Children's Hospital Of Wisconsin

Co-Management Guidelines

To support collaborative care, we have developed guidelines for our community providers to utilize when referring to, and managing patients with, the pediatric specialists at Children's Hospital of Wisconsin. Co-management guidelines provide protocols for jointly managing patient cases between community providers and our pediatric specialists.

Lower Extremity Pain

Lower extremity musculoskeletal pain is common, the possible etiologies are broad, ranging from benign to serious. The goal of this practice guideline is to present the tools for a provider to determine the diagnosis for a child with lower extremity pain in an efficient manner. This practice guideline is a reference for providers when caring for a patient with lower extremity musculoskeletal pain.

Diagnosis/symptom	Referring provider's initial evaluation and management:	When to initiate referral/ consider refer to Orthopedic Clinic:	What can referring provider send to Orthopedic Clinic:	Specialist's workup will likely include:
Signs and symptoms • The list of differential diagnoses' for lower extremity pain is extensive and broad. A thorough history and physical exam will aid the provider in identifying the correct diagnoses. Always be familiar with the child's medical history	• Focused History of Musculoskeletal Pain, symptoms and physician exam • Imaging as needed • Labs as needed • **Refer to below algorithm**	***See work-up algorithm below**	**1. Using Epic** • Please complete the external referral order **In order to help triage our patients and maximize the visit, the following information would be helpful include with your referral order:** • Urgency of the referral • What is the key question you would like answered? Note: Our office will call to schedule the appointment with the patient. **2. Not using Epic external referral order:**	**After referral to Orthopedic Clinic:** ***See Initial Interventions by referring providers below**

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			• In order to help triage our patients maximize the visit time, please **fax** the above information to **(414-607-5288**)
			• It would also be helpful to include:
			  • Chief complaint, onset, frequency
			  • Recent progress notes
			  • Labs and imaging results
			  • Other Diagnoses
			  • Office notes with medications tried/failed in the past and any lab work that may have been obtained regarding this patient's problems.	

Causes The etiology of musculoskeletal pain, with or without a limp, is broad. Below are commonly seen etiologies for musculoskeletal pain. The diagnoses can be grouped into the following categories: • Trauma: (i.e. strains/sprains, fractures, dislocations) • Infection: septic arthritis, osteomyelitis, brodies abscess • Immune-mediated: toxic synovitis, juvenile rheumatoid arthritis, Lyme disease, Strep reactive arthritis, osteoid osteoma • Acquired: slipped capital femoral epiphysis (SCFE), Legg-Calve-Perthes disease • Neoplastic: leukemia/lymphoma, Ewing's sarcoma, osteosarcoma • Referred: discitis, psoas abscess, spine or hip pathology • Benign musculoskeletal: Growing pains, tendonitis/apophysitis				

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Additional non-painful etiologies that can cause a limp to consider include: • Congenital: developmental dysplasia of the hip • Non-painful limp: leg length discrepancy, scoliosis • Neurologic: cerebral palsy, myelomeningocele, or underlying neuromuscular pathology				

