Index

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

3

3D template molds 221

A

AANEM, *see* American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM)
AC-PC line, *see* Anterior commissure–posterior commissure (AC-PC) line
ACDF, *see* Anterior cervical discectomy and fusion (ACDF)
ACoA, *see* Anterior communicating artery (ACoA)
Acute ischemic stroke (AIS) 131
Adductor digiti minimi (ADM) nerve 163
ADM nerve, *see* Adductor digiti minimi (ADM) nerve
Adverse radiation effect (ARE) 310
AIN, *see* Anterior interosseous nerve (AIN)
AIS, *see* Acute ischemic stroke (AIS)
ALIF, *see* Anterior lumbar interbody fusion (ALIF)
ALL, *see* Anterior longitudinal ligament (ALL)
Alpha Omega microelectrode drive system 334–335
American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM) 193
American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) 132
Anchor bolt placement **329**
Anesthesia 12, 46, 52
Aneurysms 7–8
Angio-Seal 133
Anterior cervical discectomy and fusion (ACDF) **245**
– background **245**
– complications **248**
– indications and contraindications **245**
– instruments *245*, **245**
– management pearls **248**
– patient positioning **246**
– patient preparation **245**
– technique **246**
–– arthrodesis and plating **247**
–– operation **246**
–– uncinate process anatomy **247**
–– uncinectomy **247**
–– uncinectomy operation **247**
Anterior commissure–posterior commissure (AC-PC) line 334
Anterior communicating artery (ACoA) 29
Anterior interosseous nerve (AIN) 163, 169–170
Anterior longitudinal ligament (ALL) 282
Anterior lumbar interbody fusion (ALIF) **259**, *264*, *267*
– *See also* Lateral lumbar interbody fusion (LLIF); Transforaminal lumbar interbody fusion (TLIF)
– background **259**
– complications **264**
– indications and contraindications **259**
– instruments **261**
– management pearls **266**
– patient positioning **261**
– technique **262**, *263–267*
Anterior temporal lobectomy (ATL) 339
Anteroposterior fluoroscopy *238*
Antibiotic prophylaxis 16
Antibiotics 12, 143, 323
– preincisional 227
– prophylactic 17, 47, 52, 80, 100, 322
Antiemetics 53
Antiepileptic drug 21
Antiseizure medications 14
Arachnoid membrane 52
ARE, *see* Adverse radiation effect (ARE)
Arrhythmia 49
Arterial blood gas monitoring 53
Arterial injury 5
Arteriovenous malformations (AVMs) 7, 61–62, 303
Arthrodesis and plating **247**
ATL, *see* Anterior temporal lobectomy (ATL)
Atlantoaxial instability **207**
– background **207**
– complications **213**
– indications and contraindications **207**, *208–209*
– instruments **207**
– management pearls *213*, **213**
– patient positioning **208**
– patient preparation **207**
– postoperative care **212**
– technique **208**, *210–212*
Atlantoaxial joint 209
Atlantoaxial stabilization 207
Atlantodental joint 214
Avascular plane 133
AVMs, *see* Arteriovenous malformations (AVMs)
Axillary nerve 157

B

BA aneurysms, *see* Basilar artery (BA) aneurysms
BAERs, *see* Brainstem auditory evoked responses (BAERs)
Basilar apex aneurysms 7
Basilar artery (BA) aneurysms 71
BED, *see* Biologically effective dose (BED)
BF, *see* Brachial fascia (BF)
Bifrontal decompressive craniectomy 80
Bill's bar 58
Biologically effective dose (BED) 315
Biplanar fluoroscopy *253*
Bipolar cautery 89
Blood pressure 143
BMI, *see* Body mass index (BMI)
BMP-2 impregnated collagen sponge, *see* Bone morphogenetic protein 2 (BMP-2) impregnated collagen sponge
Body mass index (BMI) 308
Bone flap 5, 8, 17, 53, 79–80
Bone morphogenetic protein 2 (BMP-2) impregnated collagen sponge 262
Brachial fascia (BF) 161
Brachial plexus 150
– exposure of *151*
Bradycardia 49
Brain injury, direct 5
Brainstem auditory evoked responses (BAERs) 62
Brain–bone interface 80
Burr holes and craniotomy **78**

C

Caldwell–Luc approach 103
Cannulated screw insertion **253**
Cannulated screw, placement of *256*
Carotid artery puncture 131
Carotid artery stenting (CAS) 131
Carotid balloon angioplasty and stenting **142**
Carotid stenosis 137
Carotid ultrasound 139
Carpal tunnel release (CTR) 175
Carpal tunnel syndrome (CTS), *see* Median nerve decompression at wrist for carpal tunnel syndrome
CAS, *see* Carotid artery stenting (CAS)
Caspar pins 247
Catheter-based cerebral angiography, transfemoral approach for, *see* Transfemoral approach for catheter-based cerebral angiography
Cavernous sinus (CS) 33
Cavitron Ultrasonic Surgical Aspirator (CUSA) 14, 69
CBCT, *see* Cone beam computed tomography (CBCT)
CCA, *see* Common carotid artery (CCA)
cEBRT, *see* Conventional external beam radiation (cEBRT)
Cerebellopontine (CP) angle 61
Cerebellopontine angle (CPA) 55
Cerebral angiography 51
Cerebral cavernous malformations 303
Cerebral perfusion pressure (CPP) 77
Cerebral venous system 3
Cerebrospinal fluid (CSF) leak 30, 32, 42, 48–49, 59, 66, 86, 104, 331

from: Agarwal et al, Operative Fundamentals in Neurological Surgery (9781684205615)
© 2026. Thieme. All rights reserved.

