

# Subject Index

## Notes

Page numbers in *italics* denote figures and those in **bold** denote tables  
Please note that the following abbreviations have been used in the index:  
CT—computed tomography  
ERCP—endoscopic retrograde cholangiopancreatography  
MRA—magnetic resonance angiography  
MRCP—magnetic resonance cholangiopancreatography  
MR—magnetic resonance

## A

- abdomen 179–340  
  high-field imaging 648, 648–649  
  tumors, lymph node imaging **409**  
  see also *individual organs*
- abdominal aorta 600–604  
  anatomy 599, 599  
  branches 599  
  MRA indications 600
- abdominal aortic aneurysms 600, 600–604  
  causes 600  
  complications 601  
  forms 600  
  preoperative tests 601  
  rupture risk 600–601  
  size 600–601
- abdominal aortic dissection 601–602, 602  
  causes 601  
  forms 601  
  true vs. false lumina 601
- abdominal aortic occlusion 602, 603
- abdominal aortic stenosis 602
- abdominal lymph nodes 413–414, **414**  
  imaging planes 411  
  pulse sequences **410**
- abdominal vessels 598–611, 631–632  
  anatomy 599  
  coil selection 598  
  contrast agents 598  
  examination technique 598–599  
  MRA indications 631–632  
  patient preparation 598  
  postinterventional follow-ups 603, 603  
  postoperative follow-ups 603  
  sequences 598–599
- Abdoscan (ferristene) 315
- Abernathy syndrome 194, 195
- abscess(es)  
  amebic 210, 210  
  brain 46  
  breast 159, 160  
  Brodie 457  
  cervical 62  
  Crohn disease 326  
  hepatic 209, **209**  
  perianal 358  
  perineal region 402, 403  
  prostatic 387  
  renal 285  
  retropharyngeal 52, 52  
  soft-tissue 458, 458  
  splenic see splenic abscess  
  tubo-ovarian 374–375  
  “absent bow tie” sign, meniscal tears 519  
  accessory hepatic lobes 188  
  accessory navicular bone 536, 536  
  accessory pancreatic duct (Santorini duct) 227  
  accessory renal arteries 605  
  accessory spleens 270, 270  
  acetabular fossa 502  
  acetabular fractures 508  
  acetabulum 502  
    cartilaginous changes 501  
    labrum lesions 508–509
- Achilles tendon  
  anatomy 532  
  chronic tendinopathy 535–536, 536  
  examination technique 530, **531**  
  injuries 535–536  
  normal 535
- Achilles tendon rupture  
  complete 535, 535  
  partial 535–536, 536
- acoustical noise, gradient switching  
  generated 22–23
- acquisition time 14
- acromial spur 475, 475
- acromioclavicular joint 472  
  osteoarthritis 475, 480, 480, 560
- acromion 472  
  morphology 474
- acute ascending bacterial cholangitis 256
- acute lymphoblastic leukemia (ALL) 553, 554
- acute myeloid leukemia (AML) 553, 554
- acute tubular necrosis, allograft rejection vs. 292
- Addison disease (chronic adrenocortical insufficiency) 306
- adenocarcinoma(s)  
  esophageal 132  
  gastric 320  
  lung 150  
  nasal cavity 49  
  pancreatic see pancreatic adenocarcinoma  
  papilla of Vater 235  
  paranasal sinuses 49  
  pulmonary 150  
  salivary glands 60  
  small intestine 324  
  vaginal 363
- adenoid(s) 48
- adenoid cystic carcinoma  
  nasal cavity 49  
  paranasal sinus 49  
  salivary glands 60  
  trachea 147
- adenoma(s)  
  adrenal see adrenal adenoma  
  aldosterone-secreting (Conn syndrome) 302  
  colorectal 335  
  cortisol-producing 302  
  hepatocellular see hepatocellular adenoma  
  mucinous see mucinous adenoma  
  nasal cavity 48  
  pancreatic 230, 231  
  papillary 266  
  paranasal sinuses 48  
  parathyroid gland 63, 130  
  pleomorphic 59  
  renal 285  
  small intestine 322–323  
  small salivary glands 56  
  thyroid 63  
  adenomatous hyperplasia see nodular regenerative hyperplasia (NRH)  
  adenomatous polyps  
    esophagus 319  
    gastric 320  
    small intestine 323  
  adenomyosis 371–372  
    clinical aspects 371  
    diagnosis 372  
    differential diagnosis 372  
    diffuse 372, 372  
    focal 372, 372  
    leiomyomas vs. 372  
    pathogenesis 371  
  adenosine, first-pass stress imaging 115  
  adnexa 374–379  
    benign nonneoplastic changes 374–376  
  adnexal torsion 375, 375  
  adrenal adenoma 301, 307, 307–309  
    differential diagnosis 307–309  
    dynamic imaging 302–303, 303, 307  
    epidemiology 307  
    incidental 307  
    signal characteristics 307  
  adrenal cortex 301  
  adrenal cysts 311  
  adrenal glands 299–312, 339  
    anatomy 300  
    chemical shift imaging 339  
    crus 300  
    examination technique 299  
    coils 299  
    functional diseases 301–306  
    imaging protocol **299**  
    left 300, 300  
    MRI anatomy 300, 300–301, 301  
    MRI indications 299, 339  
    pulse sequences 299  
    right 300, 300  
  adrenal hematoma, chronic 306  
  adrenal hemorrhages 306  
    diagnosis 306  
    etiology 306  
    hyperacute 306, 307  
    subacute 306, 307  
  adrenal hyperplasia 302  
  Cushing syndrome 303  
  adrenal masses 311  
  differential diagnosis 307–309  
  nonfunctioning 307–312  
  quantitative analysis 308–309  
  signal characteristics 307  
  adrenal medulla 301  
  adrenal metastases 306, 309–310, 310  
    clinical aspects 309  
    primary tumors 309  
  adrenal myelolipoma 310–311  
  adrenal neuroblastoma 305, 305  
  adrenal pseudocysts 311  
  adrenal–spleen ratio 309  
  adrenocortical carcinoma 303–304  
    clinical aspects/findings 303  
    epidemiology 303  
    MRI findings 304, 304  
    primary 304, 304  
    primary hyperaldosteronism 302  
  adrenocortical hyperfunction 301–304  
  adrenocortical insufficiency 306  
    chronic (Addison disease) 306  
  adrenocorticotrophic hormone (ACTH), Cushing syndrome 302  
  adrenomedullary hyperfunction 304–305  
  Ahlbäck disease 526  
    devascularized bone areas 526, 527  
    osteonecrosis 526, 527  
  air insufflation, distal bile duct 258  
  aldosterone-secreting adenoma (Conn syndrome) 302, 302  
  aliasing see wrap-around  
  alpha-fetoprotein (AFP)  
    hepatocellular carcinoma 196, 197  
    mesenchymal hamartoma 219  
  ALPSA (anterior labrum periosteal sleeve avulsion) lesion 478–479  
  alveolar hydatid disease 210  
  amebic abscess 210, 210  
  amebic dysentery (amebic enteritis) 210  
  amebic enteritis (amebic dysentery) 210  
  AMI 25 30, **30**  
    side effects 30  
    spleen 269  
  AMI 227 30, **30**  
  amine precursor uptake and decarboxylation (APUD) system 323  
  ampulla of the vas deferens 386  
  ampulla of Vater 265  
  amyloid arthropathy 527  
  amyloidosis  
    restrictive cardiomyopathy and 98, 98  
    splenic involvement 275  
  anaphylactoid reactions, gadolinium chelate-induced 28–29  
  anaplastic carcinoma, thyroid gland 65  
  anastomotic strictures, biliary tree 259, 260  
  anconeus 483  
  anconeus epitrochlearis 489  
  aneurysmal bone cyst 434–435, 435  
    clinical aspects 434  
    diagnosis 435  
    histology 434  
    recurrence rate 434  
    soft tissue edema 435  
  angiofibroma  
    nasal cavity 47, 47

- angiofibroma  
 paranasal sinuses 47, 47  
 vascularity 47
- angiography  
 Budd–Chiari syndrome 216  
 hepatic peliosis 217  
 magnetic resonance *see* magnetic resonance angiography (MRA)
- angiomas, nasal cavity 47
- angiomyolipoma, renal 282–283, 285
- angiosarcoma  
 breast 167  
 cardiac 109, 109  
 hepatic *see* hepatic angiosarcoma  
 pulmonary vessels 596–597  
 splenic 277
- AngioSURF  
 parallel acquisition techniques and 643  
 whole-body MRA 641, 641  
 whole-body MRI 634
- ankle joint  
 anatomy 531  
 capsule 531  
 examination technique 530  
 fractures 540, 540–541  
 imaging protocol **531**  
 injuries, acute 562  
 ligaments *see* ankle ligaments  
 osseous injuries 562  
 sprains 532–533  
 synovial diseases 530  
 tendons 531–532  
 groups 531–532  
 injuries 535–537  
 magic angle effect 532  
 sheaths 532  
 trauma 530, **531**
- ankle ligaments 531  
 examination technique 530  
 injuries 532–533  
 chronic 533  
 diagnosis 532  
 grading 533, 534  
 scarring 533
- ankylosing spondylitis 453–454  
 hip joint 507
- annular ligament 483
- annular pancreas 228, 338
- annular surface coil, scrotal imaging 393
- anomalous circumflex artery (LCX) 117, 117
- anterior cecal artery 334
- anterior cervical region/anterior triangle 60
- anterior cruciate ligament (ACL) 513  
 pulse sequences 512
- anterior cruciate ligament tears 515–516  
 complete  
 direct signs 515, 515  
 indirect signs 515–516  
 signal intensity 515, 515  
 osteoarthritis 454  
 partial 516  
 posterolateral knee corner injuries and 516
- anterior extensor mechanism, knee 514
- anterior fibulotalar ligament 532
- anterior interventricular sulcus 68
- anterior labrum periosteal sleeve avulsion (ALPSA) lesion 478–479
- anterior mediastinum 127  
 cysts **135**  
 tumors **128**, 128–130, 152
- anterior meniscofemoral ligament (of Humphrey) 513
- anterior spinal arteries 572
- anterior subtalar joint (talocalcaneonavicular joint) 531
- anterior syndesmosis 532
- anterior talofibular ligament  
 imaging 532  
 injuries 534
- anterior triangle/anterior cervical region 60
- anticoagulant therapy, pulmonary embolism 593
- antiperistaltic agents, biliary tract imaging 248
- antispasmodics  
 gastrointestinal tract imaging 313, 316  
 lymph node imaging 411  
 rectal MRI 333
- aorta 581–589  
 anatomic variants 581  
 anatomy 581  
 branches 581–589  
*see also individual branches*
- aortic aneurysm  
 abdominal *see* abdominal aortic aneurysms  
 definition 583  
 false (pseudoaneurysm) 583, 584, 600  
 fusiform 583  
 intramural hematoma 583  
 saccular 583  
 thoracic 583–585  
 abdominal aneurysm and 583  
 types 583  
 true 583, 584, 600
- aortic anomalies 91
- aortic arch 581  
 right-sided 581, 581  
 vascular ring 581, 581
- aortic bulbs 69
- aortic dissection 585–587  
 clinical aspects 585  
 complications 586  
 congenital disorders and 585  
 diagnosis 586  
 false vs. true lumina 587  
 pathogenesis 585  
 prognosis 586  
 treatment 586  
 type A 586  
 type B 586, 586
- aortic insufficiency 113–114  
 acute 113  
 chronic 113  
 clinical aspects 113  
 pathogenesis 113  
 quantification 113–114  
 regurgitant jet 113, 114  
 treatment 114
- aortic occlusion, abdominal 602, 603
- aortic sinuses (of Valsalva) 69
- aortic stenosis 87, 111–112  
 abdominal 602  
 clinical aspects 111–112, 112  
 diagnosis 112  
 functional effects 111  
 morphological effects 111
- pathogenesis 111–112  
 subvalvular membranous type 111  
 supravalvular type 111  
 valvular calcifying type 111
- aortic ulcers 602
- aortic valve 69
- aortic valve disease 111
- aortitis 604
- aortobifemoral prosthesis 623
- aortocoronary venous bypass grafts 119, 121
- aortofemoral prosthesis 625–626
- aortopulmonary shunt operation 87
- aplastic anemia 548–549  
 signal intensity 548  
 therapeutic response 549
- appendicular artery 334
- “apple-core” sign 331
- arachnoid cyst 381
- arcuate ligaments 493
- arcuate uterus 370
- arrhythmogenic right ventricular cardiomyopathy (ARVC) 98–100  
 clinical aspects 98  
 diagnosis 98, 99  
 differential diagnosis 98  
 fibrolipomatous degeneration 98  
 MRI findings **100**  
 MRI protocol **100**  
 pathogenesis 98  
 sites of predilection 99, **100**
- arteriovenous fistula 610
- arteriovenous shunts, hepatic hemangiopericytoma 218
- arteritis, thoracic vessels 588–589  
 diagnosis 588  
 treatment 588
- arthritides  
 hip joint 507, 561  
 shoulder joint 480
- articular cartilage, knee joint 523, 524, 562
- artifacts 36–41, 42  
 bladder 342  
 causes 42  
 definition 36  
 hardware-related 41  
 hepatic imaging 181  
 inherent 37–40  
 lymph node imaging 411  
 vascular imaging 564  
*see also individual types*
- arytenoid cartilage 55
- asbestos  
 pleural mesothelioma 141  
 rounded atelectasis 140
- Ascaris lumbricoides* 256
- ascending aorta 69, 581
- ascending bacterial cholangitis, acute 256
- ascites 648
- asplenia 270  
 functional 274
- asymmetric k-space sampling 613–614
- atelectasis, obstructive 149, 150
- atherosclerosis 573–575  
 carotid 573  
 grading 573, 573–574  
 predisposing factors 573
- atrial appendages 68
- atrial myxoma 104, 105, 106
- atrial septal defect (ASD) 84–85  
 clinical aspects 84–85  
 diagnosis 85  
 imaging protocol 86  
 pathogenesis 84–85  
 uncomplicated 85, 85
- atrioventricular septal defects 86
- atrium 68
- atropine 115
- autoimmune disease, adrenocortical insufficiency 306
- autosomal-dominant polycystic kidney disease (ADPKD) 220
- autosplenectomy (“end-stage spleen”) 274
- avascular necrosis 460–462, 560  
 causes 460  
 contrast administration 460, 461, 461, 462  
 examination technique 460–461  
 femoral head *see* femoral head avascular necrosis  
 hand 495, 561  
 hip 561  
 transient osteoporosis of the hip vs. 510  
 humeral head 480, 560  
 pathogenesis 504  
 precipitating factors 504  
 signal characteristics 460–461  
 staging 504
- AV malformations 591–592  
 clinical aspects 592  
 complex 592  
 forms 591–592  
 simple 592  
 treatment 592
- avulsion fractures, ischial tuberosity 509
- axial skeleton, myelofibrosis 548, 549
- axillary lymph nodes 412–413  
 imaging planes 411  
 metastases 419  
 pulse sequences **410**

## B

- backwash ileitis 335
- bacterial endocarditis 111
- bacterial sinusitis, nonspecific 45
- Baker cyst 514
- balloon PTA 625–626
- balloon valvuloplasty 87  
 bandwidth 14
- Bankart lesion 477, 477, 560  
 Buford complex vs. 478
- bare area, liver 185
- barium enema 328
- barium sulfate **314**, 315
- barium suspensions 314
- Barrett carcinoma 320
- Bartholin cyst 363
- basilar artery 572
- Beckwith–Wiedemann syndrome 220
- benign fibrous tumor of the pleura (benign pleural mesothelioma) 140, 140
- benign mixed tumor (pleomorphic adenoma) 59
- benign papillary stenosis (stenosing papillitis) 266, 266
- benign pleural mesothelioma (benign fibrous tumor of the pleura) 140, 140

- benign prostatic hyperplasia (BPH)  
386–387, 387  
prevalence 386
- benign schwannoma *see* neurinoma(s)
- Berndt–Harty classification, osteochondritis dissecans 490, 539
- Bernoulli equation 111
- Bezold mastoiditis 62
- biceps 472
- biceps brachii 483  
aponeurosis 488
- biceps tendon rupture 488–489, 561  
clinical aspects 488  
complete tears 488, 488  
distal 488  
partial tears 488, 489  
pathogenesis 488  
pseudotumor formation 488, 489  
signal intensity 488, 488  
treatment 489
- bicipital groove 472
- bicipital radial bursitis 488
- bicornuate bicollis uterus 369, 370
- bicornuate unicollis uterus 369, 370
- bicornuate uterus 369, 369, 370
- bifid ureter 294, 294
- bilateral tubal occlusion 374
- bile duct(s) 251–252  
hepatic abscess 209
- bile duct carcinoma, primary 262  
differential diagnosis 262  
MRCP 262, 263  
sites of occurrence 262  
staging 262, 262
- bile duct hamartomas (Meyenburg complexes) 188
- bile duct stones *see* choledocholithiasis
- biliary atresia, congenital 254
- biliary cystadenocarcinoma 202
- biliary cystadenoma 202
- biliary cysts, congenital *see* congenital biliary cysts
- biliary–enteric anastomosis 261, 261
- biliary microcystic carcinoma 202
- biliary tract 248–267, 338  
anatomic variants 252  
anatomy 251, 251–252  
children 252, 252  
benign strictures 259–261  
chronic inflammatory disease 259, 259  
postoperative 259–261  
congenital anomalies 253–254  
examination technique 248–250  
patient preparation 248, 248  
high-field imaging 648  
imaging indications 248  
children 248  
inflammatory diseases 254–256  
malignant strictures 262–263  
pancreatic carcinoma in 235, 263  
projection technique 249  
rhabdomyosarcoma 223  
right posterior segmental branch  
aberrant insertion 252
- biomedical implants  
displacement 32–33, 644  
heating 644  
high-field MRI and 644  
RF-associated risks 34–35  
biopsy coils, MR mammography 169
- birdcage coils, hand imaging 492, 492
- birdcage resonator 23, 23
- Bismuth classification, bile duct carcinoma 262, 262
- black-blood imaging 74, 564  
acquired valvular heart diseases 111  
aortic dissection 586, 587  
aortic insufficiency 113  
aortic stenosis 112  
cardiomyopathies 93  
coarctation of the aorta 582, 582  
myocarditis 92  
thoracic aortic aneurysm 583, 584  
thoracic vessels 579, 631  
transposition of the great arteries 88
- bladder 342–350, 405  
anatomy 344  
artifact reduction 342  
contrast agents 342–343  
examination technique 342–344  
coils 343  
patient preparation 342  
imaging parameters 344  
imaging planes 343  
inflammation 345  
intravesical hemorrhage 345, 345  
malformations 344–345  
metastases 348, 348  
MRI, advantages of 342  
pixel size 343  
sequences 343–344  
tumors *see* bladder tumors  
wall appearance 343, 343, 344  
postradiotherapy 349, 350
- bladder carcinoma 342, 343  
extravesical extension 342–343  
follow-up 349, 349–350, 350  
imaging protocol 344  
lymph node metastases 421, 422  
TNM classification 345  
treatment 349
- bladder carcinoma in situ 346
- bladder diverticulum 294, 294
- bladder fistulas, postirradiation 349–350
- bladder leiomyomas 345
- bladder malformations 294
- bladder pheochromocytoma 345
- bladder reconstruction 296, 296
- bladder tumors 295, 296  
benign 345  
local recurrence detection 347  
lymph node imaging 348  
malignant 345–350  
clinical aspects 346  
gender and 346  
incidence 345  
risk factors 346  
TNM classification 345  
recurrence vs. postsurgical changes 347, 349  
seminal vesicle invasion 347  
staging 342, 346–349, 405  
N staging 348, 348–349, 349  
T staging 346, 346–348, 347  
transmural extension 347  
*see also individual tumors*
- Blalock shunt 87
- Blalock–Taussig shunt 87
- Bloch, Felix 2
- blood–pool contrast agents 31, 42  
whole-body MRA 643, 650
- Bluemensatt line 515
- body coils  
bone marrow examination 543  
hepatic imaging 180  
pelvic floor dysfunction 351  
peripheral vessels 612  
prostatic MRI 383  
thoracic vessels 580
- bodySURF *see* AngioSURF
- Boerhaave syndrome 138
- BOLD contrast imaging 645
- Boltzmann distribution 4
- bolus arrival time (BAT) 566
- bolus chase MRA 640, 650
- bolus geometry 615
- bolus transit time (BT), measurement 615–616
- bone  
infectious diseases 456–459, 560  
classification 456  
examination technique 456, 456–457, 457  
susceptibility artifacts 457  
tumor-like lesions 427–436
- bone bruises *see* bone contusions
- bone contusions  
anterior cruciate ligament tears 515, 516  
transient patellar dislocation 520
- bone marrow 543–559  
abnormal 547–557  
contrast agents 544  
conversion *see* marrow conversion  
decreased cellularity 547, 547, 548, 548–549  
examination technique 543–544  
fatty replacement, therapy-related 549  
fibrosis 549  
imaging planes 543  
increased cellularity 547, 550–557  
malignant cell infiltration 551–557  
normal 544–547  
reconversion *see* marrow reconversion  
sequences 543–544  
storage diseases 557–559
- bone marrow edema 547–548  
chondroblastoma 430, 431  
osteochondritis dissecans 526  
osteoid osteoma 427, 427
- bone marrow edema syndrome *see* transient osteoporosis
- bone marrow metastases 551–552, 552  
axial skeleton 551  
bladder tumors 349  
calcification 552, 552  
children 551  
primary tumors 551  
sclerotic reactions 552, 552  
sites of occurrence 551
- bone mineral density (BMD) test 463
- bone scintigraphy  
avascular necrosis 460  
bone trauma 466  
foot fractures 541  
infectious bone diseases 456
- bone trauma 466, 466, 467, 560  
differential diagnosis 466, 467  
examination technique 466
- bone tumors 426–450, 560  
benign 427–436, 560  
differential diagnosis 426
- examination technique 426  
imaging planes 426  
imaging protocol 426, 560  
malignant 436–443, 560  
*see also individual tumors*
- “bovine arch” 571, 572
- brachialis 483
- brachioradialis 483
- brain abscess 46
- brain metastases 28
- branchial arch anomalies 56
- branchial arch cysts 58
- breast 154–173, 178  
examination technique 154–156  
hormonal effects 156  
inflammatory changes 159  
metastases 166–167  
differential diagnosis 166–167  
normal appearance 156, 157  
contrast enhancement 156  
physiologic changes 156  
postoperative changes 170, 172  
early 170, 170  
fat necrosis 170  
late 170, 171  
scar tissue vs. recurrent tumor 170, 171  
therapy-induced changes 169–173  
tumors 160–167  
benign 160–163  
lymph node imaging 409  
malignant 163–167  
whole-body MRI 638  
*see also MR mammography*
- breast abscess 159, 160
- breast adenosis 158
- breast angiosarcoma 167
- breast biopsy 167–169, 178  
“malignant-type” pattern 167–168  
MRI-guided 168–169  
devices 168–169  
freehand localization 168  
preoperative wire localization 168  
small, nonspecific focal enhancing lesions 167–168, 168
- breast carcinoma 163–166, 178  
axillary lymph node metastases 419  
bone marrow metastases 552  
chest wall invasion 144–145  
hepatic metastases 206, 207
- breast coils 154–155, 155
- breast cysts 156, 157, 158–159  
hemorrhagic 159, 159  
simple 157, 159
- breast hamartoma 162
- breast implant(s) 174–178  
defects 174  
double-lumen 174  
foreign-body reactions 174, 177  
integrity assessment 175, 176  
life span 174  
local complications 174  
MRI findings 176–177  
defects 176–177  
MRI techniques 175, 175  
normal 176, 176  
rupture *see* breast implant rupture seromas 177  
silicone “bleeding” 174  
breast implant rupture 174, 176, 177, 178  
detection protocol 175

