

# Index

- A**  
Acute myocardial infarction, 55–66, 73, 97, 114, 159, 305  
Angiogenesis, 221, 273, 279, 298–299, 306, 308, 309, 313–314, 317, 355  
Angioplasty balloon, 31, 161, 173–175, 192, 195, 353  
Anterograde-dissection, 31, 34  
Antioxidant, 308, 309  
Aortic dissection, 193, 195  
Aortic repair, 191–196  
Atherectomy, 1, 19, 20, 27, 28, 31–52, 77–79, 84–86, 88, 94, 97, 99, 100, 103–122, 125, 127, 130, 133–135, 141–143, 145–151, 159, 163, 164, 167, 168, 171, 177, 178, 181–189, 354, 153154  
Atherosclerosis, 15, 69, 70, 72, 75, 80, 86, 87, 103, 107, 141, 273, 308, 317, 349  
Atherosclerotic plaque, 15, 27, 35, 56, 58, 75, 85, 106, 349–351, 353, 357
- B**  
Balloon-resistant lesion, 11, 89, 97, 99, 100  
Bubble, 3–6, 9, 10, 16–18, 20–28, 34, 86, 89, 93, 94, 121, 125, 159, 163, 167, 168, 174, 291, 292, 322, 353  
Bypass graft, 31, 39, 55, 56, 62, 63, 69, 70, 72, 74, 77–80, 83, 125, 132, 136, 271, 278, 279, 287, 293, 295, 297, 316
- C**  
CABG. *See* Coronary artery bypass graft  
Calcified coronary lesion, 31  
Calcified coronary stenosis, 83  
Calcified lesions, 12, 34, 36, 83–94, 97, 99–101, 103, 168, 173  
Calcified plaques, 10, 18, 21, 23, 25, 27–29, 35, 45, 84, 89, 168  
Cardiac arrhythmias, 199–217, 234  
Cardiac implantable electronic device (CIED), 245, 247–251, 256–258, 260  
infection, 249, 256, 260  
Cavitation, 3, 16–28, 222, 224, 225, 234, 291, 292  
Chagas disease, 199, 240  
Chromophore absorption, 321  
Chronic total occlusions (CTO), 31–32, 34–37, 39–45, 47–49, 52, 55, 56, 73, 83, 84, 86–88, 92, 94, 97, 99–103, 110, 112, 122, 135, 143, 159, 162, 167, 169, 181, 357  
Claudication, 15, 48, 126, 133–135, 142–144, 148, 149, 151, 181, 191, 196, 354, 356  
CO<sub>2</sub>, 2, 6, 104, 183, 252, 264, 272, 282, 288–299, 306, 311–317, 349, 355  
CO<sub>2</sub> lasers, 2, 292, 311–317  
Complex coronary lesions, 31, 97, 100  
Continuous wave laser, 288, 353, 354  
Coronary artery bypass graft (CABG), 31, 39, 45, 48, 70, 72, 74, 79, 80, 83, 86, 94, 114, 121, 278, 279, 281, 287, 288, 293–295, 297, 298, 305, 306, 311, 314–317, 355  
Coronary artery disease, 72, 85, 97, 149, 199, 262, 271, 279, 281, 297, 299, 311, 316, 355  
angina, 97, 271, 355  
myocardial ischemia, 274, 276, 280, 316  
transmyocardial laser, 316  
Coronary intervention, 31–52, 55, 72, 75, 76, 97, 102–122, 271, 287, 306, 311, 353  
Critical limb ischemia, 126, 141–154, 157, 160, 162, 174, 176, 181–183, 188, 354  
CTO. *See* Chronic total occlusions  
CTO PCI algorithm, 31
- D**  
De novo lesions, 38, 182  
Depolarization, 199–206, 210, 211, 213, 214, 239  
Device infection, 248, 249, 251, 262  
Distal embolization, 34, 57, 59, 60, 62, 64, 73, 75, 77, 88, 93, 94, 143, 144, 151, 157–164, 174, 176–178, 182, 188, 353, 354  
Drug-eluting balloons, 98, 127, 171–178, 181–189
- E**  
ECLA. *See* Excimer coronary laser angioplasty (ECLA)  
ELCA. *See* Excimer laser coronary atherectomy  
Electrophysiological communication, 199, 201  
Endovenous laser ablation (EVLA), 337  
Endovenous therapy, 321  
EVLA. *See* Endovenous laser ablation  
Excimer, 1, 15, 31–52, 56, 69, 83–94, 97, 103–122, 125–141, 157–164, 174, 184, 245, 255–269, 288, 307, 330, 345–347, 353  
Excimer coronary laser angioplasty (ECLA), 69, 75–78, 80, 83, 86, 89  
Excimer laser, 1, 15, 31, 56, 75, 83–94, 97, 103–122, 125–141, 157–164, 174, 186, 245, 255–269, 288, 307, 330, 345–347, 353,  
Excimer laser atheroablation, 97–102  
Excimer laser coronary atherectomy (ELCA), 1, 3, 5, 11, 31–52, 37, 76, 78–80, 83–86, 88, 89, 91, 94, 97–122, 354  
Excimer laser lead extraction, 245–252
- F**  
Femoropopliteal in-stent restenosis, 141, 148  
Fiberoptic catheters, 1, 351  
Fiber optics, 6–8, 10, 15, 19, 20, 22, 27, 125, 205, 206, 209–215, 349–350, 353