Cervical pedicle screws (CPS) 217
Chiari formation *211*
Circle of Willis (CoW) 143
CISS sequences, *see* Constructive interference steady-state (CISS) sequences
Clavicular osteotomy 153
Clawing and Wartenberg's sign *180*
Clinical target volume (CTV) 313, *314*
Clivus 107
CN, *see* Cranial nerve (CN)
Common carotid artery (CCA) 131, 133–134, 137, 141
Common peroneal decompression **191**
– background **191**, *192*
– complications **195**
– indications and contraindications **193**
– management pearls **196**
– patient positioning *194*, **194**
– patient preparation **193**
– technique **194**
Common peroneal nerve (CPN) 191–192, *192*, 195
Computed tomography (CT) 7, 29, 35, 40, 51, 55, 61, 70, 89, 96, 104, 111, 207, 241, *251*, 277, 291, 321, 333
Computed tomography angiography (CTA) 12, 83, 96, 131–132, 134, 139, 202
– *See also* Digital subtraction angiography (DSA)
Computed tomography of the head (CTH) 83
Computed tomography venography (CTV) 12, 14
Condylar drilling 69–71
Cone beam computed tomography (CBCT) 304, 310
Constructive interference steady-state (CISS) sequences 104
Contralateral transmaxillary (CTM) approach 89
Conventional external beam radiation (cEBRT) 313
Convexity craniotomy **3**
– background **3**
– complications **5**
– indications and contraindications *4*, **4**
– management pearls **5**
– patient positioning **5**
– patient preparation **4**
– technique **5**
Cortical mastoidectomy 56, *56*
Corticosteroids, perioperative 21
Costotransversectomy **231**
– background **231**
– complications **232**
– indications and contraindications **231**
– management pearls **232**
– patient positioning **231**
– technique **231**
Cottle elevator 105
CoW, *see* Circle of Willis (CoW)
CP angle, *see* Cerebellopontine (CP) angle
CPA, *see* Cerebellopontine angle (CPA)
CPN, *see* Common peroneal nerve (CPN)
CPP, *see* Cerebral perfusion pressure (CPP)
Cranial nerve (CN) *65*, 70, 145
Craniotome 17, 23
Craniotomy 30, 47, 70
– convexity, *see* Convexity craniotomy
– fronto-orbital, *see* Fronto-orbital craniotomy
– frontotemporal (FT), *see* Frontotemporal (FT) craniotomy
– parasagittal, *see* Parasagittal craniotomy
– temporal, *see* Temporal craniotomy
Craniovertebral instability 207
Craniovertebral junction (CVJ) 111, 114
Crista ethmoidalis 91
CS, *see* Cavernous sinus (CS)
CSF leak, *see* Cerebrospinal fluid (CSF) leak
CT, *see* Computed tomography (CT)
CTA, *see* Computed tomography angiography (CTA)
CTH, *see* Computed tomography of the head (CTH)
CTM approach, *see* Contralateral transmaxillary (CTM) approach
CTR, *see* Carpal tunnel release (CTR)
CTV, *see* Clinical target volume (CTV), Computed tomography venography (CTV)
Curvilinear incision 8, 41
CUSA, *see* Cavitron Ultrasonic Surgical Aspirator (CUSA)
CVJ, *see* Craniovertebral junction (CVJ)

D

dAVFs, *see* Dural arteriovenous fistulas (dAVFs)
DeBakey forceps 141
Decompressive hemicraniectomy (DHC) **77**
– complications **80**
– indications and contraindications **77**
– instruments **77**
– management pearls **80**, *81*
– patient positioning **77**, *78*
– patient preparation **77**
– postoperative care **80**
– technique **78**
–– burr holes and craniotomy **78**, *79*
–– dural closure **79**
–– dural opening **79**
–– galeal and skin closure **80**
–– incision *78*, **78**
–– retractor system **78**
DECRA study 81
Deep brain stimulation (DBS), *see* ROSA-assisted deep brain stimulation surgery in awake patient
Deep-seated lesions 5
Deltopectoral dissection *156*
Dentate ligaments 71
Dentato-rubro-thalamic tract 53
Dexamethasone 12, 16, 52
DHC, *see* Decompressive hemicraniectomy (DHC)
DI, *see* Diabetes insipidus (DI)
Diabetes insipidus (DI) 84
Differential flaps 8
Diffusion tensor imaging (DTI) 15
Digital subtraction angiography (DSA) 12, 46, 132
Direct carotid artery puncture **131**
– background **131**
– complications **134**
– indications and contraindications **131**
– instruments **132**
– management pearls **134**
– patient positioning **132**
– patient preparation **132**
– postoperative care **134**
– technique **132**
Discectomy **281**
Drill guide placement and corridor drilling *255*
Drilling **328**
DSA, *see* Digital subtraction angiography (DSA)
DTI, *see* Diffusion tensor imaging (DTI)
Dual antiplatelet therapy 143
Duchenne's sign 179
Dura mater 98
DuraGen 65
Dural arteriovenous fistulas (dAVFs) 303
Dural closure **79**
Dural opening **79**
Dural sinus injury 80
Dural venous sinuses 3
Durotomy 30
Dynamic plain lateral radiographs 207

E

ECA, *see* External carotid artery (ECA)
Echocardiography 40
EDX, *see* Electrodiagnostic studies (EDX)
EEA, *see* Endoscopic endonasal approach (EEA)
EEG, *see* Electroencephalography (EEG)
Elbow, ulnar nerve compression at, *see* Ulnar nerve compression at elbow
Electrodiagnostic studies (EDX) 170
Electroencephalography (EEG) 21, 104, 321, 342
Electromyography (EMG) 104, 187, 291
EMG, *see* Electromyography (EMG)
Endoscopes 104
Endoscopic endonasal approach (EEA) 108
Endoscopic spine approaches **291**
– background **291**
– complications **293**
– indications and contraindications **291**
– instruments **291**
– management pearls **293**, *294*
– patient positioning **291**
– patient preparation **291**
– postoperative care **293**
– technique **291**, *292–294*
Endotracheal intubation 132
Endotracheal tube (ETT) 143
Enophthalmos 27
ENROUTETM J-wire 141
Epidermoid cysts 61
Epinephrine 98
ERCL, *see* Extensor carpi radialis longus (ERCL)
ESVS, *see* European Society for Vascular Surgery (ESVS)

from: Agarwal et al, Operative Fundamentals in Neurological Surgery (9781684205615)
© 2026. Thieme. All rights reserved.

