngeal nerve 22
 - hypoglossal nerve 23
 - oculomotor, trochlear and abducens nerves 18, 20
 - olfactory nerve 17
 - optic nerve 18, 19
 - spinal accessory nerve 23
 - trigeminal nerve 21
 - vagus nerve 23
 - vestibulocochlear nerve 21
 - deep tendon reflexes (DTRs) 23, 25
 - gait 25
 - hemineglect 26
 - mental status examination (MSE) 17
 - Glasgow Coma Scale (GCS) 17, 17
 - muscle strength 23, 24
 - sensation 24, 25
 - superficial reflexes 26
 - Neuropathic pain 107
 - Neurostimulation/intrathecal pump therapy, pain syndromes recommended for 107
 - arachnoiditis 108
 - complex regional pain syndrome (CRPS) 107
 - failed back syndrome 108
 - phantom limb syndrome 108
 - postherpetic neuralgia 108
 - trigeminal neuralgia (TN) 108
 - Neurosurgical APP, becoming 219
 - dedication and excellence 219
 - excellence in practice 220
 - lifelong learning and sacrifice of personal time 220
 - supportive network, building 221
 - NF1, *see* Neurofibromatosis type 1 (NF1)
 - NF2, *see* Neurofibromatosis type 2 (NF2)
 - Nociceptive pain 107
 - Normal saline (NS) 32
 - NP, *see* Nucleus pulposus (NP); Nurse practitioners (NPs)
 - NS, *see* Normal saline (NS)
 - Nucleus pulposus (NP) 93
 - Nurse practitioner programs, standardized testing for 4
 - Nurse practitioners (NPs) 9
 - undergraduate education for 3
- O**
- OA, *see* Osteoarthritis (OA)
 - Obstructive shock 35
 - Obturator nerve 176
 - Occipital condyle fractures 125
 - Occipital lobe 48
 - Occipitofrontal circumference (OFC) 194
 - Octreotide (Sandostatin) 159
 - Oculomotor nerve 18, 20
 - ODG, *see* Oligodendroglioma (ODG)
 - Odontoid (dens) fractures 125, 127
 - OFC, *see* Occipitofrontal circumference (OFC)
 - Olfactory nerve 17
 - Oligodendroglioma (ODG), criteria for 162
 - clinical presentation 162
 - diagnostic testing 162
 - treatment 162
 - Operative advanced practice provider 11
 - OPLL, *see* Ossification of the posterior longitudinal ligament (OPLL)
 - Optic nerve 18, 19
 - Optimal Team Practice (OTP) 9
 - Orogastric/nasogastric tube placement 136
 - Ossification of the posterior longitudinal ligament (OPLL) 96
 - Osteoarthritis (OA) 93
 - Osteophytes 96
 - OTP, *see* Optimal Team Practice (OTP)
 - Outpatient advanced practice provider 11
 - Oversewing a wound 41, 42
 - Oxcarbazepine 168
 - Oxycodone 36
- P**
- PA, *see* Physician associates (PAs); Pituitary apoplexy (PA)
 - PACAT, *see* Physician Assistant College Admission Test (PACAT)
 - Packed red blood cells (pRBCs) 33
 - Pain 107
 - neuropathic 107
 - nociceptive 107
 - Pain syndromes recommended for neurostimulation/intrathecal pump therapy 107
 - arachnoiditis 108
 - complex regional pain syndrome (CRPS) 107
 - failed back syndrome 108
 - phantom limb syndrome 108
 - postherpetic neuralgia 108
 - trigeminal neuralgia (TN) 108
 - PANCE, *see* Physician Assistant National Certifying Examination (PANCE)
 - Papillary pineal tumors 192
 - Parietal lobe 47
 - Parsonage–Turner syndrome 174
 - Partial thromboplastin time (PTT) 119
 - PCA, *see* Posterior cerebral artery (PCA)
 - PCC, *see* Prothrombin complex concentrate (PCC)
 - PCDF, *see* Posterior cervical decompression and fusion (PCDF)
 - PE, *see* Pulmonary embolism (PE)
 - Peak end-expiratory pressure (PEEP) 29
 - Pediatric craniopharyngiomas, *see* Craniopharyngiomas, pediatric
 - Pediatric hydrocephalus, *see* Hydrocephalus, pediatric
 - Pediatric tumors 191
 - astrocytomas 192
 - ependymomas 192
 - atypical teratoid rhabdoid tumor (ATRT) 192
 - medulloblastomas 191
 - classifications 191
 - diagnosis 191
 - epidemiology 191
 - management and treatment 191
 - pineal tumors 192
 - PEEP, *see* Peak end-expiratory pressure (PEEP)
 - Penetrating trauma 122
 - Perimesencephalic subarachnoid hemorrhage 78
 - Peripheral nerve disorders of upper extremity 174
 - Erb's palsy 174
 - Klumpke's palsy 174
 - long thoracic nerve injury 174
 - Parsonage–Turner syndrome 174
 - thoracic outlet syndrome 174
 - Peripheral nerves
 - and plexuses 67
 - brachial plexus 67, 68
 - dermatomes 70, 71, 72
 - femoral triangle 70
 - lumbosacral plexus 69
 - plexus injuries 70
 - of lower extremity 175
 - femoral nerve 175

