

MUSCULOSKELETAL STUDY GUIDE

The following pages summarize potential content for the musculoskeletal section of the Continuing Certification Exam. The subject matter that may be used for a test question is listed below in outline form as a study guide.

- Imaging: indications, techniques, and limitations (including radiography, CT, MRI, nuclear scintigraphy/PET, bone density studies, diagnostic and therapeutic aspirations and injections, percutaneous biopsy, ablations, and ultrasound)
- Normal/normal variants (including normal anatomy and physiology of bone and joints, primary and secondary ossification centers and sequence of ossification, normal marrow development/variations, physiologic radiolucencies, vascular channels, physiologic bowing, transverse/growth line, sesamoids and accessory ossicles, accessory muscles, tug lesions)
- Congenital and developmental spine abnormalities (including scoliosis, os odontoideum, Klippel-Feil, vertebral anomalies, Schmorl node, Scheuermann disease, limbus vertebra)
- Congenital anomalies and dysplasias
 - Lower extremity (including developmental hip dysplasia, Blount disease, discoid meniscus, foot deformities, coalition, syndactyly, polydactyly)
 - Upper extremity (including Madelung deformity, coalition, congenital dislocation of the radial head, carpal coalition, syndactyly, polydactyly, Sprengel deformity)
 - Diffuse/multifocal (including achondroplasia, osteogenesis imperfecta, sclerosing osseous dysplasias, osteopetrosis, cleidocranial dysplasia/dysostosis, amniotic band syndrome, connective tissue disorders such as Ehlers-Danlos syndrome and Marfan syndrome, neurofibromatosis, cerebral palsy, muscular dystrophies, congenital insensitivity to pain)
 - Miscellaneous (including mucopolysaccharidosis, tuberous sclerosis, Down syndrome, Turner syndrome, Apert syndrome, fibrodysplasia/myositis ossificans progressive, macrodystrophia lipomatosa, pachydermoperiostosis, physeal overuse syndromes, Legg-Calve-Perthes, slipped capital epiphyses, osteochondroses, nail-patella syndrome)
- Infection (including routes of spread, predisposing factors, common and other organisms including TB, Lyme disease, fungal, parasitic, syphilis)
 - Osteomyelitis (common sites, terminology including sequestrum, involucrum, cloaca, sinus, Brodie abscess, sclerosing osteomyelitis, multifocal)
 - Septic arthritis

- Soft tissue (including abscess, cellulitis, septic tenosynovitis, myositis, gas gangrene, necrotizing fasciitis)
- Tumors and tumor-like conditions
 - Imaging features (including size, location, aggressiveness/growth pattern, internal characteristics, involvement of adjacent structures, margin/zone of transition, pattern of osteolysis, periosteal reaction, soft tissue mass, matrix/calcification, biopsy techniques, metastatic spread, recurrence, therapy options)
 - Benign and malignant bone lesions of cartilaginous, osteogenic, hematopoietic, fibrogenic, metastatic, and lipoid origins. Miscellaneous bone lesions including aneurysmal bone cyst, unicameral bone cyst, giant cell tumor, fibrous dysplasia, osteofibrous dysplasia, adamantinoma, Ewing sarcoma/PNET tumors, Langerhans cell histiocytosis, non-ossifying fibroma, and chordoma. Also, bone malignancies secondary to Paget disease, radiation, infection, and inherited conditions.
 - Miscellaneous benign and malignant soft tissue tumors of adipocytic, fibroblastic, smooth muscle, skeletal muscle, chondro-osseous, neural, and metastatic origin. Also undifferentiated pleomorphic sarcoma, melanoma, myxoma, glomus tumor, tenosynovial giant cell tumor, myxoma, synovial sarcoma, alveolar small part sarcoma, and dermatofibrosarcoma protruberans.
 - Miscellaneous lesions including Ollier disease, Maffucci syndrome, sebaceous cyst, epidermal inclusion cyst, granuloma annulare, hemophilic pseudotumor, Gorham disease, giant reparative granuloma, ganglion, vascular malformation/lymphangioma, post resection neuroma, Morton neuroma, xanthoma of the tendon, and lipoma arborescens
- Trauma
 - General principles (including relationship of force and deformation to fracture, mechanisms of injury, relevant anatomy and terminology, fracture patterns and associated injuries, fracture description, bone and soft tissue stress injuries, fracture healing, complications, open fractures)
 - Fractures including adult fractures, pediatric fractures, and pathologic fractures. Also, dislocations/subluxation/instability patterns.
 - Internal derangement of joints. Tears, normal variation, pitfalls, and degeneration of the tendons, muscles, ligaments, labrum, and menisci.
 - Repetitive trauma (tendinopathy, fatigue and insufficiency fractures, sports related repetitive injury to bone, repetitive tendon conditions, impingement conditions, enthesophytes, impaction syndromes)
 - Osteo-chondral and chondral lesions
 - Miscellaneous soft tissue injuries including hematoma, myositis ossificans, compartment syndrome, pulley/sagittal band injuries, muscle hernia, adhesive capsulitis, postero-lateral corner injury, plantar fasciitis, turf toe, Morel-Lavallee/degloving injuries, thermal injury, foreign bodies and myonecrosis.