ETT, *see* Endotracheal tube (ETT)
European Society for Vascular Surgery (ESVS) 137
EVD, *see* External ventricular drain (EVD)
Extensor carpi radialis longus (ERCL) 173
External carotid artery (ECA) 141
External ventricular drain (EVD) 41–42, 47, 52–53, 80

F

Facial nerve (FN) 18, *58*, 62
Far lateral approach **69**
– background **69**
– complications **71**
– indications and contraindications **69**
– informed consent **69**
– instruments **69**
– management pearls *72*, **72**, *73–74*
– patient positioning **70**
– patient preparation **70**
– postoperative care **71**
– technique **70**
Fast Imaging Employing Steady-state Acquisition (FIESTA) 62
FCU muscle, *see* Flexor carpi ulnaris (FCU) muscle
FD, *see* Foot drop (FD)
FDP muscles, *see* Flexor digitorum profundus (FDP) muscles
FIESTA, *see* Fast Imaging Employing Steady-state Acquisition (FIESTA)
Flexor carpi ulnaris (FCU) muscle 161
Flexor digitorum profundus (FDP) muscles 161
FloSeal 80
Flow reversal **142**
Fluoroscopy 227, 252
FN, *see* Facial nerve (FN)
Foley catheter 52
Foot drop (FD) 192
Foramen lacerum 92
Foramen rotundum (FR) 92
FR, *see* Foramen rotundum (FR)
Fractional curve, realignment of 260
Frame-based Gamma Knife radiosurgery 303
Frame-based stereotactic radiosurgery **303**
– background **303**
– complications **305**
– emerging technologies **306**
– indications and contraindications **303**
– informed consent **303**
– instruments **303**
– management pearls **306**
– patient positioning **304**
– patient preparation **304**
– postoperative care **305**
– technique **304**
Frameless gamma knife stereotactic radiosurgery, *see* Gamma knife stereotactic radiosurgery (GKSRS)
Froment's sign *180*
Fronto-orbital craniotomy 22–23, 25
– technical nuances of **21**, *22*
–– background **21**
–– complications **26**
–– indications and contraindications **21**
–– informed consent **21**
–– instruments **21**
–– management pearls **27**
–– patient positioning **21**, *22*
–– patient preparation **21**
–– postoperative care **26**
–– special risks **27**
–– technique **21**, *23–26*
Frontoparietal convexity 79
Frontotemporal (FT) craniotomy **7**
– background **7**
– complications **8**
– indications and contraindications **7**
– management pearls **8**
– patient positioning **7**
– patient preparation **7**
– postoperative care **8**
– technique **8**, *9*
FT craniotomy, *see* Frontotemporal (FT) craniotomy
Furosemide 12

G

GA, *see* General anesthesia (GA)
Galeal and skin closure **80**
Gamma Knife 303–304
Gamma knife stereotactic radiosurgery (GKSRS) **307**
– *See also* Stereotactic radiosurgery (SRS)
– background **307**
– complications **310**
– contraindications **308**
– indications **308**
– instruments **309**
– management pearls **311**
– patient positioning **309**
– patient preparation **309**
– postoperative care **310**
– technique **309**
GAP score, *see* Global alignment and proportion (GAP) score
Gelfoam 80
General anesthesia (GA) 132, 139
GKSRS, *see* Gamma knife stereotactic radiosurgery (GKSRS)
Global alignment and proportion (GAP) score 260
Globus pallidus internus (GPi) 333
Glycopyrrolate 143
Goel's classification of facetal instability *213*
GPi, *see* Globus pallidus internus (GPi)
Gross total resection (GTR) 92
Gross tumor volume (GTV) 313
GTR, *see* Gross total resection (GTR)
GTV, *see* Gross tumor volume (GTV)
Guyon canal 180, *181–182*
– decompression of ulnar nerve through *183*
Guyon's canal decompression **179**
– background **179**
– complications **182**
– indications and contraindications **179**
– instruments **179**
– management pearls **184**
– patient positioning **181**
– patient preparation **179**, *180–181*
– postoperative care **182**
– technique *181*, **181**, *182–183*

H

Head fixation 5
Hematoma, postoperative 42
Hemicraniotomy 81
Heparin 143
Hinge/floating craniotomy 81
Hoehn and Yahr scores 334
Hypothenar muscles, identification of *182*

I

IAC, *see* Internal auditory canal (IAC)
IBL, *see* Internal brachial ligament (IBL)
ICA, *see* Internal carotid artery (ICA)
ICP, *see* Intracranial pressure (ICP)
IELD, *see* Interlaminar endoscopic lumbar discectomy (IELD)
IGRT, *see* Image-guided radiation therapy (IGRT)
IJV, *see* Internal jugular vein (IJV)
Image-guided radiation therapy (IGRT) 313
IMAX artery, *see* Internal maxillary (IMAX) artery
IMRT, *see* Intensity-modulated radiotherapy (IMRT)
Incision **78**
Incision planning *150*, *156*
Inferior anastomotic vein, *see* Vein of Labbe
Inferior medullary velum 53
Infraclavicular brachial plexus **155**
– background **155**
– complications **158**
– indications and contraindications **155**
– instruments **155**
– management pearls **158**, *159*
– patient positioning **155**
– patient preparation **155**
– postoperative care **158**
– technique **155**, *156–158*
Instrumented fixation of subaxial cervical spine, *see* Subaxial cervical spine (SAC), instrumented fixation of
Intensity-modulated radiotherapy (IMRT) 313
Interbody graft placement **281**
Interfascial approach 8
Interlaminar **297**
– background **297**
– complications **299**
– indications and contraindications **297**
– instruments **298**
– management pearls **299**
– patient positioning **298**
– patient preparation **298**
– postoperative care **298**
– technique **298**
Interlaminar endoscopic lumbar discectomy (IELD) 297
Interlaminar endoscopic spine techniques 297
Interlaminar endoscopy 297

from: Agarwal et al, Operative Fundamentals in Neurological Surgery (9781684205615)
© 2026. Thieme. All rights reserved.

