Index

Note: Page numbers followed by "f" indicate figures and those followed by "t" indicate tables.

a

AA, see arachadonic acid abaxial/mid-body/central meniscal release, 303 Absolute Risk Increase (ARI), 318 Absolute Risk Reduction (ARR), 317 accelerometers, 319 ACL, see anterior cruciate ligament adult mesenchymal stromal cells, 336 aLDFA, see anatomic lateral distal femoral angle allografts DDFT, 210 in intra-articular stabilization, 204–206, 205f–206f amantadine, 335 analgesics, 335-336 anatomic lateral distal femoral angle (aLDFA), 262-263, 264f angular limb deformities, 235-236 anterior cruciate ligament (ACL), 202 rupture repair, 62, 202 anti-collagen type I and II antibodies, 89-90 anti-nerve growth factor antibody, 336 arachadonic acid (AA), 337 ARI, see Absolute Risk Increase ARR, see Absolute Risk Reduction arthroscopic appearance of stifle synovium in dogs, 97f arthroscopic-assisted arthrotomy, 177-180 arthroscopic follow-up examination, stifle, 279-289 after extracapsular stabilization, 287-288, 287f-288f after intra-articular stabilization, 288-289, 288f after tibial plateau leveling osteotomy (TPLO), 280-287, 280f-286f arthroscopy, history, 171

aseptic loosening, 368–369, 369f aspirin, 335 aspirin triggered lipoxins (ATLs), 335 ASUs, see avocado and soybean oil unsaponifiables ATLs, see aspirin triggered lipoxins autografts, in intra-articular stabilization, 203–204 avocado and soybean oil unsaponifiables (ASUs), 338

b

bilateral lameness, 115, 116f biomaterials, 372 biomechanics of stifle, 227–231, 228f–231f BioMedtrix total knee replacement (TKR) implant, 364–365, 364f biplanar fluoroscopy, 272 bone screws, in tibial plateau leveling osteotomy, 219, 221 botulinum toxin A, 336 braces, 264

С

Canine Brief Pain Inventory (CBPI), 318 canine and human cruciate ligament rupture, 61–62 canine stifle joint disorders, 135 cartilage damage, 97 cartilage oligomeric matrix protein (COMP), 360 caudal cruciate ligament (CaCL), 40 CBPI, *see* Canine Brief Pain Inventory CCWO, *see* closing cranial wedge ostectomy chondroitin sulfate, 337–338 client-specific outcome measures (CSOM), 318

Advances in the Canine Cranial Cruciate Ligament, Second Edition. Edited by Peter Muir. © 2018 ACVS Foundation. This Work is a co-publication between the American College of Veterinary Surgeons Foundation and Wiley-Blackwell.

Printer Name:

386 Index

clinical outcomes, after surgical treatment of cruciate ligament rupture (CR), 313 affecting factors, 315 early postoperative, 313-314 mid- and long-term, 313f-314f, 314 clinical trial design blinding and outcome assessment, 360 control group definition, 357 intervention versus control groups, assignment to, 357-358, 360 overview, 357 placebo effects, 359t, 360 study population definition, 357 closing cranial wedge ostectomy (CCWO), 221, 243, 246f, 252, 254, 254f, 256-259, 261, 272, 275 complications, 247 implant selection, 246-247 outcome for, 247-248 patient selection, 244-245 technique research, 243-244 intraoperative, 244 planning, 244, 245f Clostridium botulinum, 336 collagen turnover, 65 collagen type I and II, 89 relevance of antibodies to collagen types I and II, 90-91 COMP, see cartilage oligomeric matrix protein comparative value of the canine model, 62 complete cruciate ligament rupture, dogs with, 292-293, 292f-293f concurrent meniscal pathology, 295 algorithm for decision-making of surgical treatment, 299f diagnosis of, 295-296 resection procedures used in dogs, 297t treatment of, 296-299, 298f types, 295, 296f contralateral cranial cruciate ligament (CrCL), 89 cortical bone, 161 COX, see cyclooxygenase cranial cruciate ligament (CrCL) clinical presentation, 123-124 cranial joint space, 135 cranial traction, 172 deficiency, 39 deficient stifle, 35, 41-43, 189 diagnosis of, 120 fibers, 121 partial rupture of, 119-121 rupture of, 123 sectioning of, 120t treatment, 124 cranial cruciate ligament (CrCL)-deficient minipig, 373 cranial cruciate ligament (CrCL) rupture in dogs, intra-articular repair for biology of, 208-210, 209f deficient stifle, 264-265, 265f