- breast implant rupture  
extracapsular 174, 176, 177, 177  
implantation time and 176–177  
intracapsular 174, 176, 176, 177  
"linguini sign" 174, 176, 176, 177, 177
- breast liposarcoma 167
- breast lymphoma 167
- breast papilloma 161–162  
clinical aspects 162  
diagnosis 162  
differential diagnosis 162  
pathogenesis 161  
types 161
- breast parenchyma 156, 157
- breast phased array 409
- breast sarcoma 167
- breath-hold sequences  
abdominal vessels 598  
aortic arch 579–580  
aortic dissection 587  
chest wall examination 126  
hepatic imaging 180  
hepatic tumors, children 218  
lymph node imaging 410  
mediastinal examination 126  
pancreatic imaging 224  
peripheral vessels 612  
pleural examination 126  
pulmonary vessels 589–590  
thoracic vessels 579–580  
whole-body MRI 636
- breath-hold techniques, cardiac MRI 73  
coronary MR angiography 116  
hypertrophic cardiomyopathy 95
- breech presentation 380
- bright-blood imaging 77  
aortic stenosis 112  
coarctation of the aorta 91  
congenital cardiac anomalies 84  
dilated cardiomyopathy 94  
hypertrophic obstructive cardiomyopathy 95  
MRA 564  
myocarditis 92  
thoracic vessels 579–580, 631  
transposition of the great arteries 88
- Brodie abscess 457
- bronchial carcinoma 148  
cardiac invasion 136, 138  
chest wall invasion 144  
lymph node staging 148  
MRI as problem-solving tool 152  
recurrence 596  
spinal cord invasion 137  
staging 136, 136, 137, 138, 148, 152  
contrast agents 148  
MRI indications 148, 148  
MRI vs. CT 136, 137, 148, 152  
TNM classification 136
- bronchogenic cyst  
middle mediastinum 131  
pulmonary 146
- Budd–Chiari syndrome 216, 605  
acute 216  
causes 216  
chronic 216  
"contrast reversal" 216  
"flip-flop pattern" 216
- Buford complex 478, 478  
Bankart lesion vs. 478  
*Burkholderia pseudomallei* 416
- Burkitt lymphoma 50
- burns, radiofrequency field-associated 34
- bursae, knee 514
- bursitis, hip joint 509, 509
- Buscopan *see* hyoscine butylbromide
- butylscopolamine 293
- C**
- calcaneodynia (heel pain) 537
- calcaneonavicular coalitions 539, 539
- calcaneus, insufficiency fractures 541
- calcifying tendinitis, rotator cuff 476
- callus formation, hip joint 509
- cancer of unknown primary (CUP phenomenon) 154
- capillary hemangioma cervical  
vessels 573  
small intestine 323  
soft-tissue 444
- capitulumtrochlear groove 482
- capsule endoscopy, small intestine 313
- carcinoid  
colonic 336  
gastric 321  
small intestine *see* small intestine carcinoid  
tracheobronchial system 148
- cardiac angiosarcoma 109, 109
- cardiac chambers  
anatomy 68–70  
left 69  
right 68–69  
*see also individual chambers*
- cardiac coil 72
- cardiac fibroma 108, 108
- cardiac leiomyosarcoma 110, 110
- cardiac lipomas 106, 107
- cardiac lymphoma 110
- cardiac masses 103–110
- cardiac MRI  
coils 72  
contrast-enhanced 80–83  
ECG synchronization 72–73  
examination techniques 71–83, 77  
functional evaluation, heart 77–80  
global myocardial function assessment 75–76, 78–80, 79  
high-field 647, 647  
imaging planes, standard 74, 75–76, 77  
indications 151  
metabolic imaging 77, 83  
morphologic evaluation, heart 74–77  
myocardial metabolism 83  
patient positioning 72  
planning 74  
principles 68–83  
prone positioning 72  
quality assurance guidelines 71  
regional wall motion 80  
abnormalities 120  
multisegment models 80, 81  
respiratory synchronization 73–74  
supine positioning 72  
technical standards 71–72  
tissue status 83  
volumetry 78–80
- cardiac thrombi 106, 106
- cardiac tumors  
benign 103, 104–108  
diagnosis 103  
imaging protocol 103  
malignant 103, 109–110  
primary 103  
secondary 103
- cardiac valves 68  
acquired diseases 110–114  
clinical aspects 111  
examination techniques 111  
pathogenesis 111  
tumors 108
- cardiomyopathies 92–100  
clinical aspects 92  
diagnosis 92–93  
MRI indications 93  
pathogenesis 92  
subtypes 92
- Caroli syndrome 253, 253
- carotid arteries 585  
elongation 575  
carotid artery stenosis 574, 574  
carotid body tumors 63, 64  
carotid stenting 574  
carotid system 571  
anatomic variants 572, 572
- carotid thromboendarterectomy (TEA) 574
- carpal bone fractures 498
- carpal instability  
dorsal intercalated segment instability (DISI) type 499  
volar intercalated segment instability (VISI) type 500
- carpal tunnel 493
- carpal tunnel syndrome 496, 561
- Carr–Purcell–Meiboom–Gill (CPMG) sequence 15, 15
- cartilaginous exostosis *see* osteochondroma
- catheter angiography, abdominal aortic aneurysm 601
- cavernous hemangioma  
cervical vessels 573  
hepatic 189–190, 190  
differential diagnosis 189  
"iris diaphragm" pattern 189, 190  
"light-bulb" sign 189, 190  
"pooling" 189  
small intestine 323  
soft-tissue 444
- cavernous sinus thrombosis 46
- cavernous transformation, portal vein 608
- cavitation 149
- celiac lymph nodes 413
- celiac trunk 226
- cellulitis 458  
cervical 52, 62
- central hepatic vein occlusion, Budd–Chiari syndrome 216, 216
- cervical abscess 62
- cervical carcinoma 365–367, 405  
bladder invasion 366, 367  
epidemiology 365  
incidence 365  
lymph node involvement 367, 368  
metastasis 365  
mixed-cell tumors 365, 366  
parametrial invasion 365–366, 367  
pathogenesis 365  
pelvic lymph node metastases 419
- prognosis 367  
pulse sequences 360–361  
rectal wall invasion 366  
recurrence vs. fibrosis 360, 364, 367  
signal intensity 365, 365, 366, 367  
staging 365  
subtypes 365  
treatment 365  
vaginal invasion 366, 367
- cervical cellulitis 52, 62
- cervical lymph nodes 60, 61  
anatomy 412, 412, 412  
imaging planes 410–411  
malignant 63  
metastases 418  
normal 415
- cervical soft tissues 60–65  
anatomy 60  
congenital diseases 61  
cystic lesions, differential diagnosis 66  
inflammatory diseases 62, 66  
tumors 63–65  
benign 63  
malignant 63–65  
neurogenic 63
- cervical spine, rheumatoid arthritis 452, 453
- cervical vessels 568–578, 631  
anatomic variants 572  
anatomy 571–572  
arterial dissections 575–576  
coils 569  
examination technique 569  
hemangiomas 573  
imaging method 568  
occlusions 573–575  
patient management 568  
sequences 569–571  
stenoses 573–575  
symptoms 574
- cervix 365–367  
benign changes 365  
malignant neoplasms 365–367  
normal appearance 362
- Charcot triad 256
- chemical shift 10, 10
- chemical shift artifacts 39–40  
cause 39, 39  
high-field MRI, 3T 645  
remedy 39, 39–40  
renal imaging 281
- chemical shift imaging  
adrenal adenomas, lipid-containing 312  
adrenal glands 339  
adrenocortical masses 307–308  
dual-echo, adrenal adenoma 309, 309  
echo times 308  
in phase 308  
out of phase/opposed phase 308  
principles 308, 308, 308  
renal angiomyolipoma 283  
renal imaging 280
- chemical shift selective suppression (CHESS) 20
- chemotherapy  
bladder carcinoma 349  
contrast enhancement reduction 169  
fatty marrow replacement 549  
osteosarcoma 436
- chest 67–152



- chest lymph nodes **410**  
chest wall 143–145, 152  
  anatomy 139, 143  
  congenital anomalies 143  
  contrast agents 126  
  examination technique 126  
  imaging planes 126  
  slice thickness 126  
malformations 143  
metastases 145  
MRI sequences 126  
normal variants 143  
tumors 143–145, 152  
  benign 143  
  lesion extent determination 145  
  MRI role 145  
  primary 143, **144**  
  secondary 143–145  
  tissue characterization 145
- chest wall plasmacytomas 145  
Chilaiditi syndrome 187  
children  
  elbow joint fractures 487  
  hip joint disorders 509–510  
  marrow conversion 544  
  thoracic vessel imaging 580
- Chlamydia trachomatis* 374  
chloromas 553  
cholangiocarcinoma 201, 201  
cholangiocellular carcinoma 262  
cholangitic hepatic abscess 209  
cholecystitis 264  
  acute 264  
  chronic 264, 264  
  bile duct strictures 259  
choledochal cyst 253, 253  
choledocholithiasis 257, 257  
  diagnostic pitfalls 257, 258  
cholelithiasis 264, 264  
chondroblastoma 430, 431  
chondromalacia 523  
chondromas, larynx 56  
chondrosarcoma 438–439  
  clinical aspects 438  
  dedifferentiated 439  
  enchondroma vs. 429  
  histology 438  
  laryngeal cartilage 57  
  primary 438  
  prognosis 438  
  “ring-and-arc” pattern 438, 439  
  secondary 438  
  soft-tissue components 438, 439
- chordae tendineae 68, 69  
chordoma 440–441  
  amorphous calcification 440  
  clinical aspects 440  
  fibrous septa 440  
  “filmy” pattern 440  
  pathogenesis 440  
  sacrococcygeal region 441, 441  
  sites of occurrence 440  
  spinal 441
- chromaffin cells (pheochromocytes) 301  
chronic renal failure 292  
chronic thromboembolic pulmonary hypertension (CTEPH) 595–596  
chylothorax 142  
chylous pericardial effusion 101  
cine MR sequences/techniques  
  aortic dissection 587
- chronic thromboembolic pulmonary hypertension 596  
coarctation of the aorta 582–583  
  pulmonary stenosis 591  
  thoracic aortic aneurysm 585  
  thoracic vessels 579, 580, 631  
  limits 580  
  retrospective gating 580
- circle of Willis 571  
circulating polarized alternating field 5  
circumflex artery (LCX) 70  
circumscribed muscular hematomas 468  
cirrhosis *see* hepatic cirrhosis  
clavicle 472  
*Clonorchis*, parasitic cholangitis 256  
*Clostridium perfringens*, cholecystitis 264  
clothing, risks associated 35  
coarctation of the aorta 90, 90–91, 582, 582–583  
  clinical aspects 90, 582  
  MRI specifics 91  
  pathogenesis 90, 582  
  postductal type 90, 582  
  preductal type 90, 582  
  prognosis 582  
  pseudocoarctation vs. 583  
  quantitative flow measurements 583  
  treatment 582
- coils  
  adrenal glands 299  
  bladder imaging 343  
  bone marrow examination 543  
  cervical vessels 569  
  elbow joint imaging 481  
  female pelvis examination 360  
  gastrointestinal tract imaging 316  
  high-field MRI 646  
  lower extremity arteries 616  
  lymph node imaging 409  
  MRA 567  
  MR mammography 154–155  
  pancreatic imaging 224  
  pelvic arteries 616  
  peripheral vessels 612  
  prostatic MRI 383, 383  
  shoulder joint imaging 470–481  
  thoracic vessels 580  
  whole-body MRI 635  
  *see also individual coils*
- collateral ligaments, knee 513  
colon  
  anatomy 334  
  MRI indications 318  
colon carcinoma 331  
  hepatic metastases 206, 208  
colonic carcinoid 336  
colonic diseases 335–336  
  neoplastic 335–336  
  MR colonography 328  
  nonneoplastic 335  
colonic lipoma 335  
colorectal adenoma 335  
colorectal carcinoma 335–336  
  adenoma-carcinoma sequence 335  
  diagnosis 335–336  
  epidemiology 335  
  frequency distribution 329  
  pathogenesis 335  
  screening 336  
  syndromes 336  
  TNM classification **335**
- colorectal imaging, contrast agents 316  
comedocarcinoma 163  
comet-tail patterns, rounded atelectasis 141  
commissurotomy 87  
common bile duct 185, 226, 251  
common carotid artery 571, 572  
common hepatic artery 185  
common hepatic duct 251  
compartment syndrome 468  
complementary spatial modulation of magnetization (CSPAMM) technique 78  
compression-induced myocardial ischemia 71  
computed tomography (CT)  
  abdominal aortic aneurysm 601  
  adrenal hemorrhages 306  
  angiography *see* CT angiography  
  bronchial carcinoma  
  chest wall invasion 144  
  staging 136, 137  
  enteroclysis, MR enteroclysis vs. 322  
  esophageal carcinoma 132  
  esophageal tumors 320  
  focal mediastinal lesion diagnosis, MRI vs. 131, 135  
  gastrointestinal tract 313  
  lymph nodes 408  
  lymphoma staging 152  
  middle mediastinal lymphomas 130–131  
  oral cavity 51  
  oropharynx 51  
  pancreatic trauma 245  
  paranasal sinuses 44  
  pheochromocytoma 305  
  renal angiomyolipoma 283  
  renal cell carcinoma **287**  
  renal malignant tumors 286  
  sacral insufficiency fracture 467  
  splenic imaging 338  
  tarsal coalition 539  
  *see also individual techniques*
- computer system 24  
congenital biliary atresia 254  
congenital biliary cysts 253–254  
  complications 253  
  Todani classification 253, 253  
  types 253, 253
- congenital fibrosis, liver 188  
congestive cardiomyopathy *see* dilated cardiomyopathy (DCM)  
Conn syndrome (aldosterone-secreting adenoma) 302, 302  
constrictive pericarditis 102, 103  
  causes 102  
  clinical aspects 102  
  diagnosis 102  
  myocardial fibrosis and 102  
  pathogenesis 102  
  restrictive cardiomyopathy vs. 97–98
- contrast agents 25–31, 42  
  abdominal vessels 598  
  biodistribution 26, 26–31  
  biphasic  
  gastrointestinal tract imaging 314, 315  
  small intestine imaging 316  
  bladder imaging 342–343
- blood-pool *see* blood-pool contrast agents  
bone marrow 544  
bronchial carcinoma staging 148  
chest wall examination 126  
classes 26–31  
colorectal imaging 316  
diamagnetic 315  
ductal carcinoma in situ 163  
duodenal imaging 315  
enhancement principles 25–26  
esophageal imaging 315  
gastric imaging 315  
gastrointestinal tract imaging 313–315, **314**  
  evaluation **314**, 315  
  selection 315–316
- hepatobiliary *see* hepatobiliary contrast agents  
high-field MRI 646  
hip joint imaging 501  
low-molecular transient protein-binding 31  
lymph node imaging 411  
mechanism of action 25  
mediastinal examination 126  
mononuclear phagocytic system 30–31  
MR colonography 329–330  
MR mammography 155  
MR urography 293–294  
pleural examination 126  
pregnancy 360  
rectal imaging 333  
renal imaging 281  
reticuloendothelial system-specific 30, 183–184  
seminal vesicle 384  
splenic imaging 269, 338  
T1 relaxation time, effects on 26  
T2 relaxation time, effects on 26  
tissue-specific *see* tissue-specific contrast agents  
virtual endoscopy 347  
*see also individual agents*
- contrast-enhanced GRASS (CE-GRASS) 18  
contrast-enhanced MRA 640  
  abdominal vessels 598, 631  
  advantages 567  
  aortic aneurysm  
  abdominal 600, 601  
  angiography vs. 583  
  thoracic 583–585  
  aortic dissection  
  abdominal 601–602, 602  
  thoracic 587  
  arteritis 589  
  AV malformations 592  
  bolus arrival time 566  
  carotid imaging 570–571  
  cervical hemangiomas 573  
  cervical stenoses 575, 575  
  cervical vessel imaging 568, 570–571, 631  
  long acquisition times 571  
  short acquisition times 571  
  subtraction techniques 570, 571  
  coarctation of the aorta 582, 582  
  first-pass imaging 565  
  hepatic vessels 604, 604–605  
  individual perfusion rate 566

- contrast-enhanced MRA  
 injection timing 566  
 interventional procedures 618–621  
 intramural hematoma 587  
 k-space 613–614  
 limitations 567  
 lower extremity arteries 616  
 mesenteric ischemia 605  
 optimum imaging quality 614  
 pelvic arteries 616  
 peripheral arterial occlusive disease 618, 619, 620, 621  
 peripheral vessels 613–614, 632  
 portal hypertension 607, 607  
 portal vein thrombosis 608, 608  
 pre-contrast images 613  
 pre-kidney donation 606  
 principles 565–566, 613  
 pulmonary embolism 594, 595  
 intraluminal filling defects 593–595  
 limitations 593  
 pulmonary stenosis 591  
 pulmonary vessels 589, 590  
 CT angiography vs. 589  
 single vs. double-dose 590  
 timing 590–591  
 renal artery stenosis 605–606, 606  
 limitations 605–606  
 renal stents 606, 607  
 renal transplant perfusion 606, 607  
 saline flush 566  
 shoulder vascular imaging 626  
 supra-aortic vessel stenoses/occlusions 585  
 symmetric sampling 613  
 technique 565–567, 631  
 thoracic vessels 579–580  
 contrast agent arrival 580  
 parallel imaging techniques 580  
 upper arm vascular imaging 626, 626  
 vasculitis 604  
 venous contamination/overlap 614, 614
- Cooper ligament 483  
 coracoacromial ligament 472  
 coracoid 472  
 corn oil 314, 314  
 coronary aneurysms 118, 118  
 coronary arteries  
 anatomy 70–71  
 anomalous 71, 117, 117–118  
 branches, segmental classification 70  
 distribution 70, 71, 71  
 indifferent circulation 71  
 left-dominant circulation 71  
 right-dominant circulation 71  
 segment-based analysis 119  
 coronary bypass graft evaluation 119, 119  
 coronary flow reserve 119  
 coronary heart disease (CHD) 114–123  
 coronary MR angiography 118–119  
 primary diagnosis 114–119  
 coronary MR angiography 116–119  
 advances in 151–152  
 coronary aneurysms 118, 118  
 coronary heart disease 118–119  
 coronary vascular anomalies 117, 117–118  
 examination technique 116, 116  
 cardiac motion 116  
 contrast 116  
 respiratory motion 116  
 indications 117–118  
 parallel imaging techniques 117  
 scan volume 117  
 sequences 116–117  
 “targeted scan” method 117  
 “whole heart” method 117
- coronary sinus 70  
 coronary steal effect 115  
 coronary sulcus 68  
 coronary veins 70  
 coronoid process shear fractures 487  
 corpora cavernosa 400  
 corpus cavernosum rupture 401, 401  
 corpus spongiosum 400  
 corticosteroids, arthritis 588  
 cortisol-producing adenomas 302  
 “cough furrows” 188  
 cricoid cartilage 55  
 crista terminalis 68  
 Crohn disease 325–327  
 abscesses 326  
 anastomotic recurrence 327  
 bowel wall 325–326  
 clinical aspects 325  
 contrast administration 326, 326, 327  
 extraintestinal manifestations 325  
 fistulas 326, 327  
 MRI role 327  
 MRI vs. enteroclysis 327  
 sclerolipomatosis 326  
 site of occurrence 325  
 strictures 326  
 submucosal edema 325  
 “target sign” 325, 325, 326  
 Crohn disease activity index (CDAI) 327  
 cruciate ligaments 513–514  
 injuries 514–517, 562  
 see also *individual ligaments*
- cryorefrigerator 22  
 CT angiography  
 abdominal aortic dissection 601–602  
 cervical vessels 568  
 chronic thromboembolic pulmonary hypertension 595  
 MRA vs. 566  
 portal vein thrombosis 608  
 pulmonary embolism 593, 594  
 pulmonary vessels 589  
 thoracic vessels 631  
 CT arthrography, osteochondritis dissecans 526  
 CT enteroclysis, MR enteroclysis vs. 322  
 cubital tunnel 489, 489  
 retinaculum absence 489  
 cubital tunnel syndrome 489  
 CUP phenomenon (cancer of unknown primary) 154  
 CUP syndrome 638  
 Cushing syndrome 302–303  
 clinical aspects 302  
 etiology 302
- cyst(s)  
 adrenal 311  
 aneurysmal bone see *aneurysmal bone cyst*  
 anterior mediastinum 135  
 arachnoid 381  
 Baker 514  
 Bartholin 363  
 branchial arch 58  
 breast see *breast cysts*  
 bronchogenic see *bronchogenic cyst*  
 choledochal 253, 253  
 congenital biliary see *congenital biliary cysts*  
 duplication, esophageal 319  
 ejaculatory duct 387  
 endocervical gland 365  
 esophageal 319  
 follicular 362, 362, 375, 376  
 hepatic see *hepatic cysts*  
 hydatid 210–211, 211, 271  
 labral 479  
 lateral neck 61  
 median neck 61, i61  
 middle mediastinum 131–132, 135  
 müllerian duct 387  
 Nabothian 365, 365  
 nasal cavity 47  
 ovarian 375, 376  
 pancreatic 228, 229, 338  
 pericardial 100, 131  
 posterior mediastinum 133, 135  
 prostate, congenital 387  
 renal see *renal cysts*  
 retention see *retention cysts*  
 salivary glands 58, 59  
 subchondral see *subchondral cysts*  
 Thornwaldt 51  
 thyroglossal duct 61  
 utricular 387
- cystadenocarcinoma(s)  
 biliary 202  
 pancreatic 230–231  
 cystadenolymphoma, parotid gland 59, 59
- cystadenoma(s)  
 biliary 202  
 ovarian see *ovarian cystadenomas*  
 pancreatic 230–231
- cystic artery 185  
 cystic duct 251  
 insertion anomalies 252  
 cystic fibrosis 244  
 cystic hydatid disease 210  
 cystic teratoma see *dermoids*  
 cystocele 353, 354, 354–356, 355, 356  
 stress incontinence 354  
 cystosarcoma phyllodes see *phyllodes tumor*
- D**
- Dandy–Walker malformation 381  
 data errors 41  
 deep infrapatellar bursa 514  
 deep infrapatellar bursitis 522, 522  
 defecation disorders 351, 355  
 MRI indications 318  
 delayed contrast enhancement 81–83  
 Budd–Chiari syndrome 216  
 clinical applications 83  
 hepatic metastases 204  
 myocardial viability 121, 122, 122–123  
 delayed imaging see *delayed contrast enhancement*  
 delayed myocardial contrast washout see *delayed contrast enhancement*  
 deltoid ligament 531, 533, 533  
 Denonvilliers fascia 385
- dentate line 357  
 dermoid plug (Rokitansky nodule) 378  
 dermoids  
 oral cavity 53  
 oropharynx 53  
 ovarian see *ovarian dermoids*  
 salivary glands 58  
 descending aorta 581  
 des- $\gamma$ -carboxyprothrombin II (DCP II) 197  
 DESS (dual-echo steady-state) sequences, knee articular cartilages 523, 524  
 diabetic foot 628  
 diamagnetic contrast agents 315  
 diamagnetism 10  
 diaphragmatic hernia, right-sided 187  
 diaphragmatic pleura 139  
 diffuse gastritis 321  
 diffuse interstitial muscular hematoma 468  
 diffuse mediastinitis 138  
 diffuse nodular hyperplasia see *nodular regenerative hyperplasia (NRH)*  
 diffuse pleural thickening 143  
 diffusion-weighted imaging (DWI) 21, 543–544  
 hepatic metastases 204, 208  
 liver 181  
 malignant hepatic lesions 181, 208  
 multiple myeloma 557  
 prostatic imaging 385  
 digital rectal examination (DRE) 388–389  
 digital subtraction angiography (DSA)  
 cerebrovascular incident rates 568  
 cerebrovascular insufficiency 568  
 cervical vessels 568  
 chronic thromboembolic pulmonary hypertension 595  
 internal carotid artery dissection 576, 577  
 interventional procedures 618–621  
 peripheral arterial occlusive disease 618  
 pulmonary embolism 593  
 dilated cardiomyopathy (DCM) 93–94, 94  
 mitral insufficiency and 94  
 systolic dysfunction 94, 95  
 thrombotic deposits 94  
 dilated ducts, breast 158  
 dipyridamole 115  
 distal bile duct 265  
 distal syndesmosis 531  
 diverticular carcinoma 345  
 diverticulitis 335  
 diverticulosis 335  
 “diving” ranula 59  
 Doppler sonography, cervical vessels 568  
 Dotarem see *Gd–DOTA*  
 double breast coils 154, 155  
 lymph node imaging 409  
 double-contrast study, hepatocellular carcinoma 197  
 double-echo steady state (DESS) 18  
 double-outlet right ventricle (DORV) 90  
 “double PCI” sign, meniscal tears 519  
 doughnut sign, hepatic lesions 205  
 Dressler syndrome 101  
 DSA see *digital subtraction angiography (DSA)*