Internal auditory canal (IAC) 55, 57, *57–58*
Internal brachial ligament (IBL) 161
Internal carotid artery (ICA) 85, 92, 103
Internal jugular vein (IJV) 140
Internal maxillary (IMAX) artery 91
Internal pulse generator (IPG) 333
Intracranial pressure (ICP) 47
Intraoperative ultrasound 5
Intravenous (IV) contrast 7
Inverted U-shaped flap 105–106
IPG, *see* Internal pulse generator (IPG)
ITF 89, 91
IV contrast, *see* Intravenous (IV) contrast

J

Jackson-Pratt perforated flat drain 80

K

K-wire 254, *255*
Keen's point 47
Kempe T-shaped incision 81, *81*
Kerlix gauze 305
Kerlix wrap 331
Kerrison rongeur 79, 91, 239
Klarity oven 309
Kocher's point 47

L

Labyrinthectomy 56, *57*
Laminar screws (LS) 214, 217, 219–220
Laser interstitial thermal therapy (LITT) 339, 341, *343*, *346*, 347–348
Lateral cavernous sinus 89
Lateral fluoroscopy *238*
Lateral lumbar interbody fusion (LLIF) 273, 277
Lateral masses screws (LMS) 217, 220
Lateral orbital approach (LOA) **33**, 34–35
– background **33**
– complications **36**
– indications and contraindications *33*, **33**, *34*
– informed consent **34**
– instruments **34**
– management pearls **36**
– patient positioning **35**
– patient preparation **35**
– postoperative care **36**
– technique **35**
Lateral semicircular canal (LSC) *56–57*
Lead placement and electrophysiological confirmation **330**
Leksell rongeur 79, 247
Leksell stereotactic frame 333
Levetiracetam 12
LITT, *see* Laser interstitial thermal therapy (LITT)
LLIF, *see* Lateral lumbar interbody fusion (LLIF)
LMS, *see* Lateral masses screws (LMS)
LOA, *see* Lateral orbital approach (LOA)
Long-term video electroencephalographic monitoring (LTVM) 342
LS, *see* Laminar screws (LS)
LSC, *see* Lateral semicircular canal (LSC)
LTVM, *see* Long-term video electroencephalographic monitoring (LTVM)
Lumbar plexus 282

M

MABC nerve, *see* Medial antebrachial cutaneous (MABC) nerve
MAC, *see* Monitored anesthesia care (MAC)
MacCarty keyhole 22, 24, 78, 81
Magerl technique 217, 220
Magnetic encephalography (MEG) 321
Magnetic resonance angiography 132
Magnetic resonance imaging (MRI) 7, 11, 15, 35, 40, 51, 55, 61, 70, 83, 89, 96, 104, 111, 139, 170, 193, 207, 227, 277, 291, 321, 333, 342
Magnetic resonance neurography (MRN) *186*, 187–188, 193
– *See also* Ultrasound (US)
Magnetoencephalogram (MEG) 15
Malignant cerebral edema 80
Mannitol 12, 16, 47, 52
MAP, *see* Mean arterial pressure (MAP)
Martin–Gruber anastomoses 167
Mastoid antrum 56, *56*
Mayfield clamp 16, 85
Mayfield head clamp 39
Mayfield head holder 5, 7, 30, 51, 97
Mayfield three-point fixation 21
Mayfield three-point head holder 21
MCA, *see* Middle cerebral artery (MCA)
MCF, *see* Middle cranial fossa (MCF)
Mean arterial pressure (MAP) 227
Meckel's cave 89
Medial and lateral cord, exposure of *157*
Medial antebrachial cutaneous (MABC) nerve 163, *163–164*, 166–167
Medial intermuscular septum (MIS) 161
Median nerve (MN) decompression
– at proximal forearm **169**
–– background **169**
–– complications **170**
–– indications and contraindications **169**
–– instruments **169**
–– management pearls **171**
–– patient positioning **170**
–– patient preparation **169**
–– postoperative care **170**
–– technique **170**
– at wrist for carpal tunnel syndrome **175**
–– background **175**
–– complications **176**
–– indications and contraindications **175**
–– instruments **175**
–– management pearls **176**
–– patient positioning **176**
–– patient preparation **175**
–– postoperative care **176**
–– technique **176**
MEG, *see* Magnetic encephalography (MEG), Magnetoencephalogram (MEG)
Meningiomas 61
MEPs, *see* Motor evoked potentials (MEPs)
Mesial temporal sclerosis (MTS) 340
Mesial TLE (MTLE) 339, 341, *345*
Mickey Mouse ears 277
Microelectrode recordings 335
Middle cerebral artery (MCA) 3, 8, 77
Middle cranial fossa (MCF) 33
Middle meningeal artery 3, 81
Midline SCIT approach 41
MIS (lumbar, microtubular surgery) **237**
– background **237**
– complications **239**
– indications and contraindications **237**
– management pearls **239**
– patient positioning **237**
– patient preparation **237**
– postoperative care **239**
– technique **237**, *238–239*
mLOA, *see* Modified lateral orbital approach (mLOA)
MN decompression, *see* Median nerve (MN) decompression
Modified lateral orbital approach (mLOA) 33–35
Monitored anesthesia care (MAC) 7, 132, 139
Monopolar cautery 105
Monopolar electrocautery 35
Motor evoked potentials (MEPs) 7, 21, 62, 70, 139
MR venography (MRV) 12, 14
MRI, *see* Magnetic resonance imaging (MRI)
MRN, *see* Magnetic resonance neurography (MRN)
MRV, *see* MR venography (MRV)
MTLE, *see* Mesial TLE (MTLE)
MTS, *see* Mesial temporal sclerosis (MTS)
Myocutaneous flap 8