treatment by tibial osteotomies, 271-276, 273f-276f fixation, 207-208 future developments, 210, 210f-211f graft selection allografts, 204-206, 205f-206f autografts, 203-204 prosthetics, 206-207 historical use, 202-203 ligament debridement for, 291-294 cranial cruciate ligament (CrCL) tensile strength, 101 cranial tibial thrust, 221 cruciate ligament functional anatomy, 9 innervation, 8-9 macroanatomy, 3-5 microanatomy, 5-6 morphology, 3-5 synovial envelope, 68 vascular supply, 6-8 cruciate ligament matrix metabolism in human beings and other species, 65 in ruptured canine cruciate ligaments, 68-69 cruciate ligament rupture (CR), 201 clinical outcomes after surgical treatment of, 313 affecting factors, 315 early postoperative, 313-314 mid- and long-term, 313f-314f, 314 clinical signs of, 116-118 epidemiology of, 109-112 bilateral, 111-112 genetics, 112 genetics of, 57-61 candidate gene analysis, 58-59 complex trait genetics, 58 genome-wide association, 59-61 heritability, 57 history, 115-116 with meniscal pathology, 295-299 morphological risk factors for, 73-77 distal femoral intercondylar notch, 73 fabella, 77 patella/quadriceps mechanism and Q-angle, 77 tibia, 76-77 obesity, 110 and osteoarthritis, 307 with patellar luxation management of, 264-268, 265f-267f pathophysiology of, 261 patient evaluation, 262-264, 263f-265f pathology of, 47 adaptation and repair, 51-54 histologic features of, 48 histopathology of canine, 49-51 pelvic limb lameness in dogs and, 279 rehabilitation for dogs with, 343 changes in posture, prevention and recovery from, 345, 347f

considerations, 347t goals of, 343-347 limb use, promotion of, 344, 345f management protocols, 349-351, 350f mechanical complications after surgery, prevention from, 345, 347 motor control, prevention and recovery from loss of, 345, 345f-346f muscle mass, prevention and recovery from loss of, 345, 345f-346f pain relief, 343-344 postoperative edema, elimination of, 344 proactive, 349-350 retroactive, 349-350 scientific evidence for, 349 stifle joint motion, maintaining/recovering, 344, 344f strategies, 347-349, 347t, 348f remodeling and repair, 23-28 healing potential of graft interface tissue, 25 - 28healing potential of reconstructed cranial cruciate ligament (CrCL) graft, 24-25 healing potential of ruptured cranial cruciate ligament (CrCL), 22-23 healing potential of surgically repaired cranial cruciate ligament (CrCL), 24 risk factors for, 111t risk prediction of, 165-166 magnetic resonance imaging, 166 radiography, 165-166 subtle effusion, 116 surgical treatment outcomes, 201-202 CSOM, see client-specific outcome measures cyclooxygenase (COX), 334-335, 337, 343

d

DDFT, see deep digital flexor tendon debridement, for cranial cruciate ligament (CrCL) rupture, 291–292 complete, 292–293, 292f–293f partial, 293–294, 293f decellularization, 205–206 deep digital flexor tendon (DDFT), 208, 210 deep intra-articular structures, 136 distribution of proteoglycan, 32 doxycycline, 380