- inferior gluteal nerve 175
 - lateral femoral cutaneous nerve 176
 - obturator nerve 176
 - sciatic nerve 175
 - superior gluteal nerve 175
 - of upper extremity 172
 - axillary nerve 172
 - median nerve 172, 173
 - musculocutaneous nerve 172
 - radial nerve 172, 173
 - ulnar nerve 172, 174
 - stimulation 110
 - Peripheral neuropathies 176
 - Charcot-Marie-Tooth disease 176
 - compartment syndrome 176
 - Guillain-Barré syndrome 176
 - mononeuritis multiplex 176
 - neuropathy related to underlying medical etiologies 176
 - PET, *see* Positron emission tomography (PET)
 - Phantom limb syndrome 108
 - Phenytoin 168
 - Physician Assistant College Admission Test (PACAT) 4
 - Physician Assistant National Certifying Examination (PANCE) 5
 - Physician assistant programs, standardized testing for 4
 - Physician assistants, undergraduate education for 3
 - Physician associates (PAs) 9
 - Pilocytic astrocytomas 192
 - Pineal tumors 192
 - Pineoblastomas 192
 - Pineocytomas 192
 - PitNETs, *see* Pituitary neuroendocrine tumors (PitNETs)
 - Pituitary apoplexy (PA) 158
 - Pituitary neuroendocrine tumors (PitNETs) 155
 - Pituitary tumors and central diabetes insipidus 155
 - classification and epidemiology 155, 156
 - clinical presentation 155
 - diagnostic testing 158
 - differential diagnoses of sellar masses 160
 - management options 159
 - multidisciplinary care 159
 - potential posttreatment complications and diabetes insipidus 160
 - Plavix 85, 119
 - Plexuses and peripheral nerves 67
 - brachial plexus 67, 68
 - dermatomes 70, 71, 72
 - femoral triangle 70
 - lumbosacral plexus 69
 - plexus injuries 70
 - Positive doll's eyes 21
 - Positron emission tomography (PET) 100
 - Posterior cerebral artery (PCA) 18
 - Posterior cervical decompression and fusion (PCDF) 97
 - Posterior cord syndrome 138
 - Posterior longitudinal ligament 59
 - Postherpetic neuralgia 108
 - Postlaminectomy syndrome 108
 - PPI, *see* Proton pump inhibitor (PPI)
 - pRBCs, *see* Packed red blood cells (pRBCs)
 - Primary benign CNS tumors 204
 - clinical points to discuss with patients 205
 - vestibular schwannomas (VS) 205
 - meningiomas 204
 - pituitary tumors and skull base chordomas 205
 - Prolactinomas 155
 - Propofol 35
 - Prothrombin complex concentrate (PCC) 121
 - Prothrombin time (PT) 119
 - Proton pump inhibitor (PPI) 37
 - PT, *see* Prothrombin time (PT)
 - PTT, *see* Partial thromboplastin time (PTT)
 - Pulmonary embolism (PE) 35
 - Pump therapy 109
 - complications of 109
 - indications for 109
 - intrathecal 108, 109
 - pump implant and refills 110
 - pump trial 110
- ## R
- Radial nerve 172, 173
 - Radiation therapy 159
 - Radicular pain 96
 - Radiofrequency thalamotomy 210
 - Radiographic anatomy 61
 - spinal anatomy on MRI 62, 64
 - spinal anatomy on X-Ray 62, 65
 - Rathke's pouch 185
 - Reflex testing 134
 - abdominal cutaneous reflex 134
 - bulbocavernosus reflex 135
 - cremasteric reflex 135
 - deep tendon reflexes 134
 - Respiratory dynamics 29
 - arterial blood gas analysis 31, 32
 - mechanical ventilation 29
 - Rhizotomies 168
 - Rinne test 22
 - Rivaroxaban 121
- ## S
- SAH, *see* Subarachnoid hemorrhage (SAH)
 - Schwannomas 101
 - Sciatic nerve 70, 175
 - Scoliosis 102, 103
 - SCS, *see* Spinal cord stimulation (SCS)
 - SDH, *see* Subdural hematoma (SDH)
 - Sedation 35
 - Seizure prophylaxis 120
 - Seizure, defined 36
 - Seizures and status epilepticus 36
 - Sensation 24, 25
 - Sensorineural hearing loss (SNHL) 143-144
 - Septic shock 35
 - Serial imaging 120
 - Serum alcohol level 119
 - Shadowing 4
 - Shock 34
 - cardiogenic 35
 - distributive 35, 35
 - hypovolemic 34, 34, 35
 - obstructive 35
 - Short-lasting unilateral neuralgiform headache attacks (SUNA) 168
 - Short-lasting unilateral neuralgiform headache attacks with eye redness and tearing (SUNCT) 168
 - Shunt tap 41
 - SIADH, *see* Syndrome of inappropriate antidiuretic hormone (SIADH)
 - Skull fractures 121
 - basal 122
 - depressed 122
 - SMARCB1 gene 151
 - SNHL, *see* Sensorineural hearing loss (SNHL)
 - Somatostatin analogs 159
 - Spina bifida occulta 181
 - Spinal accessory nerve 23
 - Spinal chordomas 99
 - Spinal cord 55, 56
 - Spinal cord hematoma 138
 - Spinal cord infarction 138
 - Spinal cord stimulation (SCS) 105, 111
 - Spinal cord tracts 137
 - Spinal curvatures 102
 - kyphosis and lordosis 103
 - scoliosis 102, 103
 - Spinal deformities 103
 - spondylolisthesis 105
 - spondylolysis 104
 - spondylolysis 103
 - Spinal trauma and fractures 124
 - cervical spine 124
 - atlanto-occipital dislocation (AOD) 124, 125
 - C1 fractures 125, 126
 - Hangman's fracture 125, 127-128
 - occipital condyle fractures 125
 - odontoid (dens) fractures 125, 127
 - cervical spine injuries 126, 129
 - jumped facets 126, 128, 130
 - examination 124, 124
 - imaging 124
 - thoracic spine 128
 - thoracolumbar and lumbar spine injuries 128, 130, 131, 131
 - nonsurgical treatment options for spinal fractures 132
 - Spine 55
 - computed tomography of 136
 - radiographic anatomy 61
 - spinal anatomy on MRI 62, 64
 - spinal anatomy on X-ray 62, 65
 - vascular anatomy 60
 - arterial anatomy 60, 62
 - venous anatomy 60, 63
 - vertebral column 55, 57
 - common ligaments 59
 - vertebrae constitution 55, 58
 - Spine metastases 99
 - Spine tumors 99
 - extradural tumors 99
 - spinal chordomas 99
 - spine metastases 99