N

Nasal endoscopy 96
Nasoseptal flap (NSF) 86, 90
NCS, *see* Nerve conduction studies (NCS)
NCV, *see* Nerve conduction velocity (NCV)
Nerve conduction studies (NCS) 187
Nerve conduction velocity (NCV) 291
Neural integrity monitor (NIM) 104
Neuronavigation 35, 39, 45, 51
Neurophysiological monitoring 7
Neuropsychological testing 96
NIM, *see* Neural integrity monitor (NIM)
Nonsteroidal anti-inflammatory drugs (NSAIDs) 289
NSAIDs, *see* Nonsteroidal anti-inflammatory drugs (NSAIDs)

from: Agarwal et al, Operative Fundamentals in Neurological Surgery (9781684205615)
© 2026. Thieme. All rights reserved.

NSF, *see* Nasoseptal flap (NSF)
NSQIP, *see* American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP)

O

OA, *see* Orbital apex (OA)
Oblique lumbar interbody fusion (OLIF) **273**
– *See also* Lateral lumbar interbody fusion (LLIF)
– background **273**
– complications **274**
– contraindications **273**
– indications **273**
– instruments **273**
– management pearls **274**
– patient positioning **273**
– patient preparation **273**
– postoperative care **274**
– technique **274**
Obstructive hydrocephalus 52
Occipital condyle fracture 201
Occipital condyle, drilling of 70
Occipital lesions 5
Occipitoatlantal joint 207
Occipitocervical fusion **201**
– background **201**
– complications **204**
– emerging technologies **205**
– indications and contraindications *201*, **201**, *202*
– informed consent **202**
– instruments **202**
– management pearls **204**
– patient positioning **203**
– patient preparation **202**
– postoperative care **204**
– technique *203*, **203**
Odontoid process 114
Odontoid screw **251**
– background *251*, **251**
– complications **257**
– indications and contraindications **251**
– instruments **252**
– management pearls **257**
– patient positioning **252**
– patient preparation **252**
– postoperative care **256**, *257*
– technique **252**
–– cannulated screw insertion **253**, *255–256*
–– setup and exposure **252**, *253–254*
Odontoidectomy defect *113*
Olfactory testing 96
OLIF, *see* Oblique lumbar interbody fusion (OLIF)
Omnipaque fluoroscopy 113
Omohyoid 150
– division of *151*
Orbital apex (OA) 33
Osbourne's band *166*
Osteotomies, thoracolumbar **233**
– background **233**, *234*
– complications **235**
– indications and contraindications **233**
– management pearls **235**
– patient positioning **233**
– patient preparation **233**
– postoperative care **234**
– technique **234**
Oxymetazoline 98

P

Palatine bones 89
Palatine line 111
Parafalcine tumors 11
Paramedian SCIT approach 41
Paramedian vertical linear incision 47
Parasagittal craniotomy **11**
– background **11**
– complications **14**
– contraindications **11**
– indications *11*, **11**, *12*
– informed consent **11**
– instruments **11**
– management pearls **14**
– patient positioning **13**
– patient preparation **11**, *12–13*
– postoperative care **14**
– technique **13**
Parieto-occipital border 5
Parkinson's disease 333
Parsonage–Turner syndrome (PTS) 169
PB, *see* Pedicle breach (PB)
PCA, *see* Posterior cerebral artery (PCA)
Pectoralis minor 156
– mobilization of *157*
Pedicle breach (PB) 220
Pedicle screws 218
Pedicle subtraction osteotomy (PSO) 233
Percutaneous access technique *134*
Percutaneous sacroiliac joint fusion **285**
– background **285**
– complications **289**
– emerging technologies **289**
– indications and contraindications **286**
– management pearls **289**
– patient positioning **286**
– postoperative care **289**
– technique *286*, **286**, *287–289*
Periorbita 22, 35
Periosteal elevator 56
PET, *see* Positron emission tomography (PET)
Petrous apex 89
PFS, *see* Posterior fossa syndrome (PFS)
Pharyngeal tubercle 108
Pharyngobasilar fascia 108
Phrenic nerve 151
PICA, *see* Posteroinferior cerebellar artery (PICA)
PIN, *see* Posterior interosseous nerve (PIN)
Planned incision and positioning *23*
Planning risk volume (PRV) structures 313
Planning target volume (PTV) 313
Platysma 133
Positron emission tomography (PET) 104, 321
Posterior cerebral artery (PCA) 45–47
Posterior cord, exposure of *158*
Posterior fossa syndrome (PFS) 53
Posterior interosseous nerve (PIN) **173**
– background **173**
– complications **174**
– indications and contraindications **173**
– instruments **173**
– management pearls **174**
– patient positioning **173**
– patient preparation **173**
– postoperative care **174**
– technique **173**
Posterior semicircular canal (PSC) *57*
Posteroinferior cerebellar artery (PICA) 69, *74*
Posterolateral spinal fusion (thoracolumbar) **225**
– background **225**
– complications **226**
– indications and contraindications **225**
– instruments **225**
– management pearls **226**
– patient positioning **225**
– patient preparation **225**
– postoperative care **226**
– technique **225**
PPF, *see* Pterygopalatine fossa (PPF)
Preincisional antibiotics 227
Prolactinomas 83
Pronator and anterior interosseous nerve syndromes, *see* Median nerve (MN) decompression at proximal forearm
Pronator syndrome (PS) 169
Prophylactic antibiotics 17, 47, 52, 80, 100, 322
Protamine 143
PRV structures, *see* Planning risk volume (PRV) structures
PSC, *see* Posterior semicircular canal (PSC)
PSO, *see* Pedicle subtraction osteotomy (PSO)
Pterional craniotomy, *see* Frontotemporal (FT) craniotomy
Pterygoid bone 89
Pterygoid wedge 91
Pterygopalatine fossa (PPF) 89–90
PTS, *see* Parsonage–Turner syndrome (PTS)
PTV, *see* Planning target volume (PTV)