- Miscellaneous conditions of bursitis, sinus tarsi syndrome, Haglund deformity, and osteitis pubis/core muscle injury
- Metabolic disorders (including osteoporosis, hyperparathyroidism, thyroid diseases, rickets and osteomalacia, renal osteodystrophy, tumoral calcinosis, pituitary disorders, intoxication/poisoning such as heavy metal/lead, fluorine, osteomalacia, hypervitaminosis A and D). Also, bone and soft tissue disorders caused by medication.
- Soft tissue calcification and ossification related to injury, paraplegia, calcific tendinosis, rheumatologic causes, vascular causes, and renal causes
- Hematologic disorders (such as chronic anemias, hemophilia, myelofibrosis, extramedullary hematopoiesis, radiation-induced marrow changes, marrow reconversion)
- Osteonecrosis (causes, site-specific disease) and muscle infarction
- Periosteal reaction (including primary and secondary hypertrophic osteoarthropathy, thyroid acropachy, venous stasis, and infantile cortical hyperostosis/Caffey disease)
- Miscellaneous (including Paget disease, sarcoidosis, mastocytosis, amyloidosis, lipid storage diseases)
- Arthropathy
 - General features (including distribution, soft tissue changes, joint space width, bone density, osteophytes, subchondral cysts, osseous erosions, proliferative new bone, joint deformity, calcification)
 - Osteoarthritis
 - Inflammatory (including rheumatoid, psoriatic, reactive arthritis, ankylosing spondylitis, enteropathic, spondyloarthropathy, juvenile idiopathic arthritis)
 - Connective tissue diseases (systemic lupus erythematosus [SLE], scleroderma, auto-immune inflammatory myositis)
 - Crystal-associated (including gout, calcium pyrophosphate deposition disease [CPPD])
 - Miscellaneous (including hemochromatosis, synovial chondromatosis, osteitis condensans ilii, degenerative disc disease, diffuse idiopathic skeletal hyperostosis [DISH])
- Spine conditions including disorders of the disc, spinal stenosis, degenerative spine disease, fracture/dislocation, spondylolysis, ossification of the longitudinal ligament, arachnoiditis, congenital spine disorders, and cord disorders
- Joint replacement procedures and complications
- Disorders related to internal fixation, labral/meniscal surgery, tendon repair, ligamentous repair, tumor resection, amputation, and chondral repair.
- Interventional MSK procedure technique, pre-procedure workup and potential complications
- Nerve impingement syndromes
- Bone density studies: technique, pitfalls, classification, FRAX calculation