- intradural tumors 99
 - ependymoma and myxopapillary ependymoma 100
 - intradural extramedullary 100
 - intradural intramedullary 99
 - meningiomas 101
 - neurofibromas 100
 - schwannomas 101
 - Split cord malformation 181
 - Spondylolisthesis 105
 - Spondylosis 104
 - Spondylosis 103
 - Spontaneous subarachnoid hemorrhage 78
 - SRS, *see* Stereotactic radiosurgery
 - Staphylococcus aureus 138
 - Stereotactic radiosurgery (SRS) 145, 153, 203
 - Steroids 136
 - Stimulator complications 111
 - Stimulator implant 111
 - Stimulator trial 111
 - Stress ulcer prophylaxis 37
 - Stroke 82
 - definitions 82
 - epidemiology 82
 - initial management 83
 - diagnosis 83, 84
 - ischemic stroke subtypes 83
 - intraparenchymal hemorrhage management 85
 - acute treatment 85
 - ischemic stroke therapeutic management 83
 - acute treatment 83
 - intravenous thrombolytic therapy 83
 - mechanical thrombectomy 84
 - secondary prevention 85
 - subacute treatment 84
 - risk and prognosis 82
 - intracerebral hemorrhage score 83, 83
 - return to function 82, 82
 - transient ischemic attack 82
 - Subarachnoid hemorrhage (SAH) 78, 117, 158
 - grading scales 78, 78, 79
 - initial management 78, 79
 - medical management 79
 - spontaneous 78
 - traumatic 78
 - Subcortical structures 48
 - internal capsule 49
 - ventricles of the brain 49, 50
 - Subdural hematoma (SDH) 117
 - SUNA, *see* Short-lasting unilateral neuralgiform headache attacks (SUNA)
 - SUNCT, *see* Short-lasting unilateral neuralgiform headache attacks with eye redness and tearing (SUNCT)
 - Superficial reflexes 26
 - Superior gluteal nerve 175
 - Supraspinous ligament 59
 - SVR, *see* Systemic vascular resistance (SVR)
 - Syndrome of inappropriately antidiuretic hormone (SIADH) 33
 - Systemic vascular resistance (SVR) 34
- T**
- TBI, *see* Traumatic brain injury (TBI)
 - tcMRgFUS, *see* Transcranial MR-guided focused ultrasound (tcMRgFUS)
 - Team dynamics 223
 - collaborative dynamics 223
 - great teammate, being 223
 - teamwork, understanding 223
 - Temporal lobe 47, 48–49
 - Tethered cord syndrome 181
 - diagnosis 181
 - etiology 181
 - follow-up 183
 - treatment 182
 - Thoracic outlet syndrome 174
 - Thoracic spine 128
 - Thoracic vertebrae 57, 59
 - Thoracolumbar and lumbar spine injuries 128, 130, 131, 131
 - nonsurgical treatment options for spinal fractures 132
 - Thoracolumbar Injury Classification and Severity Score (TLICS) 129
 - Thyrotrophs 158
 - Thyrotropin 158
 - Tic douloureux, *see* Trigeminal neuralgia (TN)
 - TLICS, *see* Thoracolumbar Injury Classification and Severity Score (TLICS)
 - TN, *see* Trigeminal neuralgia (TN)
 - Transcarotid artery revascularization 87
 - Transcranial MR-guided focused ultrasound (tcMRgFUS) 210
 - Transient ischemic attack 82
 - Traumatic brain injury (TBI) 28, 117
 - anticoagulation and antiplatelet medications 121, 122
 - application to advanced practice provider (APP) 123
 - clinical application 119
 - computed tomography 120
 - diagnostic studies 120
 - initial assessment 119
 - intracranial pressure monitoring 120
 - magnetic resonance imaging 120
 - neurologic examination 119
 - seizure prophylaxis 120
 - serial imaging 120
 - surgery 121
 - treatment 120
 - X-Ray 120
 - Glasgow Coma Scale (GCS) 119
 - hemorrhages, types of 117, 118
 - contusions 119
 - epidural hemorrhage (EDH) 117
 - intraparenchymal hemorrhage (IPH) 118
 - intraventricular hemorrhage (IVH) 118
 - subarachnoid hemorrhage (SAH) 117
 - subdural hematoma (SDH) 117
 - penetrating trauma 122
 - severity 119
 - skull fractures 121
 - basal 122
 - depressed 122
 - Traumatic subarachnoid hemorrhage 78
 - Tremors 210, 211
 - Trigeminal nerve 21
 - Trigeminal neuralgia (TN) 108, 167, 209
 - clinical manifestations, diagnosis, and treatment 167
 - clinical pearls for advanced practice provider 168
 - pain questionnaire 169
 - primary survey 169
 - secondary survey 170
 - Trochlear nerve 18, 20