Q

QM, *see* Question mark (QM)
Question mark (QM) 78

R

Radial access **127**
– background **127**
– complications **129**
– disclosures **129**
– indications and contraindications **127**
– management pearls **129**
– patient positioning **127**
– technique **127**
–– catheter navigation and reformation *128*, **128**
–– hemostasis **129**
Radiation myelopathy (RM) 315
Raney scalp clips 78
RESCUE-ASDH randomized controlled trial 82
RescueICP data 82
Retractor system **78**
Retropleural **269**
– background **269**
– complications **271**
– contraindications **269**
– indications **269**
– instruments **269**
– management pearls **271**
– patient positioning **269**
– patient preparation **269**

from: Agarwal et al, Operative Fundamentals in Neurological Surgery (9781684205615)
© 2026. Thieme. All rights reserved.

– postoperative care **271**
– technique **269**
–– closure **271**
–– exposure **269**, *270–271*
Retrosigmoid (RS) approach, *see* Cerebellopontine angle (CPA); Vestibular schwannomas
– background **61**
– complications **66**
– indications and contraindications **61**
– management pearls **66**
– patient positioning *63*, **63**
– patient preparation **62**
– postoperative care **65**
– technique **63**, *64–65*
Retrosigmoid arachnoid dissection *64*
Retrosigmoid positioning and incision *63*
Reverse question mark (RQM) 78
Rhinopharyngeal (RP) flap 113
– elevation *113*
– inset *113*
RM, *see* Radiation myelopathy (RM)
ROADSTER trial 137
ROADSTER-2 trial 138
ROADSTER-3 trial 138
Robotic fundamentals (functional) **321**
– background **321**
– complications **323**
– indications and contraindications **321**
– management pearls **324**
– patient positioning **321**
– patient preparation **321**
– postoperative care **323**
– technique **322**
Robotics 221
Rocuronium 55
ROSA-assisted deep brain stimulation surgery in awake patient **333**
– background **333**
– complications **335**
– emerging technologies **336**
– indications and contraindications **333**
– instruments **333**
– management pearls **336**
– patient positioning **334**
– patient preparation **334**
– postoperative care **335**
– technique **334**
Roy-Camille screws 220
Roy-Camille technique 218
RP flap, *see* Rhinopharyngeal (RP) flap
RQM, *see* Reverse question mark (RQM)
RS approach, *see* Retrosigmoid (RS) approach

S

S2 alar-iliac (S2AI) *264*
SAC, *see* Subaxial cervical spine (SAC)
Sacroiliac joint (SIJ) **241**
– background **241**
– complications **243**
– indications and contraindications **241**
– instruments **241**
– management pearls **243**
– patient positioning **241**, *242*
– postoperative care **242**
– technique **241**
Sagittal CT angiogram *13*
Sagittal suture 5
SAH, *see* Selective amygdalohippocampectomy (SAH)
SAN, *see* Spinal accessory nerve (SAN)
SBRT treatment, *see* Stereotactic body radiotherapy (SBRT) treatment
Schwab classification of spinal osteotomies *234*
SCIT approach, *see* Supracerebellar infratentorial (SCIT) approach
SCM muscle, *see* Sternocleidomastoid (SCM) muscle
Scratch Collapse Test (SCT) 162–163, 181
SCT, *see* Scratch Collapse Test (SCT)
SCTT approach, *see* Supracerebellar transtentorial (SCTT) approach
SEEG, *see* Stereoelectroence phalography (SEEG)
Seizure onset zones (SOZs) 339, 342, 345
Seizure prophylaxis 16
Selective amygdalohippocampectomy (SAH) 339
Shoulder rolls 8
Sigmoid sinus (SS) *57*
SIJ, *see* Sacroiliac joint (SIJ)
Simmons-2 catheter *128*
Skin flap 22
Skin incision and scalp elevation *72*
Skull base 98
SLAH, *see* Stereotactic laser amygdalohippocampectomy (SLAH)
SLJ, *see* Spinolaminar junction (SLJ)
Society for Vascular Surgery (SVS) 137
SOF, *see* Superior orbital fissure (SOF)
Somatosensory evoked potentials (SSEPs) 7, 21, 62, 70, 84, 104
SOZs, *see* Seizure onset zones (SOZs)
SPA, *see* Sphenopalatine artery (SPA)
Sphenoid bone 89, *90*
Sphenoid lingula 92
Sphenopalatine artery (SPA) 89
Spinal accessory nerve (SAN) 152
Spinal osteotomies, Schwab classification of *234*
Spinal stereotactic radiosurgery (SRS) **313**
– background **313**
– complications **315**
– indications and contraindications **313**
– instruments **313**
– management pearls **318**
– normal tissue dose constraints in spine SRS **315**
– technique **313**, *314*, *316–317*
Spinolaminar junction (SLJ) 219
SRS, *see* Spinal stereotactic radiosurgery (SRS), Stereotactic radiosurgery (SRS)
SRS-Schwab osteotomy classification 233
SS, *see* Sigmoid sinus (SS)
SSC, *see* Superior semicircular canal (SSC)
SSEPs, *see* Somatosensory evoked potentials (SSEPs)
SSS, *see* Superior sagittal sinus (SSS)
STA, *see* Superficial temporal artery (STA)
Steinman pin 286
Stereoelectroencephalography (SEEG) 321–322, **325**
– background **325**
– complications **331**
–– intraoperative **331**
–– postoperative **331**
–– special risks **331**
– contraindications **325**
– indications **325**
– informed consent **325**
– instruments **325**
– management pearls **331**
– patient positioning *326*, **326**, *327*
– patient preparation **326**
– postoperative care **331**
– technique **327**
–– anchor bolt placement *329*, **329**, *330*
–– closure **331**
–– drilling *328*, **328**
–– incision *327*, **327**
–– lead placement and electrophysiological confirmation **330**
Stereotactic body radiotherapy (SBRT) treatment 315
Stereotactic laser amygdalohippocampectomy (SLAH) 340, 346
Stereotactic radiosurgery (SRS) 303, 315
Stereotactic thermal ablation for temporal lobe epilepsy **339**
– background 339, **339**, 341
– complications **348**
– emerging technologies **349**
– indications and contraindications **341**, *343*
– informed consent **342**
– instruments **344**
– management pearls **348**
– patient positioning **344**
– patient preparation **344**
– postoperative care **348**
– technique **344**, *345*, 346, *346*, 347
Steri-Strips 195
Sternocleidomastoid (SCM) muscle 133, 139, 246
Steroids 14, 42, 47, 52–53
STN, *see* Subthalamic nucleus (STN)
Strawberry picker's knee 191
Subaxial cervical spine (SAC), instrumented fixation of **217**
– background **217**
– complications **220**
– emerging technologies **221**
– indications and contraindications **217**
– management pearls **220**
– patient positioning **217**
– technique **217**, *218–219*
Subclavian artery *152*
Subfascial technique 8
Suboccipital craniotomy 51–52