e

edema, 344 endothelial (eNOS) isoforms of nitric oxide synthase, 81 eTPA, *see* excessive tibial plateau angle excessive tibial plateau angle (eTPA), 221, 233, 235, 253–259 closing cranial wedge osteoctomy (CCWO) for, 253, 254f outcome, 259 preoperative planning for, 253, 254f–257f, 255–258 surgical technique for, 258–259 tibial plateau leveling osteotomy (TPLO) for, 253, 254f extracapsular stabilization (ES) technique, 189, 196 biological extracapsular stabilization, 190 case selection, 189 general care after surgery, 190 isometry, 194 surgical approach, 189–190 suture material, 193 extracellular matrix (ECM), 65 biomaterial, 372 proteins, 372

femoral condyles, 136 femoral and tibial attachment clinical outcome, 196–197 methods of securing suture, 194–195 stifle position while securing suture, 195–196 fibular fractures, after tibial plateau leveling osteotomy (TPLO), 222, 222f first-generation tibial tuberosity advancement (TTA) complications, 238–239 implants and techniques, 232 outcome, 238–239 flexion–extension motion, 39 force platform gait analysis, 320 fractures, as a complication of tibial plateau leveling osteotomy (TPLO), 222, 222f

g

GABA, see gamma-aminobutyric acid gabapentin, 335-336 gamma-aminobutyric acid (GABA), 335-336 Gelpi retractor, 172-173 glucocorticoids, 381 glucosamine, 337-338 grafts allografts, 204-206, 205f-206f autografts, 203-204 fixation, 207-208 intra-articular, use in restoration of joint stability, 207 - 210non-destructive assessment of, 373, 373f non-invasive assessment of, 373, 373f patella tendon, 203-204 gram-positive aerobic bacteria, 328

h

HA, *see* hyaluronic acid health measurement instruments reliability testing, 356–357 stepwise development of, 356–357, 356f, 358t validation of, 357 hoop tension theory, schematic depiction of, 36f hyaluronic acid (HA), 337 388 Index

İ

implant closing cranial wedge ostectomy, 244-246 selection, in tibial plateau leveling osteotomy (TPLO), 219, 220f, 221 tibial tuberosity advancement, 232 inducible isoform of nitric oxide synthase (iNOS), 81 intra-articular corticosteroids, 185 intra-articular grafts, for restoration of joint stability, 207-210 intra-articular repairs, 202-203 intra-articular stabilization allografts, use in, 204-206 autografts, use in, 203-204 intra-articular ligament replacement, 204-206, 206f intra-articular repairs, 202-203 prosthetics, use in, 206-207 isometry, 194

j jig

for tibial plateau leveling osteotomy, 257, 257f use in tibial plateau leveling osteotomy, 218 joint inflammation, 93 joint lavage clinical studies, 185–186 mechanism for relief of, 186 joints limit motion, 155 joint tissues antigen-specific immune responses, 103 innate immune responses, 103–105

k

knee replacement in dog, total, see total knee replacement in dog

Liverpool Osteoarthritis in Dogs (LOAD), 318 LOAD, see Liverpool Osteoarthritis in Dogs

m

material properties of the meniscus, 35 matrix metalloproteinases (MMPs), 379–380 MCL, *see* medial collateral ligament mechanical lateral distal femoral angle (mLDFA), 263, 264f mechanical medial distal tibial angle (mMDTA), 263 mechanical medial proximal tibial angle (mMPTA), 263 mechanoreceptors, 291–292 medial collateral ligament (MCL), 368 medial meniscal release, 302–303 medial patella luxation (MPL), 250 meniscal cells, 32 meniscal damage, 123 meniscal injury, 295 algorithm for decision-making of surgical treatment, 299f diagnosis of, 295-296 resection procedures used in dogs, 297t treatment of, 296-299, 298f types, 295, 296f meniscal release, 301-302 clinical decision-making and, 305-306 in dogs, 299t and joint biomechanics and biology, 302-303, 303f-304f medial, 302-303 surgical technique, 303-305, 304f and tibial plateau leveling osteotomy, 219 and tibial tuberosity advancement (TTA), 238 types of, 303 meniscal structure, 31-36 biomechanical and material properties, 34-35 meniscal function, 35–36 neurovascular anatomy, 32-34 surgical anatomy, 31-32 meniscal tear, 138, 139f menisci, extracellular matrix (ECM) of, 32 menisco-tibial release, 303-305 mesenchymal stem cells (MSCs), 336, 381 mLDFA, see mechanical lateral distal femoral angle mMDTA, see mechanical medial distal tibial angle MMPs, see matrix metalloproteinases mMPTA, see mechanical medial proximal tibial angle morphology, 73 MPL, see medial patella luxation MSCs, see mesenchymal stem cells multi-drug-resistant (MDR) bacteria, 325