U

 - UA, *see* Urinalysis (UA)
 - UDS, *see* Urine drug screen (UDS)
 - UH, *see* Unfractionated heparin (UH)
 - Ulnar nerve 172, 174
 - UMN, *see* Upper motor neuron (UMN)
 - Undergraduate education
 - for nurse practitioners 3
 - for physician assistants 3
 - Unfractionated heparin (UH) 36, 121
 - Unruptured aneurysms, management of 75
 - mycotic aneurysms 76
 - orders 76
 - treatment 76
 - watchful waiting 75
 - Upper extremity
 - peripheral nerve disorders of 174
 - Erb's palsy 174
 - Klumpke's palsy 174
 - long thoracic nerve injury 174
 - Parsonage–Turner syndrome 174
 - thoracic outlet syndrome 174
 - peripheral nerves of 172
 - axillary nerve 172
 - median nerve 172, 173
 - musculocutaneous nerve 172
 - radial nerve 172, 173
 - ulnar nerve 172, 174
 - Upper motor neuron (UMN) 21, 24
 - Urinalysis (UA) 119
 - Urine drug screen (UDS) 119

V

 - Vagus nerve 23
 - Valproic acid 168
 - Vascular anatomy 60
 - arterial anatomy of spine 60, 62
 - venous anatomy of spine 60, 63
 - Vasospasm management 80
 - Venous thromboembolism (VTE) 139
 - Ventralis intermedius (VIM) 210
 - Ventricles of brain 49, 50
 - Vertebrae constitution 55, 58
 - cervical vertebrae 55, 58
 - lumbar vertebrae 59, 60

- thoracic vertebrae 57, 59
- Vertebral column 57
- common ligaments 59
- anterior longitudinal ligament 59, 61
- interspinous ligament 59
- ligamentum flavum 60
- posterior longitudinal ligament 59
- supraspinous ligament 59

- vertebrae constitution 55, 58
- cervical vertebrae 55, 58
- lumbar vertebrae 59, 60
- thoracic vertebrae 57, 59
- Vestibular schwannomas (VS) 205
- Vestibulocochlear nerve 21
- VIM, *see* Ventralis intermedius (VIM)

Vitamin K 121

VS, *see* Vestibular schwannomas (VS)

VTE, *see* Venous thromboembolism (VTE)

W

Watchful waiting 75

Weber test 21

Word recognition score (WRS) 144

WRS, *see* Word recognition score (WRS)

X

X-linked hydrocephalus 194

X-ray 120, 136