- dual-echo steady-state (DESS) sequences, knee articular cartilages 523, 524
- dual-energy x-ray absorptiometry (DXA) 463
- dual-inversion technique 74
- ductal carcinoma in situ (DCIS) 163
- adenosis vs. 158
- classification 163
- contrast agent 163
- contrast enhancement 163
- cribriform 163
- enhancement morphology 163, 164
- examination technique 163
- high-grade 163, 164
- low-grade 163
- papillary intraductal 163
- solid 163
- duct ectasia 158
- ductectatic mucinous adenoma, pancreatic 230
- ductus arteriosus 88
- duodenal adenocarcinoma 324
- duodenal diverticulum 238
- duodenoscopy 318
- duodenum
- contrast agents 315
- MRI indications 318
- wall invasion 318
- duplication cysts, esophageal 319
- dural sinus inflammation 45
- dynamic imaging
- adrenal adenoma 302–303, 303, 307
- adrenal masses 307
- breast 154–155
- parameters 155
- fibrolamellar hepatocellular carcinoma 200
- focal nodular hyperplasia 191–192, 192
- liver 183
- pancreatic imaging 224
- renal imaging 279–280, 280
- renal oncocytoma vs. 285
- secretin-stimulated *see* secretin-stimulated dynamic imaging
- dysontogenic pancreatic cysts 228, 229
- E**
- ear, nose, and throat tumors, lymph node imaging 409
- earplugs 23, 33
- ECG gating, lymph node imaging 410
- ECG synchronization, cardiac MRI 72–73
- ECG triggering 73
- congenital cardiac anomalies 84
- mediastinal examination 126
- myocarditis 92
- Echinococcus granulosus*
- cystic hydatid disease 210
- splenic involvement 271
- Echinococcus multilocularis*, alveolar hydatid disease 210
- echo planar imaging (EPI) 19
- “gradient blips” 19, 19
- hepatic metastases 204, 208
- echo signals 7–8
- echo time 8, 9, 42
- hepatic imaging 180
- ectopic parathyroid glands 130
- ectopic spleen 270
- ectopic testes 397
- ectopic thyroid tissue 52
- anterior mediastinum 128
- eddy currents 23, 34
- eddy current suppression/compensation 23
- edema
- bone marrow *see* bone marrow edema
- hip joint 509
- osteoid osteoma 427, 427
- edematous breast changes 159
- effective echo time *see* fast spin echo (FSE)
- efferent ductules 394
- Eisenmenger reaction 86, 89
- ejaculatory ducts 385
- cysts 387
- ejection fraction 69, 79
- elbow dislocation 487
- elbow joint 481–491, 561
- anatomy 482–483
- articular surfaces 482, 483
- capsule 482
- examination technique 481–482
- coils 481
- patient positioning 481
- imaging planes 481–482
- imaging protocol 482
- inflammatory lesions 482, 482
- ligaments 482–483, 484
- injuries 483–485
- muscles 483
- neoplastic lesions 482, 482
- nerve compression syndromes 489
- occult fractures 487
- pediatric injuries 487, 561
- posterior instability 485
- pulse sequences 481–482
- soft-tissue injuries 561
- trauma 481, 482
- electrode placement, cardiac MRI 72
- electron orbital 25
- embryonal sarcoma 221–222
- contrast enhancement 222
- cystic appearance 222
- differential diagnosis 222
- embryonic carotid-vertebral anastomoses (presegmental arteries) 572
- embryonic cell carcinomas 399, 399
- embryonic rhabdomyosarcoma 345, 346, 447
- enchondroma 428–429
- bone infarction vs. 461–462
- calcifications 462
- chondrosarcoma vs. 429
- clinical aspects 428
- histology 428
- hyaline cartilage matrix 428, 429
- prevalence 428
- “ring-and-arc” pattern 428, 429
- enchondromatosis 428
- end-diastolic volume (EDV) 69, 79
- end-diastolic wall thickness (EDWT) 121, 121, 122
- endocardium 70
- endocervical gland cysts 365
- endometrial carcinoma 372–373, 405
- clinical aspects 372
- contrast administration 373
- diagnosis 372
- epidemiology 372
- junctional zone 373, 373, 374
- lymphogenous metastasis 374
- myometrial invasion 373
- prognosis 373
- staging 361, 373, 373, 373, 374
- endometrial cycle 362
- endometriomas 376
- endometriosis 371, 376
- extraovarian manifestations 376
- endometritis 368
- endometrium 361
- endomyometritis 368
- endoprostheses 603
- endorectal coils
- bladder imaging 343
- bladder tumor staging 347
- female pelvis imaging 360
- prostatic imaging 383, 383
- Endorem *see* AMI 25
- endoscopic retrograde cholangiopancreatography (ERCP)
- benign papillary stenosis 266
- biliary–enteric anastomosis 261
- biliary tract imaging, MRCP vs. 338
- laparoscopic cholecystectomy 260, 260, 261
- pancreatic adenocarcinoma 235
- primary sclerosing cholangitis 255
- endoscopy 328
- endosonography 318
- esophageal tumors 320
- endothelial cysts, adrenal 311
- endovaginal coils 360
- “end-stage spleen” (autosplenectomy) 274
- end-systolic volume (ESV) 69, 79
- Entamoeba histolytica*, amebic abscess 210
- enteritis, infectious 328
- enterocele 353, 356
- enteroclysis 313
- enterovesical fistulas 358
- enzyme replacement therapy, Gaucher disease 559
- eosinophilic granuloma 435
- epicondylitis 485–486
- imaging protocol 481, 482
- epidermoids
- oral cavity 53
- oropharyngeal 53
- epididymal duct 394
- epididymis 393–399, 406
- anatomy 394
- epididymitis 396, 396
- concomitant orchitis 396, 397
- epiglottis 55
- epithelial cysts, adrenal 311
- epithelial hemangioendothelioma (EHE) 202–203
- epithelial tumors, splenic 276
- equilibrium imaging, myocarditis 81
- Erlenmeyer flask deformity 559
- Ernst, Richard R. 2
- Ernst angle optimization 180
- esophageal adenocarcinoma 132
- esophageal carcinoma 132–133, 320
- diagnosis 132, 132
- epidemiology 132
- pathogenesis 132
- staging 132
- TNM classification 132
- esophageal cysts 319
- esophageal duplications 133, 134
- esophageal fibropapilloma 319
- esophageal hemangiomas 319
- esophageal leiomyoma 319
- esophageal lipoma 319
- esophageal lymphangioma 319
- esophageal perforation 138
- esophageal polyps 319
- esophageal tumors
- benign 319
- malignant 320
- MRI vs. CT 320
- sites of occurrence 320
- esophagogastroscopy 318
- esophagus 318–321, 339
- contrast agents 315
- inflammatory diseases 321
- metastases 320
- MRI anatomy 318
- MRI indications 318
- signal intensities 318
- esthesioneuroblastoma (olfactory neuroblastoma) 48
- ethmoid bone carcinoma 49
- ethmoid cells 44
- ethmoid labyrinth 44
- European Carotid Surgery Trial (ECST) 573, 573–574
- everted diverticula 335
- Ewing sarcoma 439, 440
- histology 439
- osteomyelitis vs. 439, 458
- therapeutic response 439
- excisional biopsy, breast 168
- extensor mechanism injuries, knee 520–522
- extensor tendons, hand 494
- external carotid artery 571
- external gradient pulse 21
- external iliac lymph nodes 414, 414
- extracellular contrast agents *see* gadolinium chelates
- extragonadal germ cell tumors 129–130
- epidemiology 129–130
- pathogenesis 129–130
- types 130
- extralobar sequestration, pulmonary 146
- extramedullary hematopoiesis, posterior mediastinum 133, 134
- extremity coils 612
- extrinsic ligaments, hand 493
- exudative pericardial effusion 101
- F**
- facial skeleton 66
- falciform ligament 185
- fast acquisition double echo (FADE) 18
- fast field echo (FFE) 18, 77
- pancreatic imaging 225
- fast imaging with steady precession (FISP) 18
- cardiac functioning 78
- pancreatic imaging 225
- fasting, gastrointestinal tract examination 313, 315
- fast low-angle shot (FLASH) 17
- cardiac functioning 78
- gastrointestinal tract imaging 316–317
- pancreatic imaging 225

- fast spin echo (FSE) 15–16  
 articular cartilage, knee 523  
 biliary tract imaging 249, 249, 249–250  
 disadvantages 249–250  
 breast implants 175  
 cardiac morphology 74  
 multislice acquisition 74  
 single-slice acquisition 74  
 T1 weighting 74–76  
 T2 weighting 74–76  
 gastrointestinal tract imaging 316–317, 317  
 hepatic imaging 181  
 lymph node imaging 409  
 pancreatic imaging 225  
 renal imaging 280  
 “fat islands” 543  
 fat (yellow) marrow 544  
 fat-saturated sequences  
 bone marrow examination 543  
 hand imaging 492  
 lymph node imaging 409  
 MR mammography 155  
 oral cavity 51  
 pancreatic imaging 224, 227  
 pelvic fistulas 357  
 fat suppression imaging  
 chemical shift 39  
 chest wall examination 126  
 elbow joint 481  
 lymph nodes 415, 416, 417  
 mediastinal examination 126  
 pancreatic adenocarcinoma 234  
 fatty infiltration of the liver 337  
 fatty liver 211–212, 212  
 feet *see* foot  
 female pelvis 360–382, 405  
 anatomy 361–362  
 examination technique 360–361  
 coils 360  
 field of view 361  
 interslice gap 361  
 patient preparation 360, 360  
 pulse sequences 360–361  
 slice thickness 361  
 obstetric indications 380–381  
 physiologic changes 361  
*see also individual pelvic organs*  
 femoral bony avulsions 516  
 femoral condylar groove depressed  
 fractures 516  
 femoral condyles, osteochondritis dis-  
 secans 525  
 femoral epiphyses, children 545  
 femoral fractures 508  
 femoral head 502  
 blood supply 502  
 cartilaginous changes 501  
 femoral head avascular necrosis 460,  
 460, 504–505  
 diagnosis 504  
 differential diagnosis 505  
 imaging protocol 504, 505  
 staging 504, 505, 505  
 treatment 505  
 femoral neck fractures 508  
 femorofemoral bypass 623, 624  
 femoropatellar joint 512, 520–522  
 femorotibial joint 512  
 femur  
 edema 561  
 hematopoietic bone marrow 502  
 ferric chloride 314  
 ferristene (Abdoscan) 315  
 ferromagnetic objects, effects on 32–33  
 ferucarbotran  
 hepatic imaging 184, 184  
 spleen 269  
 ferumoxides 184, 184  
 ferumoxsil  
 gastrointestinal tract imaging 314–315  
 small intestine imaging 316  
 fetal imaging 380–381, 381, 405  
 fetus  
 anomaly detection 381, 381  
 MRI effects 360, 380  
 fibroadenoma, breast 160–161  
 adenomatous 161  
 clinical aspects 160  
 contrast enhancement 161  
 diagnosis 160  
 differential diagnosis 161  
 epidemiology 160  
 histology 160  
 hypercellular adenomatous 160  
 hypocoelular 160, 161  
 “malignant” pattern 161  
 myxoid 161  
 nonenhancing 161  
 pathogenesis 160  
 signal intensity 160–161, 161  
 fibrocystic change, breast 158–159  
 differential diagnosis 158  
 hormonal imbalance 158  
 fibrolamellar hepatocellular carcinoma  
 (FLC) 200  
 children 221  
 fibroma, cardiac 108, 108  
 fibromuscular dysplasia  
 cervical vessels 575  
 epidemiology 575  
 histology 575  
 internal carotid artery 575  
 renal arteries 605, 606  
 fibropapilloma, esophageal 319  
 fibrosing mediastinitis 138–139, 152  
 fibrovascular polyps, esophageal 319  
 fibular collateral ligament, knee *see* lat-  
 eral collateral ligament (LCL), knee  
 fibulocalcaneal ligament  
 acute rupture 534  
 imaging 532, 533  
 injury 532  
 field inhomogeneities 7  
 field of view (FOV) 14  
 field strength 32  
 cardiac MRI 71  
 FIGO classification  
 cervical carcinoma 365, 366  
 endometrial carcinoma 373  
 ovarian carcinoma 379  
 vaginal carcinoma 364  
 first-pass myocardial perfusion imaging  
 80–83  
 coronary heart disease 114–115  
 improvements 81  
 interpretation 80–81  
 at rest 114–115  
 stress imaging 115  
 contraindications 115  
 technique 80, 82  
 time course changes 82  
 fistula(s)  
 arteriovenous 610  
 bladder, postirradiation 349–350  
 Crohn disease 326, 327  
 enterovesical 358  
 intersphincteric 358  
 ischiorectal 358  
 pelvic *see* pelvic fistulas  
 perianal *see* perianal fistulas  
 supralelevator 358, 358  
 transsphincteric 358, 358  
 ureteral 297, 297  
 vesicouterine 358  
 vesicovaginal 358  
 fistulography, large intestine 328  
 fixed cecum 334  
 flake fractures, ankle 540, 541  
 FLASH *see* fast low-angle shot (FLASH)  
 flat feet 536  
 flex coils  
 elbow joint imaging 481  
 foot imaging 530  
 hand imaging 492  
 hip joint imaging 501, 502  
 shoulder joint imaging 470, 471  
 flexor digitorum, partial tears 484  
 flexor tendons, hand 494  
 “flipped meniscus” 519  
 floating spleen 270  
 floor of mouth carcinoma 53, 54  
 flow artifacts 36, 36  
 flow-encoded cine phase-contrast se-  
 quences, thoracic vessels 580  
 flow-sensitive sequences, female pelvis  
 imaging 361  
 fluid-attenuated inversion recovery  
 (FLAIR) 17  
<sup>18</sup>F fluorodeoxyglucose (FDT) PET, myo-  
 cardial wall motion 121  
 focal nodular hyperplasia (FNH)  
 190–192, 337  
 children 219  
 contrast agents 192, 193  
 hemangiomas and 191, 192, 193  
 MRI appearance 191, 191–192, 192, 337  
 nidus (scar) 191, 191  
 follicle stimulating hormone (FSH),  
 polycystic ovaries 375  
 follicular carcinoma, thyroid gland 65  
 follicular cysts 362, 362, 375, 376  
 foot 530–542, 562  
 anatomy 531–532  
 bones 531  
 examination technique 530  
 fractures 540–541  
 imaging protocol 531, 562  
 insufficiency fractures 541  
 osseous injuries 562  
 pulse sequences 530  
 rheumatoid arthritis 451  
 soft-tissue changes 562  
 stress fractures 540  
 tendon imaging 530  
 forearm, vascular imaging 627  
 forefoot  
 anatomy 531  
 examination technique 530, 531  
 foreign-body reactions, breast implants  
 177  
 fossa ovalis 68  
 Fourier acquisition in steady state (FAST)  
 18  
 Fourier imaging  
 three-dimensional 14  
 two-dimensional 10–14  
 frequency encoding 11, 12  
 multislice technique 13–14  
 phase encoding 11–13, 13  
 slice selection 10–11, 11  
 Fourier transformation 11  
 fovea of the femoral head 502  
 fractional date acquisition, pulmonary  
 vessels 591  
 fracture(s) 466, 560  
 acetabular 508  
 ankle joint 540, 540–541  
 carpal bone 498  
 elbow joint 487  
 foot 540–541  
 hand 498–500  
 hip joint 508, 508  
 ischial tuberosity 509  
 metacarpal 498  
 pathologic 543  
 penile 401, 401  
 posttraumatic 543  
 radial 466, 487, 487, 498  
 shoulder joint 480  
 free induction decay (FID) 7–8, 8  
 frequency encoding 11, 12  
 wrap-around 37  
 frequency offset 10  
 frequency-selective fat suppression,  
 hepatic imaging 181  
 fringe field 21, 32  
 frontal sinus 44  
 functional asplenia 274  
 fungal endocarditis 111  
 fungiform papillomas 47  
 furosemide  
 MR urography 293  
 virtual endoscopy 347  
 G  
 gadobenate dimeglumine (Gd-BOPTA)  
 29, 29, 183  
 gadobutrol  
 dosage 28  
 hepatic imaging 183  
 structure 27  
 gadodiamide 27, 27  
 dosage 28  
 hepatic imaging 183  
 nephrogenic systemic fibrosis induc-  
 tion 28  
 gadolinium chelates  
 bone marrow imaging 544  
 extracellular 27–29, 42  
 agents 27  
 brain metastases detection 28  
 chemical structure 27  
 dosage 28  
 elimination 28  
 osmolality 28  
 pharmacokinetics 27–28  
 side effects 28–29  
 tolerance 28–29  
 hepatic hemangioendothelioma 218,  
 219