n

neoplastic disorders, 146 nerve growth factor (NGF), 336 neuronal (nNOS) isoforms of nitric oxide synthase, 81 NGF, see nerve growth factor nitric oxide (NO) in articular tissues, 82 cranial cruciate ligament (CrCL) structure, 85-86 influence of, 85-86 matrix metalloproteinases (MMPs), 85-86 overview, 84 role of matrix metalloproteinases (MMPs), 84-85 nitric oxide synthase (NOS), 81 N-methyl-D-aspartate (NMDA) receptors, 335 NNH, see Number Needed to Harm NNT, see Number Needed to Treat nonsteroidal anti-inflammatory drugs (NSAIDs), 334-335, 381 NRS, see numeric rating score NSAIDs, see nonsteroidal anti-inflammatory drugs

Trim: 254mm × 178mm

nucleotide-binding oligomerization domain (NOD), 103

Number Needed to Harm (NNH), 317–318, 318t Number Needed to Treat (NNT), 317–318, 318t numeric rating score (NRS), 319

0

OA, see osteoarthritis omega-3 fatty acids, 337 orthopaedic disease, owner assessments in, 355-356 orthopaedic surgical infections of stifle, 323 definition, 323-324 diagnosis, 326 economic impact, 328 incidence of, 324-325 pathogens, 325-326 prognosis of, 328 rates, 324-325 treatment, 326-328, 327f osteoarthritis (OA), 202, 307 cranial cruciate ligament (CrCL) transection as model of, 307, 308f progression after stifle stabilization procedures, 308 causes, 308-310 comparison of methods, 310 radiographic progression, 309t stifle, medical therapy for, 333-334 adjunctive therapies, 333 analgesics, 335-336 biological products, 336 care-giver placebo effect, 333-334 chondromodulating agents, 336-337 dietary supplements, 337-338 goals of, 333 NSAIDs, 334-335 weight management, 334 and stifle instability with cranial cruciate ligament (CrCL) rupture, 308 over-the-top technique, 203 owner assessments, in orthopaedic disease, 355-356

р

partial cruciate ligament rupture, dogs with, 293–294, 293f patellar luxation cruciate ligament rupture with management of, 264–268, 265f–267f pathophysiology of, 261 patient evaluation, 262–264, 263f–265f tibial tuberosity advancement (TTA), 236, 237f patellar tendon enlargement, after tibial plateau leveling osteotomy, 221 insertion point, low versus high, 233, 235f patella tendon angle (PTA), 217, 227–229, 228f–229f, 231, 231f

patella tendon autograft, 203-204 pathomechanics theory of osteoarthritis, diagrammatic presentation, 43 patient morbidity, 182-183 patient size, tibial tuberosity advancement (TTA), 236–237, 237f pedometers, 319 pivot shift, 221–222 placebo effects, 359t, 360 platelet-rich plasma (PRP), 336, 372 platelets, 372 polysulfated glycosaminoglycan (PSGAG), 336-337 polyunsaturated fatty acids (PUFAs), 337 postliminary tears, 301 pressure mat gait analysis, 353 prosthetics, use in intra-articular stabilization, 206-207 proteoglycans, 62 PRP, see platelet-rich plasma PSGAG, see polysulfated glycosaminoglycan PTA, see patella tendon angle PUFAs, see polyunsaturated fatty acids