from: Agarwal et al, Operative Fundamentals in Neurological Surgery (9781684205615)
© 2026. Thieme. All rights reserved.

Suboccipital muscles 53, 70
Subplatysmal dissection *150*
Subthalamic nucleus (STN) 333
Superficial temporal artery (STA) 8–9, 17–18
Superior orbital fissure (SOF) 33
Superior sagittal sinus (SSS) 11, 13–14, 79–80
Superior semicircular canal (SSC) *57*
Supine positioning *78*
Supracerebellar infratentorial (SCIT) approach **39**
– background **39**
– complications **42**
– indications and contraindications **39**
– instruments **39**
– management pearls **42**
– midline SCIT approach 41
– paramedian SCIT approach 41
– patient positioning **40**
– patient preparation **40**
– postoperative care **42**
– technique **41**
Supracerebellar transtentorial (SCTT) approach **45**
– background **45**
– complications **48**
– indications and contraindications **45**
– instruments **45**
– management pearls **49**
– patient positioning **46**
– patient preparation **46**
– postoperative care **48**
– technique **46**
Supraclavicular brachial plexus exposure **149**
– background **149**
– complications **152**
– indications and contraindications **149**
– instruments **149**
– management pearls **152**, *153*
– patient positioning **149**
– patient preparation **149**
– postoperative care **152**
– reference **153**
– technique **149**, *150–152*
Supraorbital approach **29**
– background **29**
– complications **32**
– indications and contraindications **29**
– informed consent **29**
– instruments **29**
– management pearls **32**
– patient positioning **30**
– patient preparation **29**
– postoperative care **32**
– technique **30**, *31*
Supraorbital craniotomy 29
Suprascapular nerve 151, 158
SVS, *see* Society for Vascular Surgery (SVS)
Sylvian fissure 3, 81
Sympathetic trunk 281

T

Takayasu technique 219
Tarsal tunnel syndrome (TTS) **185**
– background **185**, *186–187*
– complications **189**
– indications and contraindications **187**
– management pearls **189**
– patient positioning **188**
– patient preparation **187**
– technique **188**
TBI, *see* Traumatic brain injury (TBI)
TCAR, *see* Transcarotid artery revascularization (TCAR)
Teeter totter test 179
Tela choroidea 53
TELD, *see* Transforaminal endoscopic lumbar discectomy (TELD)
Telovelar approach **51**
– background **51**
– complications **53**
– indications and contraindications **51**
– instruments **51**
– management pearls **54**
– patient positioning **52**
– patient preparation **51**
– postoperative care **53**
– technique **52**
Temporal craniotomy **15**, *16*
– background **15**
– complications **17**
– indications and contraindications **15**
– instruments **15**
– management pearls **17**
– patient positioning *16*, **16**
– patient preparation **15**
– postoperative care **17**
– technique **16**
Temporal lobe epilepsy (TLE), stereotactic thermal ablation for, *see* Stereotactic thermal ablation for temporal lobe epilepsy
Temporalis fascia 30
Temporalis muscle 5, 81
Temporomandibular joint 9
Ten Test 180
Tendinous leading edge, identification of *183*
Tenecteplase (TNK) 131
TF-CAS, *see* Transfemoral carotid artery stenting (TF-CAS)
TFS, *see* Transfacet screws (TFS)
Thalamotomy 336
Thoracolumbar
– osteotomies, *see* Osteotomies, thoracolumbar
– posterolateral, *see* Posterolateral spinal fusion (thoracolumbar)
– transpedicular, *see* Transpedicular (thoracolumbar) approach
Tibial nerve (TN) 185
Tissue plasminogen activator (tPA) 131
TLIF, *see* Transforaminal lumbar interbody fusion (TLIF)
TNK, *see* Tenecteplase (TNK), Tibial nerve (TN)
Tonsils 53
tPA, *see* Tissue plasminogen activator (tPA)
Tractography 15
Transcarotid artery revascularization (TCAR) **137**, *142*
– *See also* Carotid artery stenting (CAS)
– background **137**
– complications **144**
–– after execution **145**
–– during execution **144**
– indications and contraindications **138**
– patient positioning **143**
– patient preparation **139**
–– carotid balloon angioplasty and stenting **142**
–– closing **142**
–– flow reversal **142**
–– transcarotid exposure **139**, *140*
–– transcarotid sheath, insertion of *141*, **141**, *142*
–– venous access **139**
– postoperative care **143**
–– immediate postoperative period and in-hospital course **143**
–– outpatient follow-up **144**
– technique **143**
–– setting up **143**
Transcarotid exposure **139**
Transcarotid sheath, insertion of **141**
Transclival **103**
– background **103**
– complications **107**
– indications and contraindications **103**
– informed consent **103**
– instruments **104**
– management pearls **107**
– patient positioning *105*, **105**, *106*
– patient preparation **104**
– postoperative care **107**
– technique **105**, *106*
Transcribriform **95**
– background *95*, **95**
–– preparatory diagnostics **95**
– complications **100**
– contraindications **96**
– emerging technologies **101**
– indications **96**
– informed consent **96**
– instruments **97**
– management pearls **100**
– patient positioning **97**
– patient preparation **97**
– postoperative care **100**
– technique **98**, *99*
–– relevant anatomy *100*, **100**, *101*
Transfacet screws (TFS) 217, 219–220
Transfemoral approach for catheter-based cerebral angiography **119**
– background **119**
– complications **122**
– indications and contraindications **119**
– instruments *120*, **120**
– management pearls **124**
– patient positioning **120**
– technique **120**, *121–124*
Transfemoral carotid artery stenting (TF-CAS) 137, 139
Transforaminal endoscopic lumbar discectomy (TELD) 297
Transforaminal lumbar interbody fusion (TLIF) 260, *265*
Translabyrinthine approach 55, **55**
– background **55**
– complications **59**
– indications and contraindications **55**
– instruments **55**
– management pearls **59**
– patient positioning **55**
– patient preparation **55**
– postoperative care **59**
– technique **55**, *56–58*
Transodontoid **111**
– background **111**
– complications **114**