- Fluence, 2, 4, 10, 11, 19, 20, 28, 34, 36, 59, 65, 89, 90, 100, 101, 125, 159, 174, 191, 193, 205, 209, 216, 256, 307, 321, 322, 325, 331, 345, 353
- Free radicals, 306, 307, 314
- Function, 19, 20, 22–27, 38, 40, 41, 45–47, 50, 72, 116, 164, 183, 202, 205, 207, 208, 210, 214, 229, 230, 239, 246, 268, 274, 280, 287–299, 306, 314, 321
- G**
- Great saphenous vein (GSV), 323, 326–329, 337, 339–341
- H**
- Ho:YAG, 2, 288–293, 295–299, 312–314, 316, 317, 353
- Hypertrophic obstructive cardiomyopathy, 239
- I**
- Implantable cardioverter defibrillator (ICD), 199, 238, 240, 250  
lead, 258, 260–262, 264–267
- Incompetent perforating veins (IPV), 337–342
- Infarction, 36, 42, 44, 49, 55–66, 72–74, 76–78, 97, 98, 110, 114, 159, 188, 199, 204, 214, 228, 232, 234, 240, 242, 279, 294, 297, 305–307, 315, 353, 354
- Infra-inguinal arteries, 141
- In-stent restenosis, 11, 12, 38, 55, 80, 83, 85–86, 90, 97–98, 110, 112, 121, 127, 133, 141, 142, 147–149, 171–178, 181–189, 355
- In-stent use of laser atherectomy, 142, 148
- Interventional cardiology, 75, 83, 271
- IPV. *See* Incompetent perforating veins
- Ischemia, 33, 38, 44, 47, 57, 62, 63, 66, 126, 127, 132, 133, 141–154, 157, 159, 160, 162, 164, 174, 176, 181–183, 188, 189, 191, 193, 199, 274, 276–278, 280, 296, 297, 305–308, 315, 316, 354
- L**
- Laser, 1–12, 15–29, 31–52, 55–66, 69–80, 83–94, 97–122, 125–154, 157–164, 167–178, 181–189, 191–196, 199–217, 221–242, 245–252, 255–269, 271–281, 287–299, 305, 311–317, 321–335, 337–342, 345–347, 349–357
- ablation, 4, 6, 15, 16, 18, 21, 22, 24, 159, 160, 162, 163, 211, 214, 215, 230, 234, 236–240, 247, 261, 292, 337–342
- angioplasty, 6, 55, 60, 69, 75, 76, 80, 89, 97, 98, 126, 144, 174, 350–352, 357
- catheter, 6–8, 11, 12, 34–36, 38, 40–45, 50, 51, 57, 58, 60–65, 75, 78, 84, 88, 89, 91–94, 97, 99–101, 103, 114, 125–127, 141–143, 161, 167, 174, 175, 186, 187, 191, 193–195, 199–216, 221, 223–225, 227, 229, 230, 232–234, 237, 240, 330, 350, 354, 356
- in clot, 4, 56, 164
- as crossing tool, 125, 126
- drug-eluting balloons, 178
- lead extraction, 251, 256, 261–264, 269
- light, 1, 2, 5, 7, 18–20, 75, 116, 125, 204–207, 211–213, 217, 221–223, 225, 229, 238–242, 255, 271, 288–290, 322, 325, 349, 353
- mapping, 222–225, 227, 237
- revascularisation, 69–80
- as therapy of in-stent stenosis, 127
- wavelength, 2, 22, 205, 214, 289, 321, 322, 353
- Laser atherectomy, 1, 31–52, 78, 84, 103, 106, 111, 120, 125, 127, 130, 133, 141–151, 153, 154, 164, 171, 178, 181–189
- infrapopliteal disease, 128, 160
- popliteal artery, 128, 138, 146, 149–151, 174, 176, 178, 186
- superficial femoral artery, 91–93, 126, 142, 149, 163, 167–171, 174–178, 181–189, 354, 355
- Lead fracture, 264, 267
- Limb ischemia, 126, 141–154, 157, 160, 162, 164, 174, 176, 181–183, 188, 354
- Limb salvage, 126, 141, 143–145, 148, 157, 162, 354
- M**
- Myocardial, 36, 55–66, 71, 97, 111, 159, 188, 199, 224, 246, 271, 287–299, 305–309, 311–317, 353
- Myocardial coagulation, 323
- O**
- Occlusion, 12, 15, 31–52, 55, 70, 83, 97, 103, 125, 141, 157–164, 167, 172, 181, 203, 241, 247, 257, 274, 299, 307, 326, 354
- Open irrigated laser catheter, 121, 129, 230, 233
- Optical fibers, 2, 3, 7, 9, 11, 12, 222, 223, 229, 242, 292, 299, 350, 351
- P**
- Pacemaker lead, 260, 262, 346, 357
- Percutaneous coronary intervention (PCI), 31–52, 55, 56, 59, 64, 65, 70, 72, 73, 75–80, 83, 88, 97, 103–121, 271, 281, 287, 294, 295, 299, 305, 306, 311, 353
- Peripheral arterial disease, 56, 85, 126, 157–158, 357
- Peripheral arteries, 84, 125, 157–164, 177, 354, 357
- Peripheral vessel stenosis, 83
- Photoablation, 1, 3, 162, 178, 290–292, 298
- Photocoagulation, 201, 203–206, 208–210, 212–215, 217
- Plasma formation, 18, 20, 22, 23, 292
- Platelets, 35, 56, 59, 62–66, 71, 73, 88, 107, 116, 117, 121, 159, 162, 164, 171, 172, 182, 183, 262, 263, 268, 273, 353
- PPCI. *See* Primary percutaneous coronary intervention
- Preconditioning, 280, 305–309
- Primary percutaneous coronary intervention (PPCI), 114, 116
- Pulsed laser, 16, 18, 20–24, 97, 288, 292, 322, 331, 353
- Pulse duration, 2, 7, 20, 22, 24, 56, 288, 290, 292, 293, 307, 308, 312, 321, 322, 324, 325, 337
- R**
- Relaxation time, 2, 21, 22, 321, 322
- Renal denervation, 241
- Reperfusion, 55, 77, 280, 294, 305–308, 311, 317
- Retrograde approach, 31
- Retrograde laser fenestration, 191, 193, 195, 196
- Revascularization, 31, 55, 74, 83–94, 97, 125, 141–154, 157, 175, 181, 191, 217, 271, 287–298, 305–309, 311–317, 321–335, 353
- S**
- Saphenous vein graft (SVG), 66, 69, 70, 72–80, 114, 122
- Severe dermal changes,
- SFA. *See* Superficial femoral artery