q

questionnaires, owner, 318-319

r

randomized controlled clinical trials (RCTs), 357 RCTs, see randomized controlled clinical trials regenerative medicine, cranial cruciate ligament (CrCL) and, 371 additional factors, 373, 375 arthritic degeneration, 373 cruciate ligaments, healing of, 371-372, 372f biomaterial, 372 non-destructive assessment of graft properties, 373, 373f non-invasive assessment of graft properties, 373, 373f signaling, 372-373 preclinical studies for, 375-376 surgical treatments, comparative effectiveness of, 371 rehabilitation for dogs with cruciate ligament rupture, 343 changes in posture, prevention and recovery from, 345, 347f considerations, 347t goals of, 343-347 limb use, promotion of, 344, 345f management protocols, 349-351, 350f mechanical complications after surgery, prevention from, 345, 347 motor control, prevention and recovery from loss of, 345, 345f-346f

Index 389

October 31, 2017 10:14

Printer Name:

Trim: 254mm × 178mm

390 Index

rehabilitation for dogs with cruciate ligament rupture (Continued) muscle mass, prevention and recovery from loss of, 345, 345f-346f pain relief, 343-344 postoperative edema, elimination of, 344 proactive, 349-350 retroactive, 349-350 scientific evidence for, 349 stifle joint motion, maintaining/recovering, 344, 344f strategies, 347-349, 347t, 348f Relative Risk Reduction (RRR), 317 reproductive status as risk factor for cranial cruciate ligament (CrCL) rupture, 109

RRR, see Relative Risk Reduction

S

second-generation tibial tuberosity advancement (TTA) complications with, 239-240, 239f implants and techniques, 232 outcome, 239-240 Securos tibial plateau leveling osteotomy (TPLO) plate, 219 signaling, 372-373 single-plane fluoroscopy, 272 size of patient, and tibial tuberosity advancement, 236-237, 237f Slocum tibial plateau leveling osteotomy (TPLO) plate, 219 SSI, see surgical site infections stifle arthroscopic follow-up examination, 279-289 after extracapsular stabilization, 287-288, 287f-288f after intra-articular stabilization, 288-289, 288f after tibial plateau leveling osteotomy (TPLO), 280-287, 280f-286f arthrotomy, 171 arthroscopy of, 174-177 overview, 171 biomechanics of, 227-231, 228f-231f computed tomography (CT), 141-146 features of, 143-146 indications for, 141 technical aspects, 142-143 cranial cruciate ligament (CrCL)-deficient, 264-265, 265f distraction, 180–181 instability associated with, 92-98 synovial assessment, 96 synovitis, 94-96 synovitis in cruciate ligament rupture, 96-98 joint motion, maintaining/recovering, 344, 344f

magnetic resonance imaging, 155–161 image acquisition, 155–156 meniscus, 156-161 synovial structures, 156 orthopaedic surgical infections, 323 definition, 323-324 diagnosis, 326 economic impact, 328 incidence of, 324-325 pathogens, 325-326 prognosis of, 328 treatment, 326-328, 327f osteoarthritis, medical therapy for, 333-334 adjunctive therapies, 333 analgesics, 335-336 biological products, 336 care-giver placebo effect, 333-334 chondromodulating agents, 336-337 dietary supplements, 337-338 goals of, 333 nonsteroidal anti-inflammatory drugs (NSAIDs), 334-335 weight management, 334 stabilization surgery, 271-272 accelerometers, 319 data reporting, 320 force platform gait analysis, 320 owner questionnaires and, 318-319 pedometers, 319 residual lameness, 320-321, 321f success and failure, 317-318 veterinary examination, 319 stress imaging of, 128-132 measuring subluxation, 128-129 standing radiography, 131 stress devices, 130 stress-magnetic resonance imaging (MRI), 131-132 tibial compression radiography, 129-130 ultrasonography, abnormal, 137-140 stress devices, 130 surgical site infections (SSI), 323-324, 324t deep, 324t organ/space, 324t superficial, 324t synovial immune responses, in stifle synovitis, 101-105 synovial inflammation, 379 synovial membrane, 93 synovitis, 94-96 Synthes tibial plateau leveling osteotomy (TPLO) plate, 219

t

tartrate-resistant acid phosphatase-positive (TRAP) macrophages, 101, 102f October 31, 2017 10:14