- gadolinium chelates  
 hepatic imaging 182, 183, 184  
 MR angiography 28  
 pancreatic adenocarcinoma 233, 234, 234, 235  
 pancreatic imaging 225  
 paramagnetic macromolecular 31  
 pleural effusion 143  
 safety 183
- gadolinium diethylenetriamine penta-acetic acid (Gd-DTPA) *see* Gd-DTPA
- gadolinium diethylenetriamine penta-acetic acid bismethylamide (Gd-DTPA-BMA) *see* gadodiamide
- Gadomer 31
- gadoterate meglumide (Gd-DOTA) *see* Gd-DOTA
- gadoteridol (Gd-HP-DO3 A) 27, 27
- Gadovist *see* gadobutrol
- gadoxate disodium (Gd-EOB-DTPA) 29, 29
- galactography, breast papilloma 162
- gallbladder 251, 263–265  
 anatomy 187  
 MRI anatomy 263  
 normal variants 263
- gallbladder agenesis 263
- gallbladder carcinoma 264, 265  
 morphologic classification 265  
 ovarian metastasis 379
- gallbladder diverticulum 263, 264
- gallstones 264, 264
- Gamna-Gandy bodies  
 hepatic cirrhosis 213  
 intrasplenic 274, 274
- ganglia 500  
 hip joint 507
- ganglioneuroblastoma 305
- gangrene, cholecystitis 264
- gaseous enema, MR colonography 328–329
- gastric adenocarcinoma 320
- gastric carcinoid 321
- gastric carcinoma 320, 321, 321
- gastric hemangiomas 320
- gastric leiomyoma 320
- gastric leiomyosarcoma 321
- gastric lipoma 320
- gastric lymphangioma 320
- gastric lymphoma 321
- gastric polyps 320
- gastric ulcer disease 321
- gastritis, diffuse 321
- gastroduodenal artery 185
- gastrointestinal tract 313–326, 339–340  
 examination technique 313–318  
 coils 316  
 MRI indications 318  
 multislice sequences 316–317  
 patient positioning 316  
 patient preparation 315–316  
 pulse sequences 316–317  
*see also individual organs*
- Gaucher cells 558, 558
- Gaucher disease 215, 558, 558–559  
 clinical aspects 558  
 diagnosis 558  
 marrow infarcts 559  
 pathogenesis 558  
 treatment 559  
 types 558
- Gd-DOTA 314  
 hepatic imaging 183  
 structure 27, 27
- Gd-DTPA 27  
 bone marrow imaging 544  
 dosage 28  
 ductal carcinoma in situ 163  
 gastrointestinal tract imaging 313–314, 314, 317  
 hepatic imaging 183  
 marrow reconversion 546  
 MR urography 293  
 nephrogenic systemic fibrosis induction 28  
 structure 27  
 tolerance 28
- Gd-DTPA-BMA *see* gadodiamide
- Gd-EOB-DTPA (gadoxate disodium) 29, 29
- Gd-HP-DO3 A (gadoteridol) 27, 27
- gel bleeds, breast implants 174, 176, 177, 177
- generalized autocalibrating partially parallel acquisition (GRAP PA) 20
- germ cell tumors 398–399
- Gerota fascia 281
- GE sequences *see* gradient echo (GE) imaging/sequences
- ghost artifacts  
 aortic dissection 587  
 hepatic imaging 181  
 knee joint imaging 512
- giant cell arteritis (Horton temporal arteritis) 588
- giant cell tumor 433–434, 434  
 cystic areas 434  
 hemosiderin effect 434  
 histology 433  
 local recurrence 434  
 tendon sheath, hand 500, 500
- giant hemangioma, liver 189–190
- Gibbs artifact (truncation artifact) 40, 40
- GLAD (glenoid labrum articular cartilage disruption) lesion 479
- glenohumeral instability 477
- glenohumeral joint 472
- glenohumeral ligaments 472
- glenoid labrum 472  
 pathology 478–479  
 variants 478, 560
- glenoid labrum articular cartilage disruption (GLAD) lesion 479
- gliomas, nasal cavity 50
- glomus jugulare tumors 63
- glomus vagale tumors 63
- glucagon  
 bladder imaging 342  
 gastrointestinal tract imaging 316  
 prostatic imaging 383
- glucocerebrosidase 558
- glucocerebrosidase 558
- glycogen storage diseases 215
- goiter 63  
 nodular 128  
 retrosternal 128
- “golfer’s elbow” *see* medial epicondylitis
- gradient and spin echo (GRASE) 16
- gradient echo 11
- gradient echo (GE) imaging/sequences 5, 17–19  
 articular cartilage, knee 523
- cardiac MRI  
 cine sequences 77  
 ultrafast sequences 77–78
- contrast characteristics 18
- dual, renal imaging 280
- MR mammography 154
- prostatic imaging 384
- sequences with refocusing 17, 17–18, 18
- sequences with spoiler gradients 13, 17
- spin echo imaging vs. 17
- ventricular parameters 69
- gradient errors 41
- gradient field 10  
 risk associated 32, 35
- gradient moment nulling/rephasing, physiologic artifact reduction 37
- gradient motion rephasing (GMR), MRA 565
- gradient-recalled acquisition in a steady state (GRASS) 17, 18  
 pancreatic imaging 225  
 spoiled, abdominal vessels 598
- gradient rotation 37
- gradient strengths, cardiac MRI 71–72
- gradient switching 22–23
- gradient systems 22–23
- granulomatous infectious diseases, paranasal sinuses 45
- granulomatous prostatitis 387
- groove carcinoma, pancreatic 236
- groove pancreatitis 236
- gyromagnetic ratio 4
- ## H
- HAGL (humeral avulsion of the glenohumeral ligament) lesion 477, 560
- half-Fourier acquisition single-shot turbo-spin echo (HASTE) imaging 16  
 biliary tract imaging 250, 250  
 cardiac morphology 74, 76  
 congenital cardiac anomalies 84  
 gastrointestinal tract imaging 316, 317  
 MR urography 293  
 pancreatic imaging 225  
 thoracic vessels 579
- hamartoma(s)  
 bile duct (Meyenburg complexes) 188  
 breast 162  
 mesenchymal 218–219  
 small intestine 322  
 splenic 276
- hand 492–501, 561  
 anatomy 493–494, 494  
 avascular necrosis 495, 561  
 bone tumors 500  
 cartilaginous changes 497  
 collagen diseases 627  
 contrast administration 492  
 degenerative changes 497, 497  
 erosive bone lesions 497, 498  
 examination technique 492–493  
 patient positioning 492  
 slice thickness 492  
 voxel size 492
- extensor muscles 483  
 flexor muscles 483  
 fractures 498–500  
 imaging planes 492
- imaging protocol 493  
 inflammatory changes 497–498, 561  
 MRI indications 497  
 joint compartments 494  
 ligaments 493  
 MRI indications 493  
 nerve compression syndromes 496  
 occult fractures 561  
 osteoarthritis 497  
 pulse sequences 492–493  
 retinacula 493–494  
 rheumatoid arthritis 451, 451  
 soft-tissue injuries 498–499  
 soft-tissue tumors 500  
 tendons 493–494  
 trauma 498–500  
 vascular imaging 627
- hard palate 51
- hardware-related artifacts 41
- HASTE sequences *see* half-Fourier acquisition single-shot turbo-spin echo (HASTE) imaging
- head and neck 43–66  
 examination 44  
 lymph nodes *see* cervical lymph nodes
- head and neck coils 569
- head coils 580, 612
- hearing, gradient field and 33
- heart 68–125, 151–152  
 anatomy 68–71  
 topographical 68  
 apex 68  
 base 68  
 chambers *see* cardiac chambers  
 congenital anomalies 83–92, 151  
 examination technique 84  
 MRI indications 84  
 MRI vs. echocardiography 83  
 segmental anatomical evaluation 84
- crux 68  
 diaphragmatic surface 68  
 functional evaluation 77–80  
 functional parameters 69, 70  
 morphological parameters 69  
 morphologic evaluation 74–77  
 posterior surface 68  
 sternocostal surface 68  
 wall structure 69–70  
*see also entries beginning cardiac*
- heel pain (calcaneodynia) 537
- hemangioliopomas (lipohemangiomas) 432
- hemangioma 432, 433  
 “atypical” 432, 433  
 capillary *see* capillary hemangioma  
 cavernous *see* cavernous hemangioma  
 cervical vessels 573  
 esophageal 319  
 focal nodular hyperplasia and 191, 192, 193  
 gastric 320  
 hepatic 337  
 histology 432  
 intraosseous 432, 433  
 oral cavity 52  
 oropharyngeal 52  
 “polka dot” pattern 432, 433  
 small intestine 323  
 soft-tissue 443, 444  
 splenic 275, 275–276  
 vertebral body 432, 433

- hematocele 394  
 hematologic systemic diseases 550  
   polycythemia vs. 550  
 hematoma(s)  
   adrenal, chronic 306  
   hip joint 509  
   intramural *see* intramural hematoma  
   mural 576  
   muscular 468  
   penile 401, 402  
   splenic 278  
 hematopoiesis 543  
 hematuria, bladder tumors 346  
 hemochromatosis 213–214  
   bone marrow involvement 557–558  
   differential diagnosis 244  
   pancreatic involvement 244  
   primary 244, 244  
   splenic involvement 274  
   secondary 244  
   splenic involvement 274  
 hemophilia, intra-articular hemorrhage 498  
 hemophilic arthropathy 527  
 hemorrhages  
   adrenal *see* adrenal hemorrhages  
   bladder 345, 345  
   intraprostatic 384, 388, 392  
   intratesticular 394, 395  
   splenic 272  
 hemorrhagic cysts, ovarian 375  
 hemorrhagic neuroblastoma 305  
 hemosiderin  
   hematologic systemic diseases 550  
   hepatic cirrhosis 212–213  
   knee 512  
 hemosiderosis  
   bone marrow involvement 557–558  
   clinical aspects/findings 213  
   diagnosis 213  
   hepatic 337  
   hepatocellular carcinoma and 214, 214  
   primary 557, 558  
   hepatic 213–214  
   splenic 213  
   secondary 557, 557–558  
   hepatic 213–214  
   sickle cell anemia 274  
 hepatic abscess 209, 209  
 hepatic angiosarcoma 202, 203  
   children 222–223  
   differential diagnosis 202  
   histology 202  
 hepatic aplasia 188  
 hepatic artery 185  
   aneurysm 605  
   hepatic abscess 209  
 hepatic cirrhosis 212–213, 213, 337  
   causes 212  
   effects 212  
   hepatocellular carcinoma and 197, 198, 199, 212  
   high-field MRI 648  
   liver changes 212  
   mortality rates 212  
   portal hypertension 213  
   regenerative nodules 212–213  
 hepatic cysts 205  
   children 219, 220  
   simple 188–189  
 hepatic hemangioendothelioma 202–203  
   children 218, 219  
   arteriovenous shunts and 218  
 hepatic hemangiomas 205, 337  
   children 219  
 hepatic hypoplasia 188  
 hepatic lipoma 219  
 hepatic lymph nodes 413  
 hepatic lymphoma 204–209, 208  
 hepatic metastases 203–204, 205, 206, 207, 337  
   children 223  
   histology 204  
   hyperintense rim 204, 205  
   isointensity 204, 206  
   morphologic patterns 204, 205  
   primary tumors 203  
   hypervascular 204, 206  
   vascularity 204  
 hepatic peliosis 217  
 hepatic perfusion 181–182  
   phases 181–182  
 hepatic tumors  
   benign 189, 189–196  
   children 217–223, 337–338  
   benign 218–219  
   imaging protocol 218, 218  
   malignant 220–223  
   rare 222–223  
   malignant 196, 196–209  
   secondary 203–209, 337  
   primary 337  
 hepatic veins 186, 186  
 hepatic vessels 604–605  
 hepatitis 215  
 hepatitis A virus infection 215  
 hepatitis B virus infection 215  
 hepatitis C virus infection 215  
 hepatobiliary contrast agents 29–30, 42, 183–184, 184, 337  
   absorption 182  
   chemical structures 29  
   hepatic metastases 204, 206, 207  
   hepatocellular adenoma 194–195  
 hepatoblastoma 220–221  
   differential diagnosis 221  
   enhancement 221, 222  
   signaling pattern 221, 221  
 hepatocellular adenoma 193–195, 194, 195, 337  
   differential diagnosis 195  
   intralesional hemorrhage 194, 194  
   Kupffer cells 194  
   types 193–194  
 hepatocellular carcinoma (HCC)  
   196–199, 337  
   children 221  
   classification 196  
   clinical aspects 197  
   diagnostic confirmation 197–199  
   differential diagnosis 196  
   “early” 197  
   etiology 196  
   growth characteristics 197  
   hematogenous seeding 197  
   hemosiderosis and 214, 214  
   hepatic cirrhosis and 197, 198, 199, 212  
   histology 196  
   incidence 196  
   laboratory findings 197  
   “nodule-in-nodule” appearance 197  
   predisposing factors 196  
   signal intensities 197  
   small tumors 197  
   staging 197–199, 199, 200  
   “T1 effect” 197  
   TNM classification 200  
   tumor capsule 197, 198  
   types 196  
   vascular invasion 197  
 hepatocyte-specific contrast agents *see* hepatobiliary contrast agents  
 hepatogastric ligament 185  
 hepatomegaly  
   global 188  
   hepatic lymphoma 208–209  
 hereditary nonpolyposis colon carcinoma syndrome (Lynch syndrome) 336  
 “herringbone” patterns 41  
 hibernating myocardium 121  
 hibernoma, renal 283  
 high-dose dobutamine stress imaging  
   coronary heart disease 115–116  
   imaging protocol 115  
   interpretation 115–116  
   principles 115–116  
   technique 115  
 high-field MRI, 3T 644–649  
   1.5 T vs. 646  
   advantages 650  
   biomedical implants and 644  
   cardiac imaging 647, 647  
   chemical shift artifacts 645  
   clinical applications 647–649  
   coil technology 646  
   contrast agents 646  
   future developments 650  
   parallel imaging 646  
   physical effects 644–646  
   relaxation time changes 645  
   renal imaging 279  
   safety aspects 644  
   signal-to-noise ratio 644  
   specific absorption rate 645  
   susceptibility effects 64  
 Hill–Sachs lesion 477, 477, 560  
 hindfoot 531  
 hip dysplasia 509–510  
 hip joint 501–511, 561  
   anatomy 502, 503  
   arthritis 507, 561  
   capsule 502  
   children 509–510, 561  
   contrast agents 501  
   degenerative changes 506–507, 561  
   degenerative subchondral cysts vs. synovial plaques 506, 506–507  
   examination technique 501  
   slice thickness 501  
   fibrous tissue 509  
   fractures 508, 508  
   imaging planes 501  
   imaging protocol 502  
   inflammatory changes 507  
   osteoarthritis 506  
   posttraumatic changes 509  
   pre-osteoarthritic deformities 506  
   pulse sequences 501  
   soft-tissue injuries 509  
   tendinitis 509  
   trauma 508–509, 561  
   MRI indications 508  
 hip joint bursitis 509, 509  
 hip joint ganglia 507  
 hip joint hematomas 509  
 hip joint osteoarthritis 506, 506  
 hip joint synovial condromatosis 507  
 histiocytes (Langerhans cells) 435  
 histiocytosis X *see* Langerhans cell histiocytosis  
 Hodgkin disease  
   bone marrow involvement 554  
   chest wall invasion 145  
   liver 204–207  
   lymphadenopathy and 417, 418  
   oral cavity 54  
   splenic, AIDS-associated 276  
   thymic infiltration 129  
   whole-body MRI 638  
 hormonal hyperstimulation syndrome 376  
 Horton temporal arteritis (giant cell arteritis) 588  
 Howell–Jolly bodies 274  
 humeral avulsion of the glenohumeral ligament (HAGL) lesion 477, 560  
 humeroradial joint 482  
 humeroulnar joint 482  
 humerus 472, 482  
   avascular necrosis 480, 560  
 hydatid cysts 210–211, 211, 271  
 hydatid disease 210–211, 211  
   diagnosis 211  
   forms 210–211  
 hydrocele 396, 396–397  
 hydrocephalus valves 644  
 hydrogen atom 3  
 hydronephrosis 295, 295  
 hyoscine butylbromide  
   bladder imaging 342  
   gastrointestinal tract imaging 316  
   prostatic imaging 383  
 hyperparathyroidism  
   presurgical imaging 152  
   primary 130  
   secondary 130  
 hyperplastic polyps, gastric 320  
 hyperpolarized noble gas, pulmonary embolism 595  
 hypertrophic cardiomyopathy 94–97, 95  
   MRI indications 93  
   postoperative follow-up 96, 97  
   screening 97  
 hypertrophic obstructive cardiomyopathy (HOCM) 95, 96  
   postintervention imaging 96  
 hypopharyngeal carcinomas 56  
 hypopharyngeal lipomas 56  
 hypopharyngeal lymphoma 57  
 hypopharyngeal squamous cell carcinoma 56  
 hypopharynx 55–57  
   anatomy 55  
   congenital diseases 56  
   inflammatory diseases 56  
   tumors 56–57, 66  
   benign 56–57  
   malignant 56–57  
 hysterectomy, vaginal vault prolapse 355, 356



- I**
- idiopathic osteonecrosis of the knee *see* Ahlbäck disease
  - ileal artery 334
  - ileal conduit 296, 296
  - ileal leiomyosarcoma 324
  - ileocolic artery 334
  - iliac vein thrombosis 609
  - iliofemoral prosthesis, infected 625
  - iliopsoas bursa 509, 509
  - image averaging, physiologic artifact reduction 37
  - image noise 41
  - immunosuppression, hepatic lymphoma 207
  - implants
    - biomedical *see* biomedical implants
    - breast *see* breast implant(s)
  - incidentaloma 308, 311–312
    - endocrine tests 311
    - follow-up imaging 311
    - size 311
  - indirect hemagglutinin assay, amebic abscess 210
  - induratio penis plastica 401–402, 402
  - infants, marrow conversion 544
  - infection, pelvic inflammatory disease 374
  - infectious arthritis
    - hand 497–498
    - hip joint 507
  - infectious enteritis 328
  - infectious esophagitis 321
  - infectious inflammatory arthritis 458
    - rheumatic arthritis vs. 458
  - infectious lymphadenopathy, middle mediastinum 131
  - inferior cerebellar artery 572
  - inferior coronary ligament 185
  - inferior glenohumeral ligament avulsion 477
  - inferior meatus 44
  - inferior mesenteric artery 334
  - inferior mesenteric vein 599
  - inferior parathyroid glands 130
  - inferior vena cava 68, 599, 608–609
    - anomalies 608
    - aplasia 608
    - duplication 608
    - thrombosis 608, 609, 609
      - Budd–Chiari syndrome 216
  - inflammatory aortic aneurysm 601
  - inflammatory carcinoma, breast 166, 166
    - mastitis vs. 159
  - inflammatory pseudotumor, splenic 271
  - inflammatory sinus diseases 45–46
    - chronic destructive inflammations 45
    - destructive changes 45
    - nonneoplastic noninfectious destructive diseases 45
  - infrapatellar fat pad lesions 516, 516
  - infrapinnatus 472
  - infundibulotomy 87
  - insufficiency fractures, foot 541
  - insulinomas 236
  - interatrial septum 68
  - intercondylar space, knee 512
  - intercostal lymph nodes 412
  - intermetatarsal bursitis, Morton neuro-  
ma vs. 538
  - internal carotid artery 571
    - agenesis 572
    - aplasia 572
    - fibromuscular dysplasia 575
  - internal carotid artery dissection 575–576, 577
    - atherosclerotic plaques vs. 576
    - clinical aspects 576
    - diagnosis 576
    - expanded lumen 576
    - luminal narrowing 576
    - pathogenesis 576
    - prognosis 576
    - signs 576
    - treatment 576
  - internal iliac lymph nodes 414, **414**
  - internal mammary artery bypass 119, 119
  - International Federation of Gynecology and Obstetrics (FIGO) staging *see* FIGO classification
  - interosseous talocalcaneal ligaments 531
  - intersphincteric fistulas **358**
  - interventional closure of the ductus 88
  - interventricular septum 69
  - “intestinal aneurysm” 324
  - intimal flap, aortic dissection 587
  - intra-arterial digital subtraction angiography (IADSA) 640
  - intraductal papillary mucinous tumors, pancreatic 231–232, 232
  - intralesional sequestration, pulmonary 146
  - inframammary lymph nodes 162
  - intramural hematoma 587
    - acute 587
    - aortic aneurysm 583
    - dissection vs. 587, 588
    - subacute 587
  - intraosseous lipoma 431
    - cystic structures 431, 432
    - developmental stages 431
    - mineralization 431
  - intrauterine device (IUD) 360
  - intravascular flow artifacts, hepatic 181
  - intrinsic ligaments, hand 492, 493
  - invasive breast carcinoma 164–166, 178
    - benign lesions vs. 161, 165, 165
    - classification 164
    - differential diagnosis 166
    - enhancement curves 165
    - medullary 165
    - morphologic criteria 165
    - MRI specifics 165, 165–166
    - mucinous 165
    - papillary 166
    - peripheral rim enhancement 165
    - prognosis 165
    - subtypes 164
  - invasive ductal carcinoma not otherwise specified (IDC-NOS) 164
  - invasive lobular carcinoma 164, 166
  - inversion pulse 5
  - inversion recovery (IR) imaging 16–17
    - lymph node imaging 410
  - inversion time 16
  - inverted papillomas 47
  - involuntary movement artifacts, hepatic imaging 181
  - iron oxide particles 544
  - iron sulfate suspensions 314
  - ischemic strictures, biliary tract 260
  - ischial tuberosity, avulsion fractures 509
  - ischiorectal fistula **358**
  - islet cell tumors 236
- J**
- Jatene arterial switch 90
  - jejunal adenocarcinoma 324
  - jet phenomenon 113
  - joint(s) 470–542
    - MRI indications 470
      - see also individual joints*
    - joint effusion
      - hand 497
      - scapholunate ligament 499
    - jugular chain 412
    - jugular vein phlebitis 62
    - jugulodigastric lymph nodes 412
    - jugulotympanic glomus tumor 64
    - jumper's knee (patellar apex syndrome, chronic patellar tendinosis) 520, 521
    - junctional zone, uterus 361, 362
    - endometrial carcinoma 373, 373, 374
    - juvenile nasopharyngeal fibroma *see* angiofibroma
    - juvenile papillomatosis 161
    - juxtapapillary duodenal diverticulum 257, 258, 265
- K**
- Kaposi sarcoma
    - cardiac 110
    - gastric 321
  - Kayser–Fleischer corneal rings 214
  - kidney 279–292, 338–339
    - contrast agents 281
    - corticomedullary differentiation 281
    - differential diagnosis 292, 292
    - diffuse parenchymal diseases 291–292
    - examination technique 279–281
    - fibrous capsule 281
    - imaging indications 279, **279**
    - imaging protocol 279–280, **280**
    - imaging sequences 338–339
    - malignant tumors 285–291, 295, 296
      - CT vs. MRI 286
      - masses 281–291
        - benign 281–285
        - metastases 289, **290**
      - MRI anatomy 281
      - MRI indications 339
        - see also entries beginning renal*
  - Kienböck disease (avascular necrosis of the lunate) 495, 496
  - Klatskin tumor 201, 263
  - knee coils, foot imaging 530
  - knee joint 512–530, 561–562
    - anatomy 512–514, 513–514
    - articular cartilage 523, 524
    - examination technique 512, 561–562
    - imaging planes 512
    - osteoarthritis 454, 454
    - pulse sequences 512
    - synovial diseases 527–529
  - k-space
    - MRA 566
    - raw data 13, 13
    - segmentation 116
  - Kupffer cells 194
- L**
- labral cysts 479
  - labral tears 478–479
    - causes 478
    - types 478–479
  - lactation 156, 158
  - lamellar fibrosis, fibrolamellar hepatocellular carcinoma 200
  - lamellar periosteal reaction, metatarsals 541
  - Langerhans cell histiocytosis 435–436, 436
    - clinical aspects 435
    - differential diagnosis 436
    - histology 435
    - staging 436
  - Langerhans cells (histiocytes) 435
  - laparoscopic cholecystectomy, postoperative strictures 260, 260, 261
  - large intestine 328–336
    - anatomy 334
    - arterial supply 334
    - contrast agents 316
    - MRI indications 328
    - parts 334
    - polyps 331, 331, 332
    - stenosing lesions 331, 332
    - strictures 331, 332
    - venous drainage 334
      - see also* MR colonography
  - Larmor frequency 4
  - laryngeal carcinoma 57, 57
    - staging **57**
  - laryngeal chondromas 56
  - laryngeal papillomas 56
  - laryngeal papillomatosis 56
  - laryngeal squamous cell carcinoma 57, 57
  - laryngeal ventricle 55
  - laryngoceles 56
  - larynx 55–57
    - anatomy 55
    - cartilaginous framework 55
    - chondrosarcoma 57
    - congenital diseases 56
    - inflammatory diseases 56
    - tumors 56–57
      - benign 56
      - malignant 56–57
  - lateral cervical region/lateral triangle 60
  - lateral collateral ligament (LCL), knee 514
    - complete tears 518, 518
    - injuries 517–518
    - partial tears 518
  - lateral condylar fracture 487
  - lateral epicondylitis (“tennis elbow”) 486, 486, 561
  - lateral femorotibial compartment 512
  - lateral ligament complex 531
  - lateral meniscus 513
  - lateral neck cysts 61
  - lateral triangle/lateral cervical region 60
  - leading navigator 73
  - left anterior descending artery (LAD) 70
  - left atrium 69
    - congenital anomalies 84
  - left colic artery 334
  - left coronary artery (LCA) 70, 117
    - anomalous 117
    - branches 70