from: Agarwal et al, Operative Fundamentals in Neurological Surgery (9781684205615)
© 2026. Thieme. All rights reserved.

– indications and contraindications **111**
– informed consent **111**
– instruments **111**
– management pearls **114**
– patient positioning **111**
– patient preparation **111**, *112*
– postoperative care **113**
– technique **112**, *113*
Transorbital endoscopic approaches 34
Transpedicular (thoracolumbar) approach **227**
– background **227**
– complications **229**
– indications and contraindications **227**
– management pearls **229**
– patient positioning **227**
– patient preparation **227**
– technique **227**, *228*
Transpsoas (lateral spine) **277**
– background **277**
– complications **281**
– disclosures **283**
– indications and contraindications **277**
– informed consent **277**
– instruments **277**
– management pearls **281**, *282*
– patient positioning **278**, *279*
– patient preparation **277**, *278*
– postoperative care **281**
– technique **278**
–– closure **281**
–– discectomy **281**
–– exposure **278**, *279*
–– interbody graft placement **281**
–– tubular retractor and dilation, docking of **280**
Transpterygoid 89, **89**
– background **89**, *90*
– case example **92**, *93*
– complications **93**
– indications and contraindications **89**
– informed consent **89**
– instruments **89**
– management pearls **94**
– patient positioning **89**
– patient preparation **89**
– postoperative care **93**
– technique **90**, *91*
Transsellar **83**
– background **83**
– complications **87**
–– intraoperative **87**
–– postoperative **87**
–– special risks **87**
– contraindications **83**
– disease profile **83**
– indications **83**
– informed consent **84**
– instruments **84**
– management pearls **87**
–– expert pearls **87**
– patient positioning **84**
– patient preparation **84**
–– anesthesia **84**, *85*
– postoperative care **86**
– preparatory diagnostics **83**
– relevant anatomy *86*, **86**
– technique *85*, **85**
Transvermian approach **51**, 53
– background **51**
– complications **53**
– indications and contraindications **51**
– instruments **51**
– management pearls **54**
– patient positioning **52**
– patient preparation **51**
– postoperative care **53**
– technique **52**
Transverse ligament rupture 201
Traumatic brain injury (TBI) 77
TriCor Sacroiliac Fusion System *289*
TriCor system 287
Trigeminal-cardiac reflex 66
Trochlear nerve 47
TTS, *see* Tarsal tunnel syndrome (TTS)
Tubular retractor and dilation, docking of **280**

U

Ulnar nerve
– decompression of deep motor branch of *183*
– decompression of, through Osbourne's band *166*
Ulnar nerve compression at elbow **161**
– *See also* Guyon's canal decompression
– background **161**
– complications **166**
– indications and contraindications **161**
– instruments **161**
– management pearls **167**
– patient positioning **163**
– patient preparation *162*, **162**
– postoperative care **166**
– technique *163*, **163**, *164–168*
Ulnar nerve sensory innervation *181*
Ulnar neuropathy *162*
Ultrasound (US) 139, 187, 193
– intraoperative 5
Uncinate process anatomy **247**
Uncinectomy operation **247**
Unified Parkinson's Disease Rating Scale (UPDRS) 334
UPDRS, *see* Unified Parkinson's Disease Rating Scale (UPDRS)
US, *see* Ultrasound (US)

V

VA, *see* Vertebral artery (VA)
VC, *see* Vidian canal (VC)
VCF, *see* Vertebral compression fracture (VCF)
VCR, *see* Vertebral column resection (VCR)
Vein of Labbé 3, 18
Vein of Trolard 3
Venous access **139**
Venous sinus thrombosis 48
Venous system 3
Ventral intermediate nucleus (VIM) 333
Ventrolateral brainstem 61
Vermian incision 53
Vertebral artery (VA) 69, 217
Vertebral column resection (VCR) 233
Vertebral compression fracture (VCF) 315
Vertebrobasilar junction 69
Vertical facial nerve 56
Vestibular schwannoma resection 55
Vestibular schwannomas 61
Vidian canal (VC) 91
VIM, *see* Ventral intermediate nucleus (VIM)
VMAT, *see* Volumetric intensity-modulated arc radiotherapy (VMAT)
Volumetric intensity-modulated arc radiotherapy (VMAT) 314

W

Watertight dural closure 36
Wernicke's area 15
Woodson elevator 47
Wrist, median nerve decompression at, for CTS, *see* Median nerve decompression at wrist for carpal tunnel syndrome

Y

Y-shaped dural incision 52

Z

Zoll pad 143, 145

from: Agarwal et al, Operative Fundamentals in Neurological Surgery (9781684205615)
© 2026. Thieme. All rights reserved.