Printer Name:

Index 391

T-cell inhibitors, 380-381 technical failures, tibial tuberosity advancement (TTA), 238-239 tetracyclines, 379-380 tibia fractures, after tibial plateau leveling osteotomy (TPLO), 222, 222f tibial osteotomies biomechanics of, 272-276, 273f-276f tibial plateau angle (TPA), 217-219, 218f, 221, 243-244 excessive, 221, 233, 235, 236f, 253-259. See also excessive tibial plateau angle (eTPA) measurement, 218, 218f in stifle biomechanics, 272 tibial plateau leveling osteotomy (TPLO), 97, 136, 201, 217, 243 bone screws, locking/conventional, 219, 221 complications after, 22f, 221-223 for dogs with combined cruciate ligament rupture (CR) and patella luxation (PL), 266-267, 266f-267f implant selection, 219, 220f, 221 infection rates for, 221 and meniscal release, 219 outcome after, 223 patient selection, 219 proximal tibial valgus deformity treated by, 256f technique, 217-219 three-jig pin technique for, 257, 257f tibial tuberosity fracture of, as complication of tibial plateau leveling osteotomy, 222 in human knee joint, 227, 228f tibial tuberosity advancement (TTA), 217, 227 case selection angular and torsional limb deformities, 235-236 excessive tibial plateau angle (TPA), 233, 235, 236f low versus high patellar tendon insertion point, 233, 235f patellar luxation, 236, 237f patient size, 236-237, 237f for dogs with combined cruciate ligament rupture (CR) and patella luxation (PL), 268 first-generation complications, 238-239 implants and techniques, 232 outcome, 238-239 implants and techniques, 231-232 first-generation, 232 second-generation, 232 pre-planning, 232-233, 234f-235f second-generation complications with, 239-240, 239f

implants and techniques, 232 outcome, 239-240 stifle biomechanics, 227-231, 229f-231f surgery, 232-233 toll-like receptor (TLR), 103 torsional limb deformities, 235-236 total knee replacement (TKR) in dog BioMedtrix, 364-365, 364f clinical results with cemented canine, 366-367 complications aseptic loosening, 368-369, 369f infection, 367, 367f joint/implant instability, 368 neurovascular injury, 368 wear of ultra-high-molecular-weight polyethylene, 368 contraindications for surgery, 365, 365f history of, 363-364 indications for surgery, 365 laboratory testing for, 369-370 postoperative pain management, 366 surgical technique, 365-366, 366f TPA, see tibial plateau angle TPLO, see tibial plateau leveling osteotomy tramadol, 335 transection of the meniscus, 35 transient receptor potential vanilloid 1(TRPV1) receptor, 335 traumatic lesions, 146 triple tibial osteotomy (TTO), 248 complications, 250-251, 251f implant selection, 249-250, 250f outcome, 251 patient selection, 249 technique intraoperative, 248-249, 249f planning, 248 T-style plates, 246 TTA, see tibial tuberosity advancement

u

UHMWPE, see ultra-high-molecular-weight polyethylene ultra-high-molecular-weight polyethylene (UHMWPE), 368f

V

VAS, see visual analog scale visual analog scale (VAS), 319

W

wedgie, spacer tool, 248 wedging phenomenon, 301–302 weight management, for osteoarthritis, 334 JWST867-bind

JWST867-Muir O

October 31, 2017 10:14

Printer Name:

Trim: 254mm × 178mm