Work-up Algorithm

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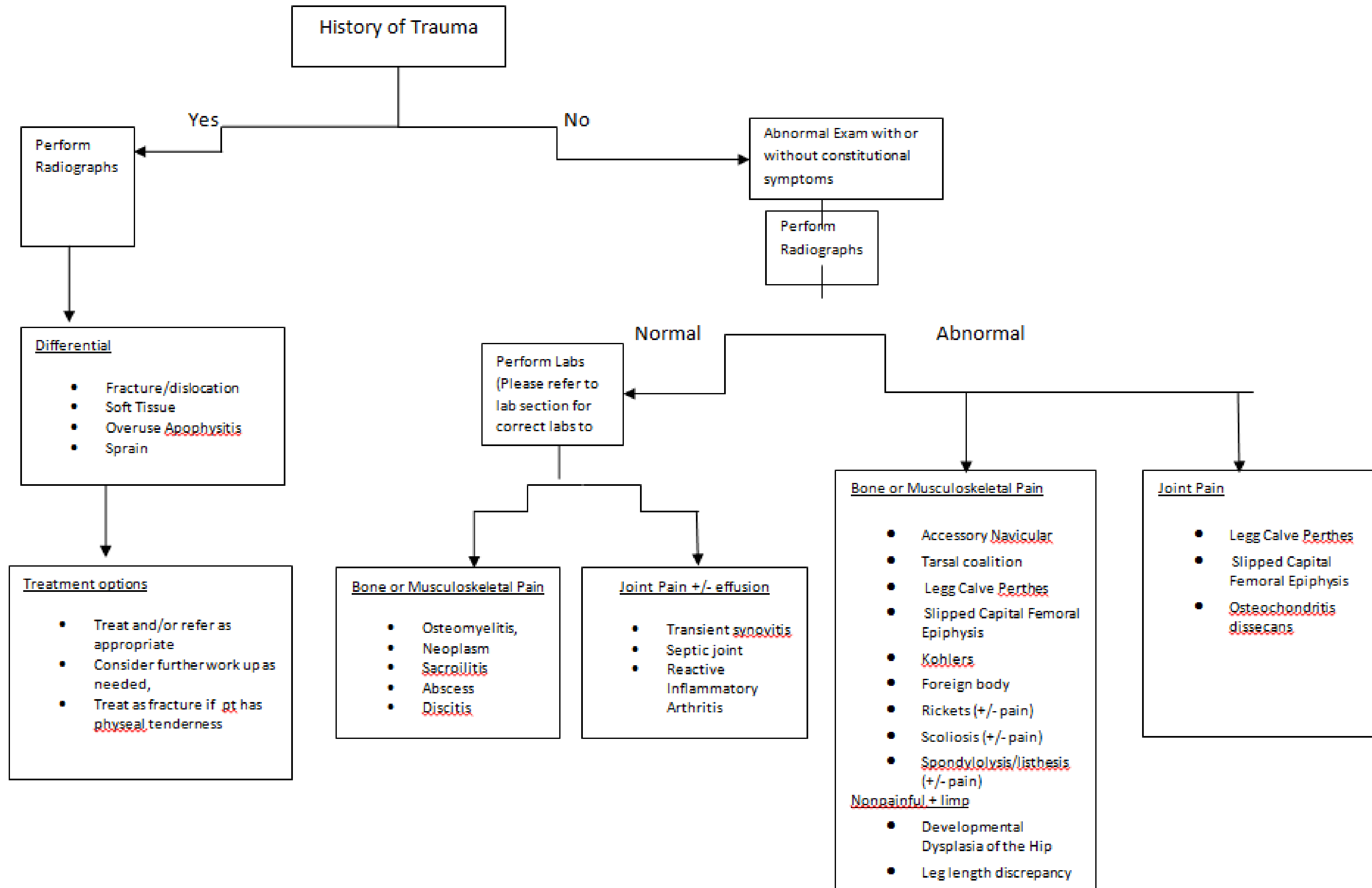

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Imaging

Location of Pain	Radiographs	Views to Obtain	Other Imaging Tests
Hip	Pelvis	AP, frog, lateral	-MRI: Soft tissue and joints, large amounts of effusion; ex: stress fractures; infection; abscess; neoplasm; ligament injury; cartilage evaluation -CT: Boney abnormalities suspected but not definitive by x-ray, ex: intra-articular fracture -Ultrasound: Effusion of joints, vascular injuries suspected; ex: septic hip, infant DDH
Femur	Femur	AP, lateral	
Knee	Knee	AP, lateral, sunrise, notch	
Ankle	Tibia Ankle	AP, lateral AP, lateral, mortise	
Foot	Foot	AP, lateral, oblique	

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Laboratory Tests

Test	Condition	Expected Finding
CBC	Infection Inflammation Malignancy	Elevated WBC & Platelets Elevated WBC & Platelets Cytopenia
CRP	Infection Inflammation Malignancy	Elevated Elevated Elevated
ESR	Infection Inflammation Malignancy	Elevated Elevated Elevated
ASO	Acute rheumatic fever Unresolved/undetected Group A hemolytic strep	Markedly increased & usually very ill child Increased ASO, sore throat
AntiDNAse B	Acute rheumatic fever Unresolved/undetected Group A hemolytic strep	Positive & usually very ill child Positive
ANA	SLE	Markedly positive