Small saphenous vein (SSV), 326–329, 337, 339  
Spallation, 20–23, 26–28  
Step by step, 91–93, 126, 128, 138, 139, 142–144, 151, 167–170, 239  
Subacute and chronic thrombus, 163–164  
Superficial femoral artery (SFA), 91–93, 126, 127, 134, 135, 139, 142–144, 146, 149, 150, 163, 167–171, 174–178, 181–189, 354, 355  
occlusion, 126, 127, 134, 135, 167, 354

**T**

TEVAR. *See* Thoracic endovascular aneurysm repair (TEVAR)  
Thermo-elastic expansion, 20–22  
Thoracic aortic aneurysm, 195  
Thoracic endovascular, 191–196  
Thoracic endovascular aneurysm repair (TEVAR), 191–193, 195, 196  
Thrombosis, 27, 31, 36, 57, 62, 64, 69, 72, 73, 114–120, 147, 157, 162, 164, 172, 176, 177, 181, 189, 250, 251, 256, 257, 260, 268, 313, 322, 327–331, 338, 341, 345, 353  
Tissue interaction, 1–3, 19–20, 114, 115, 210, 217, 288, 291, 321  
Transmyocardial, 271–281, 287–299, 305–309, 311–317

Transmyocardial laser revascularization, 271–281, 289–299, 311, 316  
Transmyocardial revascularization, 294, 295, 305–309, 311–317  
Transseptal laser puncture, 236, 241–242  
Transvenous lead extraction, 245–252, 258, 259

**U**

Uncrossable total occlusions, 84, 86–88  
Undilatable in-stent stenosis, 84

**V**

Vaporization, 3, 4, 15, 16, 18–21, 23, 25–28, 56, 66, 84, 207, 211, 214, 216, 217, 222, 224, 231, 234, 279, 289–293, 314, 349, 350, 357  
Vascular calcification, 83, 106, 267  
Vein graft, 34, 45, 56, 59, 62, 63, 69–80, 97, 109, 113–116, 354, 357  
Venostenosis, 80  
Venous ulcer, 326