- left ventricle 69  
 congenital anomalies 84  
 functional parameters **69, 70**  
 outflow tract 69  
 volumetric parameters **69**
- left ventricular aneurysm **121, 123, 123**
- left ventricular noncompaction 69
- Legg–Calvé–Perthes disease **509, 510**
- leiomyoma  
 adenomyosis vs. 345  
 bladder 345  
 esophageal 319  
 gastric 320  
 small intestine 323  
 uterine *see* uterine leiomyoma
- leiomyosarcoma  
 cardiac **110, 110**  
 gastric 321  
 pulmonary arteries 149  
 small intestine 324
- Leriche syndrome **620**
- leukemia(s)  
 acute lymphoblastic **553, 554**  
 acute myeloid **553, 554**  
 bone marrow changes **553**
- leukocyte scintigraphy, infectious bone diseases 456
- levator ani complex **353, 354**
- levator fascia 385
- ligament(s)  
 injuries 469  
 examination technique 469  
 tears 469  
*see also individual joints; individual ligaments*
- ligamentous injuries 560
- light-bulb sign, hepatic lesions 205
- lingual tonsil 51
- "linguini sign," breast implant ruptures **174, 176, 176, 177, 177**
- lip carcinomas 54
- lipohemangiomas (hemangioliopomas) 432
- lipoma(s) **443, 444**  
 cardiac **106, 107**  
 cervical soft tissues 63  
 colonic 335  
 esophageal 319  
 fibrous septa 443  
 gastric 320  
 hepatic lipoma 219  
 hypopharyngeal 56  
 intramuscular 443  
 intraosseous *see* intraosseous lipoma  
 mediastinal **135, 135**  
 oral cavity 53  
 oropharynx 53  
 renal 283  
 sites of predilection **443**  
 small intestine 323
- lipomatosis  
 mediastinal 138  
 pancreatic 244
- liposarcoma **445–446**  
 breast 167  
 myxoid 446  
 poorly-differentiated **446**  
 prognosis **445–446**  
 subtypes **445–446**  
 well-differentiated **444–446, 446**
- liver **180–223, 338**  
 anatomy **185–187**  
 anomalies **187–189, 188**  
 arterial supply variants 185  
 blood supply 185  
 caudate lobe 187  
 congenital anomalies 188  
 contrast agents **181–184, 182, 184**  
 diffuse diseases **211–215, 337**  
 examination technique **180–184, 337**  
 patient positioning 180  
 imaging indications **181, 337**  
 inflammatory lesions **209–211**  
 lobar atrophy 188  
 lobes 186  
 accessory 188  
 lymphatic drainage 187, 413  
 lymphomatous involvement **204–209**  
 negative signal effect 184  
 normal parenchyma 187  
 parasitic lesions **209–211**  
 patient preparation 180  
 polycystic changes 188  
 positional anomalies 187, **188**  
 pulse sequences **180–181, 182**  
 segmental anatomy **186, 186–187**  
 shape anomalies **187–188, 188**  
 silicone in, breast implant rupture **174, 176**  
 storage diseases **214–215**  
 structural anomalies **188–189**  
 surface buckling ("cough furrows") 188  
 tumors *see* hepatic tumors  
 vascular diseases **216–217, 337**  
*see also entries beginning hepatic*
- liver flukes 256
- liver transplantation 260
- "lobular cancerization" 163
- lobular carcinoma in situ (LCIS) 163
- longitudinal (spin-lattice) relaxation 6, 42
- longitudinal relaxation time 6
- low-dose dobutamine stress imaging  
 contraindications 122  
 interpretation 122  
 myocardial viability **121–122**  
 side effects 122
- lower extremity arteries **616–622**  
 anatomy 618  
 examination technique **616–618**  
 MR-guided interventions 621  
 patient positioning 616  
 postinterventional follow-up **621, 623**  
 postoperative follow-up **621, 623**  
 treatment planning **618–621, 622**
- low-field systems, renal imaging 279
- L/T ratio, lymph nodes 415
- lumbar lymph nodes **414, 414**
- Lumirem *see* ferumoxsil
- lunate 494  
 avascular necrosis (Kienböck disease) **495, 496, 561**
- lung(s) **146–152**  
 encasement, pleural mesothelioma 141  
 malformations 146, 152  
*see also entries beginning pulmonary*
- lung parenchyma  
 diffuse changes **149–151, 150**  
 MRI limitation **149–151**
- lunotriquetral (LT) ligament 494  
 injuries **499–500, 561**  
 tears **499–500**
- lutinizing hormone (LH), polycystic ovaries 375
- Lutembacher syndrome 85
- lymphadenectomy, bladder carcinoma 349
- lymphadenitis, bladder carcinoma 348
- lymphadenopathy  
 benign **416, 417, 418**  
 benign–malignant discrimination **416, 416, 417, 420, 421**  
 cervical 62  
 gastric tumors 321  
 malignant **418–421**
- lymphangioma(s)  
 esophagus 319  
 gastric 320  
 oral cavity 52  
 oropharyngeal 52  
 splenic **276, 276**
- lymph node(s) **407–424**  
 abnormal **416–421**  
 anatomy **411–414**  
 artifacts 411  
 bladder tumors 348  
 cervical **60, 61**  
 contrast administration **416, 417, 418, 421, 422**  
 contrast agents 411  
 examination techniques **409, 409–411**  
 coils 409  
 imaging planes **410–411**  
 fat-suppressed sequences **415, 416, 417**  
 fibrolipomatous degeneration **415, 415**  
 future developments 408  
 imaging protocol **410**  
 intramammary 162  
 metastatic 162  
 L/T ratio 415  
 MRI diagnostic capabilities 408  
 MRI indications **408, 409**  
 MRI sensitivities 408  
 MRI specificities 408  
 MRI vs. CT 408  
 normal **415, 415**  
 rectal MRI 333  
 regional examination 408  
 sequences **409–411, 410**  
 shape 415  
 size criterion 408
- lymph node metastases **418, 418–421, 419**  
 drainage obstruction 418  
 L/T ratio 420  
 node shape 420  
 pancreatic adenocarcinoma 236  
 spherical transformation 420  
 study results 420
- lymphoepithelial carcinoma, paranasal sinuses **49–50, 50**
- lymphoepithelial cysts, salivary glands 58
- lymphoma(s)  
 bone marrow involvement 553  
 breast 167  
 Burkitt 50  
 cardiac 110  
 chest wall invasion 145  
 examination technique **409**  
 gastric 321
- hepatic **204–209, 208**  
 Hodgkin *see* Hodgkin disease  
 hypopharynx 57  
 imaging indications **409**  
 lymphadenopathy and **417, 418**  
 middle mediastinum **130–131**  
 nasal cavity 50  
 non-Hodgkin *see* non-Hodgkin lymphoma  
 oral cavity 54  
 oropharyngeal 54  
 pancreatic **237, 237**  
 paranasal sinuses 50  
 pleura 142  
 renal *see* renal lymphoma  
 splenic **276–277**  
 testicular **399, 400**  
 vaginal **363, 363**  
 whole-body MRI **638**
- lymphoproliferative systemic diseases **552–557, 553**  
*see also individual diseases*
- Lynch syndrome (hereditary nonpolyposis colon carcinoma syndrome) **336**

## M

- macrocystic adenoma, pancreatic 230
- macrohematuria, urothelial carcinomas 289
- macromolecules 20, 20
- macroregenerative nodules 196
- Madelung disease 63
- magic angle effect  
 ankle joint tendons 532  
 elbow joint 481  
 patellar tendon 514  
 rotator cuff imaging 475  
 rotator cuff tears 560
- magnet(s) **21–22**  
 field strength 21  
 homogeneity 21  
 types **21–22, 22**
- magnetic dipole moment 3  
 external magnetic fields and 3, 3
- magnetic field gradients 10
- magnetic field inhomogeneities **40, 41, 42**
- magnetic resonance angiography (MRA)  
 acquisition times 631  
 advantages 567  
 chronic thromboembolic pulmonary hypertension **595–596**  
 coarctation of the aorta 91  
 coils 567  
 congenital cardiac anomalies 84  
 contrast-enhanced *see* contrast-enhanced MRA  
 coronary *see* coronary MR angiography  
 CT angiography vs. 566  
 flow effects **564–567**  
 gadolinium chelate dosage 28  
 gradient motion rephasing **565**  
 high-field 647  
 image resolution 631  
 imaging strategies 631  
 inflow effects **564–565**  
 limitations 567  
 lower extremity **616–618**  
 misinterpretation 564



- magnetic resonance angiography (MRA)  
 pancreatic adenocarcinoma 234  
 pancreatic imaging 224–225  
 pancreatic transplantation 246–247  
 pelvic 616–618  
 peripheral  
 errors/limitations 629  
 outlook 629  
 phase-contrast *see* phase-contrast MRA  
 phase dispersion 565  
 phase error 565  
 postinterventional follow-ups 603, 603  
 postoperative follow-ups 603  
 pulmonary sequestration 146  
 pulmonary vessels 589  
 sequences 564  
 signal-to-noise ratio 567  
 technique 564–567, 631  
 three-dimensional data set 564  
 time-of-flight (TOF) *see* time-of-flight (TOF) MRA  
 time window 566  
 two-dimensional data set 564  
 unenhanced 564–567  
 whole-body *see* whole-body MRA
- magnetic resonance cholangiopancreatography (MRCP)  
 acute pancreatitis 241  
 benign papillary stenosis 266  
 bile duct carcinoma, primary 262, 263  
 biliary–enteric anastomosis 261, 261  
 biliary tract 248, 251, 338  
 children 252, 252  
 contraindications 248  
 ERCP vs. 338  
 imaging parameters 249, 249  
 multislice technique 250  
 patient preparation 248, 248  
 projection technique 249–250  
 PTCd vs. 338  
 sequences 248–250  
 chronic pancreatitis 241, 241  
 extrahepatic bile ducts 252  
 high-field MRI, 3T 648  
 multislice 338  
 pancreatic adenocarcinoma 235  
 pancreatic imaging 225–226, 227  
 pancreatic resection 245–246  
 pancreatic trauma 245  
 postoperative strictures 260, 260, 261  
 primary sclerosing cholangitis 255–256
- magnetic resonance imaging (MRI)  
 advantages of 2–3  
 computer system 24  
 contrast agents *see* contrast agents  
 fetal effects 360, 380  
 historical aspects 2, 2  
 imaging types 10–21  
 principles 2–24, 42  
 risks 32–35, 42  
 hearing 33  
 safety procedure guidelines 35  
 sequencing acronyms 16  
 side effects 32–35, 42  
 system components 21–25, 42  
 unwanted signal component suppression 20
- magnetization-prepared rapid gradient echo (MP RAGE) 19
- magnetization transfer 20, 20  
 magnetization transfer contrast 20, 20  
 magnetohydrodynamic effect 32  
 Magnevist *see* Gd–DTPA  
 Magnevist Enteral 316  
 male pelvis 383–404, 405–406  
 “malignant” coronary anomalies 117–118  
 malignant fibrous histiocytoma 449, 449  
 cardiac 110  
 clinical aspects 449  
 hemorrhagic areas 449  
 histology 449  
 secondary bone involvement 449
- malignant melanoma  
 breast metastasis 166  
 cardiac metastasis 103, 104  
 lymph node metastases 421, 421  
 whole-body MRI 637
- malignant pericardial effusion 109  
 malignant pericarditis 101  
 malignant peripheral nerve sheath tumor (MPNST) *see* malignant schwannoma  
 malignant pleural effusions 142  
 malignant schwannoma 448, 448  
 prognosis 448
- MALT lymphomas 321  
 mammography  
 breast papilloma 162  
 fibroadenoma 160  
 MRI *see* MR mammography  
 mandibular carcinoma 53, 54  
 mangafodipir trisodium *see* manganese dipyridoxyl diphosphate (Mn-DPDP)  
 manganese-containing compounds 314  
 manganese dipyridoxyl diphosphate (Mn-DPDP) 29–30, 183  
 focal nodular hyperplasia 192  
 infusion 30  
 mannitol 313
- Mansfield, Sir Peter 2  
 marrow conversion 544–546, 545  
 ageing 544, 545  
 fatty 543  
 infants 544  
 vertebral bodies 545
- marrow reconversion 546, 546–547  
 pathologic process vs. 546
- mastitis 159, 160  
 acute 159  
 classification 159  
 inflammatory carcinoma vs. 159
- mature teratoma *see* dermoids
- maxilla carcinoma 53, 54  
 maxillary sinus 44  
 maxillary sinus carcinoma 48, 49  
 maximum intensity projections (MIP), MR mammography images 156
- Mayer–Rokitansky Küster syndrome 369
- medial collateral ligament  
 elbow *see* ulnar collateral ligament  
 knee 514  
 complete tears 517, 517  
 injuries 517  
 partial tears 517  
 strains 517
- medial epicondylitis 485, 561  
 chronic 485  
 tears 485
- medial femorotibial compartment 512  
 medial meniscus 512–513
- median neck cysts 61, 61  
 median nerve 494, 496  
 segmental thickening 496  
 mediastinal lipomas 135, 135  
 mediastinal lipomatosis 138  
 mediastinal lymphadenopathy, sarcomatosis and 131  
 mediastinal pleura 127, 139  
 mediastinitis  
 diffuse 138  
 fibrosing 138–139, 152  
 mediastinum 127–139, 152  
 anatomy 127, 127–128  
 compartments 127, 127–128  
*see also individual compartments*  
 cystic structure diagnosis 129, 134, 135  
 cysts 152  
 diffuse diseases 138–139  
 examination technique 126  
 contrast agents 126  
 imaging planes 126  
 slice thickness 126  
 focal lesion diagnosis, MRI vs. CT 131, 135  
 lymphatics 412, 413, 413  
 normal variants 127  
 sequences 126  
 tumors 128, 128–134  
 extent determination 135, 135, 137  
 mediastinum testis 394  
 medullary carcinoma, thyroid gland 65  
 melioidosis 416, 418
- meningiomas  
 nasal cavity 50  
 paranasal sinuses 50  
 meningitis, sinusitis extension 45  
 meningoceles, posterior mediastinum 133  
 meniscal ganglion 520  
 meniscal lesions 518–520  
 examination technique 518  
 meniscal repair 520  
 meniscal tears 562  
 “absent bow tie” sign 519  
 bucket-handle tears 518–519, 519, 562  
 classification 518, 519  
 “double PCI” sign 519  
 examination technique 518  
 “fragment in notch” sign 519  
 horizontal 518, 519  
 longitudinal 518  
 oblique (flap tear) 518  
 osteoarthritis 454  
 radial 518, 519  
 vertical 518
- menisci, knee 512–513  
 image misinterpretation 513  
 postoperative 520  
 meniscocapsular separation 519–520  
 meniscofemoral ligaments 513  
 “meniscus homologue” 493
- menstrual cycle 361  
 breast parenchyma changes 156  
 mesenchymal hamartoma 218–219  
 mesenchymal sarcomas, hepatic 203
- mesenchymal tumors  
 oral cavity 54  
 oropharynx 54  
 splenic 276
- mesenteric ischemia 605  
 mesenteric lymph nodes 413, 414  
 imaging planes 411
- mesothelioma, pleura *see* pleural mesothelioma  
 metacarpal fractures 498  
 metal ions  
 magnetic moments 25  
 unpaired electrons 25
- metatarsus 531  
 methylcellulose 313  
 Meyenburg complexes (bile duct hamartomas) 188  
 microcystic adenoma, pancreatic 230, 231  
 microcystic carcinoma, biliary 202  
 middle colic artery 334  
 middle meatus 44  
 middle mediastinal lymphomas 130–131  
 middle mediastinum 127  
 cysts 131–132, 135  
 tumors 128, 130–132, 131, 152
- midface 44–51  
 anatomy 44  
 examination techniques 44  
 traumatic lesions 46
- midfoot 531  
 milary adenomatosis *see* nodular regenerative hyperplasia (NRH)
- Mirizzi syndrome 264  
 mitral insufficiency 113  
 dilated cardiomyopathy and 94  
 pathogenesis 113  
 quantification 113
- mitral stenosis 112  
 localized valve thickenings vs. 112  
 presentation 111
- mitral valve 69  
 mitral valve disease, gender and 111
- mobile cecum 334  
 moderator band (septomarginal trabeculae) 68  
 mononuclear phagocytic system (MPS), contrast agents 30–31
- Morison pouch (subhepatic space) 185  
 Morton neuroma 538, 538
- motion artifacts 36, 36  
 lymph node imaging 411  
 pancreatic imaging 224  
 prostatic imaging 383
- MotionTrak 73–74
- MR arthrography  
 articular cartilage, knee 523, 524  
 glenoid labrum pathology 478, 560  
 hand 492–493  
 hip joint imaging 501  
 knee joint 512  
 osteochondritis dissecans 526, 540  
 elbow joint 490  
 postoperative meniscus 520  
 shoulder joint 471  
 direct 471  
 indirect 471  
 triangular fibrocartilage injuries 499  
 ulnar collateral ligament tears 484
- MR colonography 328–331, 329, 331, 332, 340  
 air as distention medium 330  
 artifacts 331  
 coil selection 328–329  
 colonic tumors 328  
 contrast agents 329–330  
 data acquisition 330  
 examination techniques 329–330

- MR colonography  
 examination techniques  
   bright-lumen technique 329–330  
   dark-lumen technique 329, 330, 332  
 imaging guidelines 330–331  
 imaging parameters **330**  
 incomplete colonoscopy and 328  
 indications 318, 328  
 interpretation 331  
 new techniques 329  
 patient positioning 329  
 patient preparation 328–329  
 postprocessing 331  
 as screening test 340  
 sequences 329–330, **330**  
 subtraction technique 331  
*see also* large intestine
- MR enteroclysis  
 CT enteroclysis vs. 322  
 patient positioning 316  
 small intestine 322
- MR fluoroscopy 330
- MR hysterosalpingography 374
- MR mammography  
 artifacts 156  
 biopsy devices 168–169  
 coils 154–155  
 contrast agents 155  
 differential diagnosis aids 156  
 examination explanation/patient preparation 154  
 examination planning 154  
 examination technique 154–156  
 history taking 154, **154**  
 imaging sequences 154–155  
 indications 154, 178  
 interpretation 155–156, **157**  
 limitations 154  
 patient positioning 155  
 region of interest 156  
*see also* breast
- MR pelvimetry 380, **380**
- MR spectroscopy (MRS)  
 adrenocortical carcinoma 304  
 myocardial metabolism 83  
 prostate 385, **391**, 406  
 prostatic carcinoma 390, **391**
- MR urography 293–297, **339**  
 advantages 339  
 contrast agents 293–294  
 disadvantages 339  
 examination technique 293–294  
 patient preparation 293  
 postoperative findings 296–297  
 renal imaging **280**  
 strictures 295  
 traumatic lesions 297, **297**  
 tumors 295
- mucinous adenoma 230–231  
 malignant transformation 230–231, **231**
- mucocele 45, 46
- mucoepidermoid carcinoma, salivary glands 60
- mucosal fold (web), distal bile duct 257, **259**
- mucosal (intraluminal) tumors, esophagus 319
- müllerian duct cysts 387
- MultiHance (gadobenate dimeglumine; Gd-BOPTA) 29, 29, 183
- multiplanar reconstruction (MPRs), MR mammography 156
- multiple endocrine neoplasia (MEN) type IIa 304
- multiple endocrine neoplasia (MEN) type IIb 304
- multiple myeloma 441, **442**  
 bone marrow involvement 555–557, **556**  
 “salt and pepper” pattern 555–557, **556**  
 stages 555, **556**, 557  
 therapeutic response 557  
*see also* plasmacytoma(s)
- multiple overlapping thin-slab acquisitions (MOTSA), cervical vessels 569
- multislice spiral computed tomography (MSCT)  
 adrenal glands 299  
 coronary arteries 151–152  
 renal cell carcinoma 289  
 renal masses 279
- “mummy technique” 640, 641–642, **642**
- mumps (viral parotitis) 58
- mural hematoma, internal carotid artery dissection 576
- muscle(s)  
 elbow joint 483  
 injuries 560  
 trauma 468
- muscle contusions, posttraumatic 468
- muscular atrophy, hip joint 509
- muscular effort, vigorous 468
- muscular hematomas 468
- musculoskeletal system, high-field imaging 649
- Mustard procedure (Senning–Brom technique) 89, 90, **90**
- myasthenia gravis 129, 152
- mycetoma 45
- Mycobacterium avium-intracellulare* infection 271
- Mycobacterium tuberculosis* infection 271
- myelofibrosis 548, 549
- myelolipoma, adrenal 310–311
- mylohyoid muscle 51
- myocardial diseases 92–100  
 MRI indications **92**
- myocardial fibrosis, constrictive pericarditis and 102
- myocardial hemochromatosis 98
- myocardial infarction  
 acute **121**  
 chronic **106**, **121**, **122**  
 complications 123  
 diagnosis 114, 120–123  
 functional changes 122  
 morphological changes **122**, **123**
- myocardial ischemia, compression-induced 71
- myocardial mass **69**, 79–80
- myocardial MR tagging 78
- myocardial viability assessment 114, 120–123
- myocarditis 92
- myocardium 70
- myometrium 361
- myositis ossificans 468, **468**, 560
- myxomas 103, 104, **105**, **106**
- N**
- Nabothian cysts 365, **365**
- <sup>23</sup>Na imaging 83
- nasal cavity 44–51  
 anatomy 44  
 examination techniques 44  
 hematologic diseases 50  
 tumors 47–51  
   benign 47–48  
   malignant 48–51  
   neurogenic 48
- nasal cavity adenocarcinoma 49
- nasal cavity adenomas 48
- nasal cavity angiofibroma 47, **47**
- nasal cavity gliomas 50
- nasal cavity lymphoma 50
- nasal cavity meningiomas 50
- nasal cavity papillomas 47–48
- nasal cavity polyps 47
- nasal cavity retention cysts 47
- nasal cavity squamous cell carcinoma 48
- nasopharyngeal carcinoma 418
- navicular bone, accessory 536, **536**
- navigator echoes  
 cardiac MRI 73  
 physiologic artifact reduction 37
- navigators, coronary MR angiography 116
- navigator signal 73
- navigator technique, cardiac MRI 73
- NC100 150 **30**, **31**
- neck  
 neurovascular structures 60  
 visceral space 60
- negative contrast agents *see* superparamagnetic iron oxide particles (SPIOs)
- Neisseria gonorrhoeae* 374
- neoadjuvant chemotherapy-induced changes, breast 169, **169**
- nephroblastoma, renal 291
- nephrogenic systemic fibrosis (NSF), gadolinium chelate-induced 28, 183, **281**
- nerve compression syndromes  
 elbow 489  
 hand 496
- net magnetization 4, 4, **42**
- neurinoma(s) 445, **445**  
 cervical soft tissues 63  
 signal intensity 445, **445**  
 sinonasal system 48
- neuroblastoma(s)  
 adrenal 305, **305**  
 hemorrhagic 305  
 hepatic metastases, children 223  
 olfactory (esthesioneuroblastoma) 48  
 posterior mediastinum 133
- neuroendocrine tumors, hepatic metastases 206
- neuroenteric cysts, posterior mediastinum 133
- neurofibroma(s) 445  
 cervical soft tissues 63  
 posterior mediastinum 133  
 sinonasal system 48
- neurogenic tumors  
 benign 445  
 cervical soft tissues 63  
 posterior mediastinum 132–133, **133**
- neuroradiology, high-field MRI 644
- neurovascular bundle, prostate 385, **386**
- nidus, osteoid osteoma 427, **427**
- 90° pulse 5
- nitinol-based stents 603
- nodular cortical hyperplasia 303
- nodular goiter 128
- nodular regenerative hyperplasia (NRH) 195–196  
 portal hypertension 195–196  
 systemic disease associations 195
- nodular transformation *see* nodular regenerative hyperplasia (NRH)
- non-breath-hold sequences  
 chest wall examination 126  
 mediastinal examination 126  
 pleural examination 126
- noncirrhotic nodulation *see* nodular regenerative hyperplasia (NRH)
- non-Hodgkin lymphoma  
 bone marrow involvement 554, **555**  
 chest wall invasion 145  
 cystic transformation 554  
 hepatic 204, **208**  
 lymphadenopathy and 418  
 middle mediastinum 130–131  
 oral cavity 54, **55**  
 pancreatic 237, **237**  
 pleural 142  
 renal 289, **290**  
 small intestine 324  
 splenic 276  
 whole-body MRI 638
- nonobstructive hypertrophic cardiomyopathy (NOHCM) 97, **97**
- non-small cell carcinoma 148
- North American Surgical Endarterectomy Trial (NASCET) 573, 573–574
- nuchal muscles 60
- nuclear magnetic resonance (NMR)  
 historical aspects 2  
 principles 3–10
- nuclear magnetization 21
- nuclear spin 3–4  
 definition 3
- nuclei, macroscopic ensemble 4
- O**
- obstetric indications 380–381
- obstructive atelectasis 149, **150**
- obturator lymph nodes 414
- oil-based agents 314
- oil cysts, breast 170, **171**
- Okuda staging system, hepatocellular carcinoma **199**
- olfactory neuroblastoma (esthesioneuroblastoma) 48
- Ollier disease 428
- omental lymph nodes 411
- Omniscan *see* gadodiamide
- oncocytoma, renal *see* renal oncocytoma
- Opisthorchis* 256
- opposed-phase sequences  
 adrenal gland imaging 299  
 bone marrow examination 543
- optic nerve, contusional lesions 46
- oral cavity 51–55  
 anatomy 51  
 congenital diseases 52  
 examination technique 51