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	False positive	Mildly positive
Lyme	Lyme disease False positive titer (exposed but no disease)	Titer positive and Western Blot positive
Synnovial Cell Count	Septic arthritis Transient synovitis JIA	Turbid fluid; WBC >50,000 to over 100K, PMNS >75% Clear yellow synovial fluid; WBC 5, 000-15K, PMNs <25% 25,000-100,000K
Blood Cx	Infection	+/- positive
Joint/Bone Cx	Infection	+/- positive
Stool Cx	Reactive arthritis with diarrhea	*Salmonella,Shigella, Yersinia, Campylocbacter*
Urine Cx	Reactive arthritis	*Neisseria gonorrhoeae* or *Chlamydia*
Serum ferritin	Restless Leg Syndrome	Meet NIH RLS criteria Serum Ferritin < 50mcg

Adapted from Junnila & Cartwright, 2006a; Junnila & Cartwright, 2006b; Sawyer, J.R. & Kapoor, M. 2009, p. 220

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Initial Interventions from Orthopedic Providers

Diagnosis	History, Physical and Test findings	Treatment and Referral
Accessory navicular	Medial foot pain + x-ray findings	• conservative treatment with Non-steroidal anti-inflammatory drugs (NSAIDS) • activity modification • possible immobilization or orthosis • referral to CHW Orthopedics or Sports Medicine with no improvement
Apophysitis/ **musculoskeletal conditions:** **-Osgood- Schlatter** **-Patella femoral pain** **-Sindig-Larsen-Johanssen Syndrome** **-Severs**	Tender to palpation over apophysis +/- x-ray findings	• NSAIDS or Naproxen twice a day • may consider short one to two week immobilization or bracing • physical therapy (PT) 1-2 times per week for 6-8 weeks to include range of motion of affected joint(s), strengthening of lower extremities including hamstring/quadriceps/gluteus/calf muscles, with a return to sports program Local options: CHW main campus and CHW Green Sports Medicine Physical Therapy • follow up in 6 weeks, consider referral to CHW Sports Medicine with no improvement of symptoms
Cerebral palsy	Neurology deficits with motor impairment Hypertonia Non painful limp	• Referral to CHW Multi Disciplinary Cerebral Palsy Clinic or CHW Physical Medicine and Rehabilitation
Complex regional pain syndrome	Pain after an injury, lower limb most common; pain to light touch that is disproportionate to mechanism of injury; evaluate for autonomic symptoms (skin temp different; color changes, absence of sweating)	• NSAIDS or Naproxen twice a day • begin PT for desensitization • discontinuation of any bracing • refer to CHW Pain & Palliative Care

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Developmental dysplasia of hip	Check history for female, first born, breech, and family history. + Ortalani and Barlow, asymmetric thigh fold, + galeazzi, + klisic	• refer to CHW Pediatric Orthopedics with positive exam findings or imaging studies (ultrasound or x-ray)
Discitis	Back pain, +/-fever, decreased spinal motion, often systemic symptoms and systemically ill	• Referral to CHW emergency room • treat with IV antibiotic therapy with inpatient admission. • involvement of CHW orthopedics • consider LSO immobilization for pain control
Foreign Body	Possible history of foreign body, red, swollen, +/- x-ray findings	• remove of foreign body • antibiotic prophylaxis as needed • if surgical excision required referral to CHW general surgery or orthopedics if bone involvement
Fracture	Swelling/pain with motion/palpation: + x-ray findings: If tender over physis assume fracture	• splint and refer to CHW orthopaedics if non-displaced and closed fracture • urgent care or emergency department if open fracture, displacement, or angulation present
Gonococcal/ Chlamydial arthritis	+ Sexual activity; arthritis of one or more joints; sometimes accompanying dermatitis and systemic signs and symptoms; +/- positive nucleic acid amplification (NAAT) tests of synovial fluid, urine, vagina/cervix	• involvement of local subspecialists as needed , (i.e. infectious disease and/or rheumatology), orthopaedics if septic joint • I&D and antibiotic treatment if septic joint • antibiotic treatment if aseptic joint and chlamydia likely plus pain management
Growing Pains	Late evening or night time lower extremity pains, usually bilateral, resolve with pain reliever/massage, not typically during day. X-rays negative/Labs negative	• conservative management using symptomatic NSAIDS, massage, warmth, and other supportive measures until the syndrome resolves with time • may try a course of PT with muscle stretching and exercise • Restless Leg Syndrome may present as growing pains. Consider referral to CHW

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Juvenile inflammatory arthritis	Morning pain, often multiple joint involvement, chronic, younger than sixteen, +/-CBC, ESR, ANA, AntiDNAse B, ASO	• symptomatic relief can be obtained with NSAIDS • referral to a CHW Pediatric Rheumatology
Kohler's disease	Pain/swelling mid foot, limp, + x-ray findings navicular bone	• restrict weight bearing and splint (ie prowalker • consider refer to CHW orthopedics
Legg-Calve-Perthes disease	White males 4-10yo, hip and groin pain, decreased internal hip rotation, x-ray findings: flattening and fragmentation of femoral head	• restrict activities and refer to CHW Orthopedics
Limb length discrepancy	+/-limp, not painful, + galeazzi, + AP leg length films	• refer to CHW Orthopedics
Lyme Arthritis	Exposure to endemic area, +/-target rash, swelling/pain joints, +Lyme titer with +western blot,	• refer to cdc.gov for most recent treatment guidelines OR • refer to *Red Book: Report of the Committee on Infectious Disease* (most recent edition) • involvement of local subspecialists as needed (i.e. infectious disease and/or rheumatology)
Neoplasm	Progressive or intermittent, deep seated, gnawing pain, often worse at night, +/- constitutional symptoms, +/- elevated labs, +/- x-ray findings	• expedited referral to CHW/Froedert pediatric musculoskeletal tumor specialist or pediatric oncologist

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Non accidental Trauma	Injury doesn't match story, child non-ambulatory with high suspicion fractures, + x-ray findings of affected area	• treat injuries and begin further workup to evaluate for non accidental trauma based upon CHW facility guidelines • admit to hospital for safety of patient and further work up
Osteochondritis dissecans	Pain +/- swelling affected joint, increase with activity, +/- catch/locking, + x-ray findings or older child/teen	• treat initially with activity restrictions, immobilization, and non weight bearing to affected limb • NSAIDS • refer to CHW Sports Medicine
Osteomyelitis	Local tenderness/swelling bone, limp,+/- fever, elevated CBC, ESR, and CRP	• refer to emergency room • emergent
Restless Leg Syndrome	Sleep disturbance, normal physical exam, no systemic symptoms, meet NIH RLS guidelines criteria	• Referral to pediatric sleep center
Rickets	No supplemental vitamin d, darker skin, genu varum and x-rays findings: widening/cupping of the metaphysis; abnormal labs	• treatment of rickets by primary care provider with involvement of CHW endocrine team as needed • refer to CHW Orthopedics for treatment of genu varum
Scoliosis	Thoracic/lumbar prominence on Adams forward bend test/ asymmetric shoulders/pelvis; Rarely painful; x-ray PA/lateral scoliosis shows scoliosis	• refer to CHW Orthopedics-scoliosis/spine conditions clinic

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Septic joint	Pain with joint motion, redness, swelling, warmth, restricted joint motion, non-weight bearing or limp, fever, elevated CBC, CRP, ESR +/-blood cultures	• emergent • ultrasound hip joints to evaluate for septic hip • refer CHW Emergency room septic joint work up protocol
Slipped Capital femoral epiphysis	Often seen 10-14yo teens, M>F, overweight, groin/knee pain, pain internal hip rotation, limp, + AP/frog lateral Pelvis x-ray	• emergent • strict non-weight bearing • refer to emergency room for surgical stabilization
Spondylolysis / Spondylolisthesis	Pain with back extension, AP/Lat/Oblique lumbar sacral spine films +/- findings	• refer to CHW Orthopedics-scoliosis/spine conditions clinic • NSAIDS as needed for pain • consider activity limitations until seen by subspecialty providers
Strain/sprain	Tender to palpation over soft tissue, +/- laxity, swelling, no significant pain with weight bearing	• NSAIDS • range of motion brace • begin ambulation as tolerated • refer to physical therapy if needed • refer to CHW Orthopedics with recurrent sprains
Tarsal coalition	Pain in foot with activity, often flat foot and restricted subtalar foot motion, +/- x-ray findings	• refer to CHW Orthopedics
Toxic synovitis	Mild pain with hip motion, ambulatory, afebrile, normal CBC, CRP, ESR Labs needs to be evaluated	If ambulatory, afebrile, no constitutional symptoms, normal CBC, ESR, CRP, provider comfortable • NSAIDS • follow up in 2 to 3 days • ambulation as tolerated • limit sports If any of following symptoms refer to CHW Emergency for septic joint work up protocol • Nonweightbearing • Febrile or constitutional symptoms • Moderate-severe pain • Elevated WBC, CRP or ESR

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