- oral cavity  
inflammatory diseases 52, 52  
tumors 53–55, 66  
benign 53  
malignant 53–55  
vascular malformations 52  
oral cavity dermoids 53  
oral cavity epidermoids 53  
oral cavity hemangiomas 52  
oral cavity lipomas 53  
oral cavity lymphangiomas 52  
oral cavity lymphoma 54  
oral cavity squamous cell carcinoma 53–54  
oral vestibule 51  
orbital cellulitis 45  
orbital lesions, traumatic 46  
orchitis 396, 397  
organ prolapse, pelvic 356, 356–357  
Ormond disease 292  
oropharyngeal dermoids 53  
oropharyngeal epidermoids 53  
oropharyngeal hemangiomas 52  
oropharyngeal lipomas 53  
oropharyngeal lymphangiomas 52  
oropharyngeal lymphoma 54  
oropharyngeal pseudotumors 54–55  
oropharyngeal squamous cell carcinoma 53–54  
oropharynx 51–55  
anatomy 51  
congenital diseases 52  
examination technique 51  
inflammatory diseases 52, 22  
tumors 53–55, 66  
benign 53  
malignant 53–55  
vascular malformations 52  
orthopantomogram 51  
Osborne lesion 489  
osteitis 456  
imaging 457  
posttraumatic 456, 457  
osteoarthritis 454, 454  
acromioclavicular joint 475, 480, 480, 560  
examination technique 454  
hand 497  
hip joint 506, 506  
knee joint 454, 454  
shoulder joint 480  
osteoblastoma 428, 428  
osteochondral fractures 466  
osteochondritis dissecans  
ankle joint 539–540  
classification 539  
elbow joint 490, 491  
imaging protocol **482**  
osteochondral fragment (intra-articular loose body) 490, 491  
prognosis 490  
foot **531**  
knee joint 525–526  
detachment 526  
pathogenesis 525  
sites 525  
staging 490, 525–526, 525–526  
osteochondroma 429–430  
cartilaginous cap thickness 429–430  
clinical aspects 429, 430  
complications detection 429  
MRI indications 429–430  
osteoclastoma *see* giant cell tumor  
osteoid osteoma 427, 427  
osteomyelitis 456, 456  
chronic 457, 457  
differential diagnosis 458  
Ewing sarcoma vs. 439, 458  
hip joint 507  
osteomyelofibrosis 548  
osteophytes  
hand 497  
hip joint 506, 506  
osteoporosis 463–465, 560  
benign fractures 543  
T2\* relaxation time determination 463, 463–464  
trabecular structure in 463–464  
trabecular structure analysis 464, 464, 465  
osteosarcoma 436–438, 437  
clinical aspects 436  
cystic components 437  
diagnosis 437–438  
focal hemorrhages 437  
histology 436  
joint effusion 437  
neurovascular bundle invasion 437  
signal patterns 436, 437  
sites of predilection 436  
skip lesions 438  
telangiectatic subtype 437  
therapeutic response 438  
treatment 436  
ovarian carcinoma 378–379  
diagnosis 378, 378–379  
epidemiology 378  
epithelial origin 378  
pathogenesis 378  
peritoneal metastases 379  
prognosis 379  
staging **379**, 405  
ovarian cystadenomas 376–377  
classification 376–377  
diagnosis 377, **377**  
epidemiology 376–377  
mucinous 377, 377  
serous 376  
ovarian cysts 375, 376  
ovarian dermoids 377–378, 378  
diagnosis 377–378  
epidemiology 377  
pathogenesis 377  
ovarian masses, hemorrhagic 377  
ovarian metastases 379, 379  
ovaries 362, 362, 374–379  
benign neoplasms 376–378  
benign nonneoplastic changes 374–376  
benign vs. malignant lesions **377**, 378–379  
endometriosis 376  
malignant neoplasms 378–379
- P**  
Paget cell 163  
Paget disease of the nipple 163–164  
clinical aspects 163  
diagnosis 163–164  
differential diagnosis 164  
normal breast parenchyma vs. 157, 164  
palatine tonsils 51  
palmar aponeurosis 493  
Pancoast tumor 137, 596  
pancreas 224–247  
age-related changes 227  
anatomy 226, 226–227  
anomalies 227–228, 338  
diffuse diseases 244  
examination preparation 224  
examination technique 224–226, 338  
contrast-enhancement 225  
patient preparation 224  
head 226  
inflammatory diseases 338  
metastases 238, 238  
MRI anatomy 227  
organ boundaries 226  
postoperative changes 245–247  
pulse sequences 224–226  
rare masses 238, 239  
relations 226  
tail 226  
tumors 228–238  
cystic 228–232  
solid 232–238  
staging 608  
pancreas divisum 227, 228, 338  
acute pancreatitis and 227  
chronic pancreatitis and 227, 242  
pancreatic adenocarcinoma and 235  
pancreatic adenocarcinoma 224  
biliary strictures and 235, 263  
chronic pancreatitis vs. 236, 242  
contrast administration 233, 234, 234, 235  
diagnosis 232–235, 233, 234, 235  
differential diagnosis 236  
“double-duct sign” 235, 235, 263  
ductal 232  
ductal dilatation 233, 234, 235, 235  
epidemiology 232  
extension 236  
hepatic metastases 234–235  
image analysis 235–236  
inoperability signs 234  
lymph node metastasis 236  
necrosis 235  
pancreas divisum and 235  
pathogenesis 232  
penetrating duct sign 263  
recurrent 234  
staging examination 234–235  
stenosis 235, 235  
vascular invasion 236  
pancreatic cystadenocarcinoma 230–231  
pancreatic cystadenoma 230–231  
pancreatic cysts 338  
pancreatic duct 226  
isthmus (genu) 226  
MRI anatomy 227  
pancreatic duct system 226–227, 228  
pancreatic head carcinoma 236  
pancreatic lipomatosis 244  
pancreatic lymphoma 237, 237  
pancreatic pseudocysts 229, 229  
pancreatic resection 233, 245–246  
diagnostic pitfalls 245–246  
MRI indications 245  
pancreatic transplantation 246, 246–247  
necrotic allografts 247  
rejection 246  
pancreatic trauma 245, 245  
ruptures 245  
pancreatitis 239–242  
acute 240, 240–241  
complications 241  
edematous form 240  
MRI indications 241  
pancreas divisum and 227  
chronic  
advanced 241, 242  
autoimmune disease and 242  
Cambridge classification 241  
contrast enhanced imaging 242, 243  
differential diagnosis 242  
pancreas divisum and 227, 242  
pancreatic adenocarcinoma vs. 236, 242  
forms **239**  
groove 236  
posttraumatic 245  
pannus, rheumatoid arthritis 452, 452  
papilla of Vater 226  
adenocarcinoma 235  
papillary adenoma 266  
papillary carcinoma 267, 267  
thyroid gland 65  
papillary fibroelastoma 108  
papillary muscles 68, 69  
papillary (uncinate) process 187  
papillary tumors, benign 266  
papilloma(s)  
breast *see* breast papilloma  
fungiform 47  
inverted 47  
larynx 56  
nasal cavity 47–48  
paranasal sinus 47–48  
papillomatosis  
esophageal 319  
juvenile 161  
laryngeal 56  
papillotomy 265  
para-aortic lymph nodes 414  
paracardiac lymph nodes 412  
paracaval lymph nodes 414  
paracolicum 362  
paragangliomas  
cervical soft tissues 63, 64  
“salt-and-pepper” patterning 63  
parallel acquisition technique (PAT), abdominal vessels 599  
parallel imaging 20  
hepatic imaging 180  
renal imaging 279  
paramagnetic contrast agents 26  
paramagnetic molecules 25  
paramagnetism 10, 25  
paranasal sinus(es) 44–51  
anatomy 44  
examination techniques 44  
hematologic diseases 50  
tumors 47–51  
benign 47–48  
malignant 48–51  
neurogenic 48  
paranasal sinus adenocarcinoma 49  
paranasal sinus adenoma 48  
paranasal sinus angiofibroma 47, 47  
paranasal sinus lymphoepithelial carcinoma 49–50, 50  
paranasal sinus lymphoma 50

- paranasal sinus meningiomas 50  
 paranasal sinus papillomas 47–48  
 paranasal sinus polyps 47  
 paranasal sinus retention cysts 47  
 paranasal sinus squamous cell carcinoma 48, 49  
 parasitic cholangitis 256, 256  
 parasitic cysts, adrenal 311  
 parasitic excitation 40  
 parasternal lymph nodes 412  
 parathyroid adenoma 63, 130  
 parathyroid glands 61, 130  
 parietal pleura 139  
 parotid duct 58  
 parotid fascia 58  
 parotid gland 58  
 metastatic deposits 60  
 parotid gland cystadenolymphoma 59, 59  
 partial cystectomy, bladder carcinoma 349  
 partial meniscectomy 520  
 partial nodular transformation *see* nodular regenerative hyperplasia (NRH)  
 partial volume effects, rotator cuff imaging 475  
 patching valvulotomy 87  
 patellar apex syndrome (chronic patellar tendinosis, jumper's knee) 520, 521  
 patellar tendinosis, chronic (patellar apex syndrome, jumper's knee) 520, 521  
 patellar tendon 514  
 lesions 520, 521  
 tears 521  
 patent ductus arteriosus (PDA) 88  
 pathologic fractures 543  
 peak pressure gradient 111  
 pedal arteries 627, 628  
 examination technique 616  
 pedal vessels 632  
 peliosis  
 hepatic 217  
 splenic 273  
 pelvic/iceal system 281  
 pelvic arteries 616–622  
 anatomy 618  
 patient positioning 616  
 postinterventional follow-up 621, 623  
 postoperative follow-up 621, 623  
 pelvic fistulas 357–358, 405  
 anatomy 357, 358  
 examination technique 357  
 subcutaneous 358  
 pelvic floor 405  
 abnormal findings 354–357  
 definition 351  
 function 351  
 normal findings 405  
 organ prolapse 405  
 pelvic floor dysfunction 351–357  
 anatomy 352, 353, 353  
 examination techniques 351–352  
 follow-up examination 352, 353  
 patient positioning 351–352  
 patient preparation 351  
 rectal opacification 351, 352  
 sequences 352  
 vaginal opacification 351, 352  
 image analysis 352–353, 353  
 organ prolapse 352–353  
 MRI indications 351  
 symptoms 351  
 pelvic inflammatory disease (PID) 374–375, 405  
 clinical aspects 374  
 diagnosis 374  
 pathogenesis 374  
 pelvic lymph nodes 414, 414  
 imaging planes 411  
 metastases 419  
 pelvic phased-array coil 360  
 pelvic tumors 409  
 pelvis 341–406  
 examination technique 616–618  
 female *see* female pelvis  
 male 383–404, 405–406  
 penile carcinoma 403  
 penile fibrosis 402  
 penile fracture 401, 401  
 penile hematomas 401, 402  
 penile urethra 400  
 penis 400–404, 406  
 anatomy 400, 401  
 base 406  
 benign disorders 401  
 bulb 400  
 erectile bodies 400  
 examination technique 400  
 glans 400  
 inflammatory diseases 401–402  
 malignant tumors 403  
 metastases 403, 404  
 trauma 401  
 pentalogy of Fallot 86  
 percutaneous needle biopsy, breast 168  
 percutaneous transhepatic cholangiographic drainage (PTCD), MRCP vs. 338  
 perfusion-ventilation scintigraphy, pulmonary embolism 593  
 perianal abscess 358  
 perianal fistulas 318, 358  
 anatomical classification 358  
 pericardial cysts 100, 131  
 pericardial diseases 100–102  
 MRI indications 92  
 pericardial effusion 101  
 hemorrhagic 101  
 purulent 101  
 transudative 101, 102  
 pericardial fluid collections 101  
 pericardial masses 103–110  
 pericardial tamponade 101  
 pericarditis 101  
 pericardium 68, 69  
 complete absence 101  
 congenital changes 100–101  
 normal appearance 100  
 parietal layer 69, 100  
 partial aplasia 101  
 visceral layer 69  
 pericholecystitis 264  
 pericolic lymph nodes 333  
 perigastric lymph nodes 411  
 perihepatic ligaments 185  
 perineal region abscess 402, 403  
 peripancreatic lymph nodes 411  
 peripheral arterial occlusive disease (PAOD) 618  
 follow-up 624  
 prosthetic occlusion 621  
 peripheral nerve stimulation (PNS), gradient field-associated 33  
 peripheral skeletal system 425–562  
 trauma 466  
 peripheral vessels 612–630, 632  
 bolus geometry 615  
 clinical practice tips 629  
 coils 612  
 examination technique 612–616  
 outlook 629  
 patient preparation 612  
 scan parameters 613–615  
 vascular contrast 615  
 periprostatic venous plexus 385  
 perirectal lymph nodes 333  
 perirenal space 281  
 peritoneal metastases, ovarian carcinoma 379  
 peritoneocele 356  
 peritoneum 334  
 permanent magnets 22, 22, 22  
 Perthes lesion 478  
 pes anserinus band 514  
 pes planus 536  
 Peutz–Jeghers syndrome 322–323  
 phalangeal fractures, hand 498  
 pharyngoceles 56  
 phase-contrast MRA 565  
 aortic stenosis 87  
 cervical vessels 570, 631  
 lower extremity arteries 617  
 pelvic arteries 617  
 peripheral vessels 612  
 phased-array coils  
 adrenal gland imaging 299  
 bladder imaging 343  
 cardiac MRI 72  
 cervical vessels 569  
 gastrointestinal tract imaging 313, 316  
 hand imaging 492  
 hepatic imaging 180  
 hip joint imaging 501  
 lymph node imaging 409  
 MRA 567  
 MR colonography 328  
 pancreatic imaging 224  
 peripheral vessels 612  
 pulmonary vessels 589  
 rectal MRI 333  
 renal imaging 279  
 RF system 23  
 shoulder artery imaging 626  
 shoulder joint imaging 470, 471  
 thorax examination 126  
 upper arm vascular imaging 626  
 phase encoding 11–13, 13  
 phase-encoding direction, wrap-around 37  
 pheochromocytomas (chromaffin cells) 301  
 pheochromocytoma 304–305, 305  
 bladder 345  
 catecholamine-secreting 304  
 clinical aspects 304  
 diagnosis 305  
 familial syndromes and 304–305  
 phleboliths 444  
 phyllodes tumor 162–163  
 clinical aspects 162  
 diagnosis 162–163  
 differential diagnosis 163  
 physiologic artifacts 36, 36–37  
 remedial 36–37  
 pigmented villonodular synovitis (PVNS)  
 clinical aspects 527  
 definitions 527  
 differential diagnosis 527  
 hip joint 507, 508  
 histology 527  
 iron deposits 527  
 knee joint 527  
 erosive bone changes 527  
 osseous lesions 527  
 subchondral cysts 527, 528  
 pathology 527  
 “pinnate figure,” soft-tissue hemangiomas 444  
 piriform recess 55  
 tumors 56  
 pixel dimensions 14  
 plantar fasciitis 537, 538, 562  
 differential diagnosis 537  
 plantar fibromatosis 537  
 plaque imaging 647  
 plasma cell neoplasms 554  
 plasmacytoma(s)  
 bone marrow 554–555  
 chest wall 145  
 multiple myeloma development 555  
 pathologic fractures 554  
 skeletal 441  
 sphenoid sinus 50  
 treatment 554  
 whole-body MRI 638  
*see also* multiple myeloma  
 pleomorphic adenoma (benign mixed tumor) 59  
 pleura 139–143, 152  
 anatomy 139, 139  
 contrast agents 126  
 diffuse changes 142–143  
 examination technique 126  
 imaging planes 126  
 slice thickness 126  
 fat layer 139  
 lymphomatous involvement 142  
 MRI sequences 126  
 normal variants 139  
 tumors 140–142  
 benign 140–141  
 malignant 141–142  
 pleural carcinomatosis 141, 142  
 pleural cavity 139  
 pleural effusions 142–143  
 exudates 142  
 hemorrhagic 142  
 loculated 142  
 MRI specifics 142–143, 143  
 pleural mesothelioma 141  
 transudative 142  
 pleural empyema 142  
 pleural mesothelioma 141–142  
 differential diagnosis 141–142  
 epidemiology 141  
 findings 141  
 pathogenesis 141  
 pleural effusions 141  
 staging 141  
 TNM classification 141  
 pleural metastases 142  
 plexiform neurofibroma 133  
*Pneumocystis carinii* infections 271  
 polycystic ovaries 375



- polycythemia 550  
 polyps  
   adenomatous *see* adenomatous polyps  
   fibrovascular, esophageal 319  
   hyperplastic, gastric 320  
   large intestine 331, 331, 332  
   nasal cavity 47  
   paranasal sinuses 47  
 polysplenia 270  
 popliteal hiatus 513  
 porcelain gallbladder 265  
 porta hepatis 185  
   hepatic cirrhosis 212  
   hepatic lymphoma 207  
 portal circulation 607–608  
 portal vein hypertension 607, 607  
   diagnosis 607  
   hepatic cirrhosis 213  
   pathogenesis 607  
   splenic involvement 273, 274  
 portal vein thrombosis 217, 608  
   causes 608  
   diagnosis 608  
   tumor invasion 608, 608  
 positive contrast agents, gastrointestinal tract imaging 313–314, 315  
 “positive fat pad sign” 487  
 positron emission tomography (PET), lymphomas 553  
 postbiopsy hemorrhage, prostate 388  
 postcardiotomy syndrome 101, 101  
 posterior cecal artery 334  
 posterior cruciate ligament (PCL) 513–514  
   angulation changes, anterior tibial displacement 515, 516  
   injuries 517  
 posterior cruciate ligament tears complete  
   direct signs 516, 517  
   indirect signs 517  
   partial 517  
 posterior ethmoid cells 44  
 posterior fibulotalar ligament 532  
   injury 532  
 posterior interventricular sulcus 68  
 posterior mediastinum 127  
   cysts 133, 135  
   pseudocysts 133  
   tumors 128, 132–133, 152  
     extent determination 135, 137  
     neurogenic 132–133, 133, 152  
 posterior meniscofemoral ligament (of Wrisberg) 513  
 posterior spinal arteries 572  
 posterior subtalar joint (talocalcaneal joint) 531  
 posterior tibiofibular ligament 532, 533  
 posttraumatic bone injuries, elbow 561  
 posttraumatic calcifications, hip joint 509  
 posttraumatic fractures 543  
 posttraumatic muscle tears, hip joint 509  
 posttraumatic pancreatitis 245  
 posttraumatic pseudocysts, splenic 278  
 pregnancy  
   adnexal torsion 375  
   fetal anomaly detection 381, 381  
   imaging 380–381, 381  
   MRI during 360, 380–381, 381  
   MRI vs. ultrasound 381  
   prepatellar bursa 514  
   prepatellar bursitis 522  
   presaturation 20  
   presbypancreas 227  
   presegmental arteries (embryonic ca-rotid-vertebral anastomoses) 572  
   primary biliary cirrhosis (PBC) 254, 254  
   primary hyperaldosteronism 301–302  
     clinical aspects 301–302  
   primary pigmented nodular adrenocortical disease (PPNAD) 303  
   primary sclerosing cholangitis (PSC) 254–256, 255  
     complications 256  
     differential diagnosis 256  
     gallbladder in 254  
     MRCP indications 255–256  
     MRCP vs. ERCP 255  
     secondary cholangiocarcinoma 256  
     staging 254–255  
   primitive neuroectodermal tumor (PNET), chest wall 143, 144, 145  
   ProHance 28  
   projection reconstruction (PR) technique 11  
   pronator teres 483  
   prospective ECG triggering 73  
   prostaglandins, tetralogy of Fallot 87  
   prostate 383–393, 405–406  
     benign changes 386–388  
     central gland 385  
     central zone 386  
     congenital cysts 387  
     cystic lesions 387–388  
     examination technique 383–385  
       coils 383, 383  
       scanners 383–384, 405  
       sequences 384  
     extracapsular tumor extension 384, 391  
     hemorrhages 384, 388, 392  
     imaging protocol 384  
     malignant changes 388–390  
     MRI anatomy 385–386  
     MRI indications 406  
     new imaging techniques 385  
     peripheral zone 385  
     periurethral zone 386  
     pseudocapsule 385  
     transitional zone 386  
     zonal anatomy 384, 385, 386  
   prostate specific antigen (PSA) 388  
   prostatic abscess 387  
   prostatic adenocarcinoma *see* prostatic carcinoma (PCA)  
   prostatic capsule 385  
   prostatic carcinoma (PCA) 388–390, 406  
     bone marrow metastases 552  
     core biopsy 389  
     description of findings 390  
     early detection 388–389  
     epidemiology 388  
     extracapsular extension 390, 391  
     incidence 388  
     metastases 421  
     metastases detection 420  
   MRI  
     indications 389–390  
     MRS and 390  
     results 389–390  
     staging accuracy 390  
     transrectal ultrasound vs. 390  
     treatment planning 390  
   pretherapeutic staging 383  
   screening 388–389  
   seminal vesicle involvement 390, 391  
   signs 386, 390, 391, 392  
   staging 388, 389  
   TNM classification 389  
   prostatic fascia 385  
   prostatic urethra 386  
   prostatitis 387  
     acute 387  
     chronic 387, 388  
   proton density (PD) 4  
   proton density-weighted (PDW) echo 15  
     articular cartilage, knee 523, 524  
     knee joint imaging 512  
   proximal radioulnar joint 482  
   proximal vertebral artery  
     agenesis 572  
     aplasia 572  
     occlusions 574  
   pseudoaneurysmal dilatation, pulmonary vessels 592  
   pseudocalculus 257  
   pseudocalculus sign 265, 266  
   pseudocapsule(s)  
     prostate 385  
     renal cell carcinoma 286, 287  
     uterine leiomyoma 370  
   pseudocoarctation 583  
   pseudocyst(s)  
     adrenal 311  
     pancreatic 229, 229  
     posterior mediastinum 133  
     splenic, posttraumatic 278  
   pseudostenoses, positioning pad-induced 613  
   pseudotumors  
     oropharyngeal 54–55  
     renal 281, 282  
     splenic 271  
     tongue base 54–55  
   psoriatic arthritis 453–454  
   ptotic spleen 270  
   pulmonary adenocarcinoma 150  
   pulmonary arterial aneurysms 592, 592  
   pulmonary arterial window 591  
   pulmonary artery angiosarcoma 596  
   pulmonary artery leiomyosarcoma 149  
   pulmonary artery stenosis 87–88  
     clinical aspects 87  
     pathogenesis 87  
     types 88  
   pulmonary embolism 593–595  
     clinical aspects 593  
     diagnosis 593  
     diagnostic criteria 594  
     pathogenesis 593  
     treatment 593  
     unenanced MRI 595  
     wedge-shaped perfusion defects 595  
   pulmonary hypertension 86  
   pulmonary metastasis 149, 149  
   pulmonary sequestration 146  
   pulmonary stenosis 591  
   pulmonary thromboendarterectomy 595  
   pulmonary valve 69  
   pulmonary veins 69  
   pulmonary vessels 589–592  
     anatomy 591  
     angiosarcoma 596–597  
     congenital anomalies 591–592  
     examination techniques 589, 589–591  
       parallel imaging 589  
     imaging planes 590  
     pressure 591  
     subtraction techniques 591  
     tumor invasion 596, 596  
     tumors 596  
       *see also individual vessels*  
   pulse angle 5  
   Purcell, Edward M. 2  
   pyelonephritis, acute 291–292  
     corticomedullary differentiation loss 292  
   pyosalpinx 374
- Q**
- quadriceps femoris tendon 514  
 quadriceps tendon  
   injuries 521  
   normal 521  
   tears 521, 521  
   quenching 22
- R**
- radial collateral ligament 483, 484, 485  
   accessory part 485  
   posterior instability 485  
   rupture 485  
   tears 485  
 radial fractures  
   distal 498  
   head 487, 487  
 radical cystectomy, bladder carcinoma 349  
 radiofrequency field  
   artifacts 41  
   intermittent contact 34  
   risks associated 34–35, 35  
     heating 34  
     implants 34–35  
     metallic conductors 34  
     skin-to-skin contact 34  
 radiofrequency pulse, net magnetization deflection 5, 5  
 radiofrequency system 23–24  
   coil design 23, 23  
   noise amplitude 23  
 radiography, conventional  
   avascular necrosis 460  
   bone trauma 466  
   hip joint osteoarthritis 506  
   infectious bone diseases 456  
   oral cavity 51  
   oropharynx 51  
   rheumatic diseases 451  
   tarsal coalition 539  
 radiotherapy  
   breast change induction 170–173, 172  
   fatty marrow replacement 547, 549

- radius 482  
fractures 466
- random phase orientation 7
- ranula 59
- rapid acquisition with relaxation enhancement (RARE) *see* fast spin echo (FSE)
- Rasmussen pseudoaneurysm 592
- reactive arthritis (Reiter disease) 453–454
- real-time slice tracking, cardiac MRI 73–74
- receiving coils, MRA 567
- reconstructive breast surgery 170
- rectal carcinoma 333, 333, 334  
MRI role 328, 340  
retroperitoneal lymph node metastases 420
- rectal disease 335–336  
neoplastic 335–336  
nonneoplastic 335
- rectal kinking 355, 356
- rectal MRI 333  
coil selection 333  
contrast agents 333  
examination technique 333  
imaging parameters **330**  
interpretation 333, 333, 334  
lymph nodes 333  
patient preparation 333  
postprocessing 333  
sequences **330**, 333  
transmural tumors 333  
tumor staging 333
- rectocele **353**, 356, **356**
- rectopexy, follow-up examination 352, 353
- rectosigmoid junction stricture 332
- rectovaginal septum 357
- rectovesical septum 357
- red marrow 544
- red pulp, spleen 270
- reflux esophagitis 321
- refocusing pulse 7
- regional myocardial contraction abnormalities 80, 80
- Reichel disease 528
- Reiter disease (reactive arthritis) 453–454
- relaxation 6, 6–7  
components 6  
definition 6  
longitudinal 6, 42  
spin-lattice 6, 42  
spin-spin 6, 42  
transverse 6, 42
- relaxivities 26
- renal abscess 285
- renal adenoma 285
- renal allograft rejection  
acute tubular necrosis vs. 292  
corticomedullary differentiation loss 292
- renal angiomyolipoma 282–283, 285
- renal arteries 281  
examination technique 616  
occlusion 292  
variants 604, 604, 604–606
- renal artery stenosis 605–606, 606  
diagnosis 605  
screening tests 605
- renal cell carcinoma 286–289, 339  
blood products 286  
chromophilic (papillary) 286  
clear-cell 286  
contrast enhancement 286, 289  
cystic, complicated cysts vs. 286, 287  
detection 286, **287**, 288  
histopathology 286  
incidence rates 286  
inferior vena cava thrombosis 609, 609  
large 289  
metastases detection 420  
MRI vs. CT 286, **287**, 288, 339  
organ-conserving tumor surgery criteria 286  
perirenal fat invasion 289  
renal oncocytoma vs. 285  
small 289  
staging 286–289, **288**  
inaccurate 289  
MRI vs. CT 289, **289**  
TNM classification **288**
- renal cysts 282, 339  
category I (simple benign) 282, 283  
category II (moderately complicated) 282, 283  
category IIF (follow-up) 282  
category III (potentially malignant) 282, 284  
category IV (definite malignancy) 282  
classification 282  
renal cell carcinoma vs. 286, 287
- renal hibernoma 283
- renal hilum 281
- renal impairment  
contrast agents, MR urography 293–294  
nephrogenic systemic fibrosis 281
- renal infarction 291
- renal insufficiency 183
- renal lipoma 283
- renal lymphoma 289–290  
differential diagnosis 290  
epidemiology 289–290
- renal metastases 289, **290**
- renal nephroblastoma 291
- renal oncocytoma 283–285  
renal cell carcinoma vs. 285  
spoked-wheel pattern 285
- renal pelvic carcinoma, MR urography 295, 296
- renal pelvis 281
- renal pseudotumors 281, 282
- renal sarcoma 291
- renal stents 606, 607
- renal transplantation  
femorofemoral bypass 623  
ureteral strictures 297, 297
- renal vein 281
- repetition time 7, 8, 42  
hepatic imaging 180  
physiologic artifact reduction 36
- resistive magnet 22, **22**
- resolution 14
- resonant condition 5
- resonant excitation 5
- Resovist *see* ferucarbotran
- respiratory gating/trigging 126  
lymph node imaging 410
- respiratory synchronization, cardiac MRI 73–74
- respiratory-triggered two-dimensional imaging, pulmonary embolism 594–595
- restrictive cardiomyopathy 97–98, 98  
constrictive pericarditis vs. 97–98  
diagnosis 97  
primary 97  
secondary 97
- retention cysts  
esophagus 319  
nasal cavity 47  
paranasal sinus 47  
prostate 387  
salivary glands 59
- rete testis 394
- reticuloendothelial system (RES)-specific contrast agents 30, 183–184
- retrocrural lymph nodes 413, **414**
- retroperitoneal lymph nodes 414  
imaging planes 411  
metastases 420
- retropharyngeal abscess 52, 52
- retrospective ECG gating 73
- retrosternal goiter 128
- retrosternal lymph nodes 412
- reverse Bankart lesion 477
- rhabdomyoma 107, 107
- rhabdomyosarcoma(s) 109, 447  
alveolar subtype 447  
biliary tree 223  
embryonic 345, 346, 447  
malignant pericardial effusion and 109  
pleomorphic subtype 447
- rheumatic carditis 111
- rheumatic diseases 451–455, 560  
imaging techniques 451  
seronegative 453–454  
joint involvement patterns 453–454  
sacroiliac joint 453, 453–454
- rheumatic equivalents, acquired valvular heart diseases and 111
- rheumatoid arthritis 451–452  
cervical spine 452, 453  
concomitant joint effusion 451, 452  
cystic bone changes 452  
edematous changes 452  
erosive changes 452  
examination technique 451  
hand 497–498  
hip joint 507  
imaging protocol 451  
infectious inflammatory arthritis vs. 458  
initial stage 452  
knee joint 527  
shoulder joint 480
- ribs, congenital anomalies 143
- Riedel lobe 188
- Riedel thyroiditis 62
- right atrium 68  
congenital anomalies 84
- right cardiophrenic angle, pericardial cysts 100
- right colic artery 334
- right coronary artery (RCA) 70, 117  
anomalous 117, 118  
branches 70
- right coronary sinus of Valsalva aneurysm 118
- right descending thoracic aorta 91, 91
- right hepatic artery, aberrant 185
- right hepatic vein 186
- right subclavian artery, aberrant 572
- right ventricle 68  
congenital anomalies 84  
functional parameters **69**  
myocardium 68  
volumetry **69**, 79
- right ventricular hypertrophy 88
- right ventricular outflow tract 68–69
- ringing artifact (truncation artifact) 40, 40
- Roger disease 85
- Rokitansky nodule (dermoid plug) 378
- rotator cuff 472  
degenerative changes 475  
rotator cuff lesions 474–477  
rotator cuff tears 476–477, 560  
acromion morphology 474  
causes 476  
full-thickness (complete) 476, 476  
MRI sensitivity 477  
MRI specificity 477  
partial-thickness 475, 475, 476  
rounded atelectasis 140–141  
comet-tail patterns 141  
round ligament, liver 185

## S

- saciform recess 482
- sacral insufficiency fracture 467
- sacrocolpopexy 352, 353
- sacroiliac joint 454  
sacroiliac joint imaging 451
- salivary gland(s) 58–60  
acquired cysts 59  
anatomy 58  
congenital lesions 58  
cystic changes 58  
inflammatory diseases 58–59  
acute 58  
chronic 58  
neoplastic disease 54, 59–60  
benign 59  
malignant 60
- salivary gland adenocarcinoma 60
- salivary gland metastases 60
- salivary gland mucoepidermoid carcinoma 60
- salivary gland retention cysts 59
- salivary glands metastases 60
- salivary gland squamous cell carcinoma 60
- salpingitis 374
- salpingoadnexitis 374
- salpingo-oophoritis 374
- Santorini duct (accessory pancreatic duct) 227
- sarcoidosis  
lymphadenopathy and 417, 418  
mediastinal lymphadenopathy and 131  
myocardial infiltration 98  
pancreatic 239  
salivary glands 59  
splenic involvement 271
- sarcoma(s)  
breast 167  
embryonal *see* embryonal sarcoma

- sarcoma(s)  
 Ewing see Ewing sarcoma  
 renal 291  
 synovial see synovial sarcoma
- satellite ("skip") lesions 60, 438
- saturation 20
- saturation pulses, physiologic artifact  
 reduction 37
- scanners, safety limits 33
- scaphoid 494  
 avascular necrosis 495, 495  
 fractures 498, 499  
 hyperemia vs. necrosis 495  
 nonunion 495
- scapholunate (SL) ligament 493, 494,  
 499, 561  
 dissociation 499  
 tears 499, 500
- scapula 472
- schistosomiasis 346
- Schmincke tumors 49–50, 50
- scirrhous carcinoma, gastric invasion  
 321
- sclerolipomatosis 326
- sclerosing cholangitis 648, 648–649
- scrotal cavity 394
- scrotal fluid collections 396–397
- scrotum  
 anatomy 394, 394  
 benign disorders 394–398  
 benign masses 397  
 benign tumors 397  
 examination technique 393  
 malignant tumors 398–400  
 sequences 393  
 trauma 394, 395
- secretin-stimulated dynamic imaging  
 chronic pancreatitis 241  
 pancreas 225, 225–226  
 pancreatic ducts 227  
 papillary region 265
- segmented gradient-echo sequence  
 (turbo-field echo), coronary MRA  
 116–117
- Segond fracture 516
- semimembranous bursa 514
- seminal vesicles 383–393, 405–406  
 benign changes 388  
 contrast agents 384  
 examination technique 383–385  
 imaging protocol **384**  
 malignant invasion, bladder tumor 347  
 MRI anatomy 386  
 prostatic carcinoma involvement 390,  
 391  
 rare malignant tumors 390
- seminiferous tubules 394
- seminomas  
 extragonadal 130  
 testicular 399, 399
- Senning–Brom technique (Mustard pro-  
 cedure) 89, 90, 90
- sensitivity encoding (SENSE) 20
- septate uterus 369, 369, 370
- septic cavernous sinus thrombosis  
 45–46
- septic puerperal ovarian vein thrombosis  
 (SPOVT) 375
- septomarginal trabeculae (moderator  
 band) 68
- septum 68
- septum primum 84  
 defects 84
- septum secundum 84  
 defects 84
- seromas, breast implants and 177
- serotonin, small intestine carcinoids 323
- serous adenoma, pancreatic 230
- SE sequences see spin echo (SE) imaging
- shielded magnets 32
- short inversion recovery (STIR) images  
 16–17  
 avascular necrosis 460, 461  
 bone marrow examination 543  
 hand imaging 492  
 hip joint imaging 501  
 prostatic imaging 384
- shoulder arteries 626, 626
- shoulder dislocation 477
- shoulder joint 470–481, 560  
 anatomy 472, 473–474  
 arthritis 480  
 contrast administration 470  
 degeneration 480  
 examination technique 470–471  
 patient positioning 470  
 fractures 480  
 imaging planes 470  
 imaging protocol **472**  
 inflammation 480  
 osteoarthritis 480  
 pulse sequences 470–471
- SHU 555A **30, 30**
- SHU 555 C **30, 31**
- sialadenitis, acute 58
- sickle cell anemia 550, 550, 551  
 bone marrow infarcts 550, 550  
 "H" deformity 550, 551  
 splenic changes **273, 274**
- siderocytes 274
- signal amplitude 5
- signal inhomogeneities 41
- signal intensity 42  
 equation 15
- signal intensity index, adrenal masses  
 308
- signal-to-noise ratio (SNR) 14  
 high-field MRI 645  
 RF system 23
- silicone "bleeding," breast implants 174
- simultaneous acquisition of spatial har-  
 monics (SMASH) 20
- single-shot half-Fourier TSE sequence  
 see half-Fourier acquisition single-  
 shot turbo-spin echo (HASTE) im-  
 aging
- single-slice sequences  
 cardiac functioning 78  
 gastrointestinal tract imaging 316–317  
 sinusitis 45–46
- sinus radiographs 44
- sinus tarsi syndrome 534, 562  
 clinical aspects 534  
 etiology 534  
 mucoid degeneration 534, 535
- Sjögren syndrome 58–59
- skeletal metastases 442, 443  
 chest wall invasion 145  
 osteoplastic lesions 442  
 whole-body MRI 638  
 see also bone marrow metastases
- skeletal plasmacytomas 441
- skip ("satellite") lesions 60, 438
- SLAP (superior labrum from anterior to  
 posterior) lesions 479, 479, 560
- slipped capital femoral epiphysis 509,  
 510
- small cell carcinoma, bronchial 148
- small intestine 322–328, 339  
 contrast agents 316  
 diffuse diseases 325–328  
 hemangiomas 323  
 inflammatory diseases 325–328  
 metastases 322  
 MRI anatomy 322  
 MRI indications 318  
 non-Hodgkin lymphoma 324  
 tumor-related obstructions 322  
 tumors 322–325  
 benign 322–324  
 malignant 323–325  
 MRI role 325  
 MRI vs. enteroclysis 325  
 primary 322  
 "target sign" 325  
 wall thickness 322
- small intestine adenocarcinoma 324
- small intestine adenoma 322–323
- small intestine carcinoid 323–324  
 diagnosis 323–324  
 dystrophic calcification 324  
 "spoked-wheel" pattern 324
- small intestine hamartomas 322
- small intestine leiomyoma 323
- small intestine leiomyosarcoma 324
- small intestine lipoma 323
- small liver 188
- small salivary gland adenomas 56
- smoking, bladder cancer 346
- snapshot FLASH (turbo-FLASH) **18,**  
 18–19, 19
- "snowboarder's ankle" 540, 540
- <sup>23</sup>Na imaging 83
- soft palate 51
- soft tissue(s)  
 cervical see cervical soft tissues  
 infectious diseases 456–459  
 inflammatory changes 458  
 tumors 560  
 benign 443–445  
 examination technique 426  
 hand 500  
 imaging indications 426  
 imaging planes 426  
 imaging protocol 426, 560  
 malignant 445–449, 560
- soft-tissue abscess 458, 458
- soft-tissue edema, osteoid osteoma 427,  
 427
- soft-tissue hemangiomas 443, 444
- soft-tissue injuries  
 hand 498–499  
 hip joint 509
- solenoid coils 21–22
- solid papillary epithelial tumor, pan-  
 creatic 236–237
- spatial encoding 10, 42
- spatial frequency 10
- spatial modulation of magnetization  
 (SPAMM) technique, myocardial tag-  
 ging 78
- specific absorption rate (SAR) 24  
 high-field MRI, 3T 645
- safe limit 34
- spermatocord 396
- spermatocoele 397
- sphenoid sinus 44  
 plasmacytomas 50
- spherocytosis 550
- extramedullary hematopoiesis 134
- sphincter complex, biliary tract 265–267  
 normal anatomy 265, 266
- sphincter of Oddi 265
- spinal coils 126
- spinator 483
- spin down alignment 3
- spin echo 7, 9
- spin echo (SE) imaging 15–16  
 basic contrast 15, 15  
 fast see fast spin echo (FSE)  
 gradient echo imaging vs. 17  
 hepatic imaging 180  
 prostatic imaging 384
- spin-lattice (longitudinal) relaxation  
 6, 42
- spin quantum number I 3
- spin-spin (transverse) relaxation 6, 42
- spin up alignment 3
- spin warp imaging 12
- spiral CT  
 adrenocortical carcinoma 304  
 renal masses 279
- spiral MR 643
- spleen 268–278, 338  
 accessory 270, 270  
 anatomy 269–270  
 congenital anomalies 270  
 contrast agents 338  
 cystic lesions 271, **271**, 272  
 dimensions 269  
 examination technique 268–269  
 contrast agents **268**, 268–269, 269  
 pulse sequences 268  
 focal hemorrhages 272  
 imaging indications 268  
 imaging protocol 268  
 infectious diseases **270**, 270–271  
 causes 271  
 inflammatory lesions **270**  
 metastases 277, 277  
 MRI vs. CT 338  
 nonneoplastic, noninfectious diseases/  
 changes **273**, 273–275  
 normal variants 270  
 pancreatic-related cystic changes 271  
 shape anomalies 270  
 signal intensities 268, **268**, 269  
 traumatic lesions 278  
 tumors 275–277  
 benign **275**, 275–276  
 malignant **276**, 276–277  
 mixed 277  
 vascular diseases 272–273, **273**
- splenic abscess **270**, 270–271  
 bacterial 271  
 fungal 271
- splenic angiosarcoma 277
- splenic artery aneurysm 605
- splenic hamartoma 276
- splenic hemangiomas 275, 275–276
- splenic hematomas 278
- splenic index 269
- splenic infarction 272–273  
 complications 273

- splenic lymphangioma 276, 276  
splenic lymphoma 276–277  
splenic pseudocysts, posttraumatic 278  
splenic sequestration 274  
splenic vein 185, 599  
splenogonadal fusion 270  
splenomegaly 273, 273  
squamous cell carcinoma  
  hypopharynx 56  
  larynx 57, 57  
  nasal cavity 48  
  oral cavity 53, 53–54, 54  
  oropharynx 53–54  
  paranasal sinuses 48, 49  
  salivary glands 60  
  trachea 147  
squamous cell papilloma, esophagus 319  
staging laparotomy, ovarian carcinoma 379  
static magnetic field  
  biological effects 32  
  ferromagnetic objects, effects on 32–33  
  risk associated 32–33, 35  
steady-state free precession (SSFP) 18, 18  
female pelvis imaging 361  
  pelvic floor dysfunction 352  
  pulmonary embolism 595  
  ventricular parameters 69  
steady-state imaging, myocarditis 81  
Stein–Leventhal syndrome 375  
steinstrasse 297  
stenosing papillitis (benign papillary stenosis) 266, 266  
stents 603, 603  
sternoclavicular joint 472  
STIR images *see* short inversion recovery (STIR) images  
stomach 318–321, 339  
  contrast agents 315  
  inflammatory diseases 321  
  MRI anatomy 318  
  MRI indications 318  
  signal characteristics 318  
  tumors  
    benign 320  
    malignant 320–321  
    wall thickness 318, 319  
  *see also* entries beginning gastric  
storage diseases, hepatic 214–215  
stress fractures 458, 466  
  foot 540  
stress incontinence, cystocele 354  
“string-of-beads”  
  parasitic cholangitis 256  
  polycystic ovaries 375  
stroke volume (SV) 69, 79  
stunned myocardium 121  
subacromial bursa 472  
  inflammation 475  
subacromial impingement syndrome 474–476  
  causes 474, 475  
subcarinal lymph nodes 412  
subchondral cysts  
  hand 497, 497  
  hip joint 506–507  
subclavian artery occlusions 585  
subclavian steal syndrome (subclavian stenosis) 585, 626  
subclavian stenosis (subclavian steal syndrome) 585, 626  
subcoracoid bursa 472  
subglottic carcinomas 57  
subglottic space 55  
subhepatic space (Morison pouch) 185  
subhilar filling defects 258  
sublabral foramen 478  
sublingual caruncle 58  
sublingual duct 58  
sublingual gland 58  
submandibular duct 58  
submandibular gland 58  
submaximal echo amplitude 8  
submucosal (intramural) tumors, esophagus 319  
subphrenic space 185  
subscapular bursa 472  
subscapularis 472  
  rupture 476  
subseptate uterus 369  
subspinatus 472  
subtalar joint 531  
subtraction artifacts, MR mammography 156  
subvalvular membranous aortic stenosis 87  
subvalvular pulmonary artery stenosis 88  
superconducting magnets 21–22, 22, 22  
superficial infrapatellar bursitis 522  
superior accessory lobe, liver 187  
superior coronary ligament 185  
superior labrum from anterior to posterior (SLAP) lesions 479, 479, 560  
superior meatus 44  
superior mesenteric artery aneurysm 605  
superior mesenteric vein 185, 226, 599  
superior parathyroid glands 130  
superior vena cava 68  
superparamagnetic iron oxide particles (SPIOs) 30, 42  
  absorption 30  
  biliary tract imaging 248  
  bladder carcinoma N staging 348–349  
  focal nodular hyperplasia 192  
  gastrointestinal tract imaging 314–315  
  hepatic imaging 184  
  hepatic lymphoma 209  
  hepatic metastases 204, 207  
  hepatocellular carcinoma 197  
  lymph node imaging 421, 422  
  mechanism of action 25  
  properties 30  
  pulmonary embolism 595  
  spleen 269  
  T2 relaxation time, effects on 26  
  virtual endoscopy 347  
superparamagnetic molecules 25  
supra-aortic vessels  
  occlusions 585  
  stenoses 585  
supracondylar humeral fracture 487  
supraglottic carcinomas 57  
supralevator fistula 358, 358  
suprarenal glands *see* adrenal glands  
supraspinatus 472  
  tendon rupture 476  
supravalvular pulmonary artery stenosis 88  
surface coils  
  adrenal gland imaging 299  
  bladder imaging 343  
  bone marrow examination 543  
  female pelvis imaging 360  
  hand imaging 492  
  hip joint imaging 501  
  peripheral vessels 612  
  prostatic MRI 383  
  shoulder joint imaging 470  
  thorax examination 126  
surgical endarterectomy 574  
susceptibility artifacts 38, 38, 42  
  cardiac thrombi 106  
  gastrointestinal tract imaging 315  
  infectious bone diseases 457  
  lung parenchyma, diffuse changes 149  
susceptibility effects, high-field MRI 645  
synovial chondromatosis, hip joint 507  
synovial diseases  
  ankle joint 530  
  knee joint 512, 527–529  
synovial osteochondromatosis, knee joint 528–529  
  hyaline cartilage mass 528, 529  
  intra-articular loose bodies 528, 529  
  malignant transformation 528  
  microchondromatous form 529  
  pathogenesis 528  
  pressure erosions 529  
  secondary changes 528  
synovial plaques, hip joint 506, 506–507  
synovial processes, elbow joint 482  
synovial sarcoma 447, 447–448  
  calcification 448  
  clinical aspects 447  
  prognosis 447  
  pseudocystic appearance 447–448  
  subtypes 447  
synovitis, hand 497  
systemic sclerosis 150  
T  
T1 fast field echo (T1-FFE) 17  
T1 relaxation times, hepatic metastases 204  
T1-weighted (TW1) echo 15  
T1 weighted images *see* T1W sequences  
T1W sequences  
  adrenal gland imaging 299  
  bladder 344  
  bone tumors 426  
  elbow joint 481  
  female pelvis imaging 361  
  gastrointestinal tract imaging 317  
  hand imaging 492  
  knee joint imaging 512  
  liver 180–181  
  lymph node imaging 409–410  
  meniscal tears 518  
  MR urography 293, 293, 294  
  pancreatic imaging 224–225, 227  
  prostatic imaging 384, 386, 392  
  renal cell carcinoma 286  
  renal imaging 280, 280  
  rheumatoid arthritis 451  
  soft-tissue tumors 426  
  spleen 268  
T2 contrast agents *see* superparamagnetic iron oxide particles (SPIOs)  
T2-FFE 18  
T2\* GE sequences, pigmented villonodular synovitis 527  
T2 relaxation times, hepatic metastases 204  
T2-weighted (T2W) echo 15  
T2-weighted images *see* T2W sequences  
T2W sequences  
  adrenal gland imaging 299  
  bladder 343, 343, 344  
  bone tumors 426  
  elbow joint 481  
  female pelvis 360–361  
  gastrointestinal tract imaging 317  
  hand imaging 492  
  hepatic 181  
  hepatic hemangioendothelioma, 218, 219  
  knee joint imaging 512  
  lymph node imaging 409, 410  
  meniscal tears 518  
  MR mammography 155  
  MR urography 293, 293  
  pancreatic imaging 225, 227  
  pelvic floor dysfunction 352  
  prostatic imaging 384  
  renal cell carcinoma 286  
  renal imaging 280, 280  
  rheumatoid arthritis 451  
  spleen 268  
Takayasu arteritis 588, 596  
talocalcaneal coalition 539  
talocalcaneal joint (posterior subtalar joint) 531  
talocalcaneonavicular joint (anterior subtalar joint) 531  
talocrural joint *see* ankle joint  
talus, occult fracture 467  
tampons, female pelvis imaging 360, 360  
“target sign”  
  Crohn disease 325, 325, 326  
  hepatic lesions 205  
  small intestine tumors 325  
tarsal coalition 539, 539  
tarsal fractures 540, 540  
tarsus 531  
“teardrop sign,” breast implant gel bleeds 176, 177  
tendinitis, hip joint 509  
tendinosis 475  
“tennis elbow” (lateral epicondylitis) 485, 486, 561  
tenosynovitis, hand 497  
teratoma(s)  
  extragonadal 130  
  testicular 399  
teres minor 472  
Teslascan *see* manganese dipyridoxyl diphosphate (Mn-DPDP)  
testes 393–399, 406  
  anatomy 394, 394  
  benign disorders 394–398  
  decreased blood flow 394–396  
  ectopic 397  
  malignant tumors 398–400  
  trauma 394, 395  
  undescended *see* undescended testis  
  *see also* scrotum



- testicular embryonic cell carcinomas 399, 399
- testicular lymphoma 399, 400
- testicular rupture 394
- testicular seminomas 399, 399
- testicular teratomas 399
- testicular torsion 394–396
- acute 394
  - complete 394, 395
  - definition 394
  - differential diagnosis 396
  - fibrotic transformation 396
  - hemorrhagic transformation 396
  - incomplete/partial 394
  - “torsion knot” 395, 396
  - “whirlpool pattern” 395, 396
- testis *see testes*
- tetralogy of Fallot 86–87
- clinical aspects 86–87
  - diagnosis 86–87
  - palliation 87
  - pathogenesis 86–87
  - treatment 87
- thalassemia 550
- thermal motion 6
- thoracic asymmetries 143
- thoracic inlet syndromes 626
- thoracic lymph nodes 412–413
- thoracic outlet syndromes 626
- thoracic vessels 579–597, 631
- arteritis 588–589
  - children 580
  - coils 580
  - examination techniques 579–580
  - patient positioning 580
  - stenosis 580
- thorax
- examination techniques 126
  - imaging planes 126
  - slice thickness 126
- Thornwaldt cyst 51
- Thorotrast exposure
- hepatic angiosarcoma 202
  - splenic involvement 275
- 3-Tesla MR scanners 644
- osteoporosis 464, 465
- three-dimensional Fourier imaging 14
- thrombi
- myocardial infarction complication 107, 123
  - soft-tissue hemangiomas 444
- thymic carcinoma 129
- “thymic rebound” 128, 152
- thymic tumors 128–129, 152
- epidemiology 128–129
  - pathogenesis 128–129
- thymomas
- benign 129, 129
  - malignant 129
- thymus 128, 129
- thyroglossal duct cyst 61
- thyroid adenoma 63
- thyroid cartilage 55
- thyroid gland 60–65
- anatomy 60–61
  - ectopic tissue 52, 128
  - inflammatory diseases 62
  - lobes 60–61
  - tumors 66
    - benign 63
    - malignant 65
- thyroid isthmus 61
- thyroiditis 62
- tibial avulsions 516
- tibial collateral ligament, knee *see* medial collateral ligament, knee
- tibialis posterior tendon injuries 536–537
- chronic tendinopathy 537
  - ruptures 536, 536
  - classification 537, 537
- tibial subluxation 516
- tibial vessels 632
- tilted optimized nonsaturated excitation (TONE) pulses, cervical vessel imaging 569–570
- timed arterial compression (TAC) 627
- time-of-flight (TOF) MRA 564–565
- abdominal vessels 598
  - advantages 567
  - carotid artery stenosis 574, 574
  - cervical vessels 569–570, 570, 631
    - acquisition time 570
    - reliability 570
    - superimposed signals 570  - internal carotid artery dissection 576
  - interventional procedures 618–621
  - limitations 567
  - peripheral vessels 612
  - portal hypertension 607
  - three-dimensional 569, 569
  - two-dimensional 569, 569
  - vertebral artery dissections 578
- time-resolved (TR) MRA
- abdominal vessels 599
  - limitations 615
  - peripheral vessels 615
- tissue
- relaxation times 6
  - water content 5, 6
- tissue-specific contrast agents 29–31
- focal nodular hyperplasia 192, 193
  - hepatic imaging 183–184
  - lymph node imaging 411
  - titanium implants 38
- TNM classification
- bladder carcinoma 345
  - bronchial carcinoma 136
  - colorectal carcinoma 335
  - endometrial carcinoma 373
  - esophageal carcinoma 132
  - hepatocellular carcinoma 200
  - ovarian carcinoma 379
  - pleural mesothelioma 141
  - prostatic carcinoma 389
  - renal cell carcinoma 288, 289, 289
  - vaginal carcinoma 364
- toes 531
- tongue 51
- tumors 66
- tongue base pseudotumors 54–55
- tongue carcinoma 53–54, 54
- tongue MALT lymphoma 55
- tonsillar carcinoma 53
- torque 3–4
- torso phased-array coils, lymph node imaging 409
- total acquisition time 14
- total imaging matrix (TIM) technology 634–635, 635, 650
- total transverse relaxation time 7
- toxic megacolon 335
- trachea
- malignant invasion 147
  - tumors 147, 147, 152
- tracheal squamous cell carcinoma 147
- tracheobronchial system 146–152, 152
- diseases 146–149
  - metastases 149, 149
- trailing navigator 73
- transcoronary ablation of septal hypertrophy (TASH) 96
- transglottic carcinomas 57
- transient osteoporosis 462
- hip 510, 511, 561
    - avascular necrosis vs. 510
    - diagnosis criteria 510
- transient patellar dislocation 520–521, 521
- transmit and receive coils
- elbow joint imaging 481
  - foot imaging 530
  - knee joint imaging 512
- transposition of the great arteries (TGA) 88–90, 89
- clinical aspects 88
  - incomplete 90
  - pathogenesis 88
  - postoperative evaluation 90
  - preoperative evaluation 88
  - treatment 90
- transrectal ultrasound (TRUS), prostatic carcinoma 390
- transsphincteric fistula 358, 358
- transurethral resection, bladder carcinoma 349
- transvaginal ultrasound 405
- transverse ligament of the knee 513
- transverse magnetization 5
- decay 6, 7
- transverse (spin–spin) relaxation 6, 42
- transverse relaxation time 6–7
- trapeziotrapezoid ligament 493
- trauma
- ankle joint 530, 531
  - avascular necrosis 460
  - bone *see* bone trauma
  - elbow joint 481, 482
  - hand 498–500
  - hip joint *see* hip joint
  - midface 46
  - muscular 468
  - pancreatic *see* pancreatic trauma
  - penile 401
  - peripheral skeletal system 466
  - scrotum 394
  - splenic 278
  - testicular 394, 395
  - urinary tract 297, 297
- “tree-in-winter” pattern, primary biliary cirrhosis 254, 254
- triangular disk 492
- degenerative changes 497
- triangular fibrocartilage (TFC) 493
- central perforation 499, 499
  - high-field imaging 648, 649
  - imaging sequences 498–499
  - lesions 498–499, 499, 561
  - symptoms 499
- tears 499
- triangular ligament 185
- triceps brachii 483
- triceps tendon rupture 561
- tricuspid insufficiency 89, 113
- tricuspid valve 68
- triquetrum fractures 498
- TrueFISP, gastrointestinal tract imaging 316, 317
- truncation artifact 40, 40
- truncus arteriosus 89
- tubal occlusion, bilateral 374
- tuberculosis 306
- tuberous sclerosis 282–283
- tubo-ovarian abscess 374–375
- “tumor thrombi,” portal vein thrombosis 217
- tunica albuginea 394, 400
- rupture 401
- tunica dartos 394
- tunica vaginalis 394
- tuning errors 41
- turbinates, nasal cavity 44
- turbo-FLASH (snapshot FLASH) 18, 18–19, 19
- turbo-inversion recovery (TIR) 17
- turbo-spin echo (TSE) *see* fast spin echo (FSE)
- turbo-STIR sequences
- hand imaging 492
  - whole-body MRI 634

## U

- ulcerative colitis 332, 335
- ulcers, aortic 602
- ulna 482
- ulnar collateral ligament 482–483
- acute tears 483–485
  - complete tears 484, 484
  - injuries 483–485
    - chronic 485
    - intraosseous contusions and 484
    - pathogenesis 483
    - severity 484  - overstretched 484
  - partial tears 484
  - valgus stress 483
- ulnar groove 489
- ulnar nerve 489, 493
- compression 496
- ulnar neuritis 489, 490
- medial epicondylitis 485
- ulnar tunnel 496
- ultrasmall superparamagnetic iron oxide particles (USIPOs) 30–31, 42
- as blood-pool contrast agents 31
  - bone marrow imaging 31, 544
  - lymph node imaging 30, 411, 421, 422
  - marrow reconversion 547
  - properties 30
- ultrasound
- adrenal hemorrhages 306
  - breast cysts 158
  - breast fibroadenoma 160
  - breast implant defects 174
  - breast papilloma 162
  - Budd–Chiari syndrome 216
  - esophageal carcinoma 132
  - fetal imaging 380
  - gastrointestinal tract 313
  - hepatic tumors, children 218
  - inflammatory soft tissue changes 458
  - interventional procedures 618

- ultrasound  
 mesenteric ischemia 605  
 pancreatic trauma 245  
 portal vein thrombosis 608  
 renal cell carcinoma **287**  
 shoulder joint 470  
 transvaginal 405
- ultrasound gel, as contrast medium  
 pelvic fistulas 357  
 pelvic floor dysfunction 351
- umbilical vein 185
- uncinate (papillary) process 187
- undescended testis 397–398, 398, 406  
 atrophic 398, 398  
 complications 397
- undifferentiated hepatic sarcoma *see*  
 embryonal sarcoma
- unicornuate uterus 369, 369
- Union Internationale Contre le Cancer*  
 (UICC) staging system, hepatocellular  
 carcinoma **199**
- upper arm arteries 626, 626
- upper limb tumors **409**
- urachal carcinoma 344
- ureteral fistulas 297, 297
- ureteral strictures 295, 295  
 postoperative 296, 296–297  
 renal transplant patients 297, 297
- ureteropelvic junction stenosis 295, 295
- urinary bladder *see* bladder
- urinary incontinence 354
- urinary tract 293–297  
 malformations 294  
 normal 293  
 traumatic lesions 297, 297  
 variants 294
- urinoma 297, 297
- urogenital hiatus 353, 354
- urolithiasis 297, 297
- urothelial carcinomas 289  
 men 403, 403
- uterine corpus 361
- uterine leiomyoma 370  
 adenomyosis *vs.* 372  
 classification 370, 371  
 clinical aspects 370  
 diagnosis 370  
 epidemiology 370  
 hemorrhagic/"red" degeneration 370  
 hyaline degeneration 370, 372  
 intramural 370, 371  
 pathogenesis 370  
 pseudocapsule 370  
 submucous 370, 371  
 subserous 370, 371
- uterine prolapse 355, 356
- uterus 361, 362, 368–373  
 benign lesions 370–372, 405  
 congenital anomalies 360, 361,  
 369–370, 405  
 classification 369, 369–370  
 diagnosis 369  
 epidemiology 369  
 pathogenesis 369  
 malignant neoplasms 372–373  
 uterus didelphys 369–370  
 utricular cysts 387
- V**
- vacuum-assisted core biopsy, breast 169
- vagina 363–364  
 anatomy 362  
 benign changes 363  
 endometrial cycle 362  
 malignant neoplasms 363–364  
 walls 362
- vaginal adenocarcinoma 363
- vaginal agenesis 369
- vaginal carcinomas 363  
 diagnosis 363  
 differential diagnosis 363  
 staging **364**
- vaginal deliveries, pelvic floor dysfunc-  
 tion 351
- vaginal lymphoma 363, 363
- vaginal metastases 363–364
- vaginal stump masses 360, 363, 364
- vaginal vault prolapse **353**, 355, 356
- valgus stress, elbow 561
- vallecular carcinoma 53
- valvular aortic stenosis 87
- valvular insufficiency 112–114  
 regurgitant jet 89, 112, 113, 113
- valvular pulmonary artery stenosis 88
- valvular stenosis 111–112
- varicocele 397
- vasa deferentia 386
- vascular imaging  
 artifacts 564  
 intracranial 647  
 technique 564–567  
*see also* magnetic resonance angiogra-  
 phy (MRA); *individual vessels*
- vascular malformations  
 oral cavity 52  
 oropharyngeal 52
- vasculitis 604
- vas deferens 394  
 ampulla 386
- Vasovist 31
- VCG algorithm (vectorcardiography) 72
- vectorcardiography (VCG algorithm) 72
- venous compression, thigh 643
- ventilation studies, pulmonary embo-  
 lism 595
- ventricles 68  
 volume determination 78–79
- ventricular folds 55
- ventricular myxoma 104, 105
- ventricular noncompaction, isolated 92,  
 93
- ventricular septal defect (VSD) 85–86, 86  
 apical defects 85  
 clinical aspects 85–86  
 diagnosis 86  
 imaging protocol 86  
 pathogenesis 85–86  
 pulmonary hypertension 86  
 subvalvular defects 85  
 treatment 86  
 types 85
- vertebral arteries 572, 585
- vertebral artery dissections 578
- vertebral deformities 143
- vertebral fractures 578
- vertebrobasilar system 571  
 anatomic variants 572
- vesicouterine fistulas 358
- vesicovaginal fistulas 358
- vesicovaginal septum 357
- vessels 563–632  
 wall imaging, high-resolution 647, 647  
*see also individual vessels*
- vestibule 55
- viral hepatitis 215  
 acute 215  
 chronic 215  
 hepatocellular carcinoma 196  
 regenerative nodules 215
- viral parotitis (mumps) 58
- viral sinusitis, nonspecific 45
- virtual endoscopy 331, 331, 347–348  
 bladder distention recommendations  
 347  
 bladder tumors 347–348, 348  
 contrast agents 347  
 interpretation 348
- visceral arteries 604–606  
 aneurysms 605  
 variants 604, 604
- visceral pleura 139
- vocal cords 55  
 nodules 56
- volumetric interpolated breath-hold  
 examinations (VIBE) 180
- von Hippel-Lindau disease 236, 304
- vowel size 14
- VSOP-C184 **30**, 31
- ovula 363–364  
 benign changes 363  
 malignant neoplasms 364
- ovular carcinoma 364, 364
- W**
- Waldenström disease 557
- Warthin tumor 59, 59
- water, gastrointestinal tract imaging 314
- water-based enema, MR colonography  
 328
- water-methylcellulose suspension  
 gastrointestinal tract imaging 314, 315  
 small intestine imaging 316
- water molecules 20, 20
- Waterston–Cooley anastomosis 87
- Wegener granulomatosis 45
- white pulp, spleen 270
- whole-body coil 634
- whole-body MRA 640–643, 650  
 coils 642  
 continuous contrast injection 640–642  
 further developments 643  
 high-field 643  
 injection protocols 641–643  
 limitations 650  
 lower extremity arteries 617  
 parallel imaging techniques 643  
 patient positioning 641, 642  
 scanner optimization 643  
 segmental k-space acquisition tech-  
 niques 643, 650  
 sequences 641–643  
 table extenders 641, 642  
 technical concepts 640–642  
 whole-body MRI 634–639, 636, 637, 650  
 applications 637–638  
 benign diseases 638  
 coils 635  
 imaging protocol 635, **635**, **636**  
 oncologic applications 638  
 patient positioning 635  
 screening 637  
 sequences 635  
 technical concepts 634–635
- Wilms tumor 290–291, 291
- Wilson disease 214–215  
 clinical aspects/findings 214–215  
 micronodular cirrhosis 215  
 pathogenesis 214
- Wirsung duct *see* pancreatic duct
- wrap-around 37, 37  
 pulmonary vessels 590
- wrap-around coils 612
- wrist, high-field imaging 648, 649
- wrist coils 451
- Wüthrich, Paul C. 2
- Y**
- yellow (fat) marrow 544
- Z**
- "zebra-stripe" pattern, spleen 268, 269